CRIMINAL LIABILITY OF ARTIFICIAL INTELLIGENCE (AI): THE LEGAL CONCEPTUAL STUDY AND THE REGULATING CHALLENGES IN GLOBAL DISRUPTIVE TECHNOLOGY ERA

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Abstract *– This research aims to understand the legal concept of AI criminal liability and the global challenges in disruptive AI era. The emergence of a machine with artificial intelligence (AI) has in fact caused a disruptive and harm effect, which is raise question about can AI be held liable in criminal law for its criminal act?*
The research used doctrinal-comparative legal research, which desk study research and qualitative method. The research found the possible models of AI criminal liability, namely: the perpetration-by-another, the natural-probable-consequence, the direct liability model, and corporate. Yet, the government in all-round the world faced similar challenges in conceptualize AI criminal liability. They focus on finding the liability of the human actor behind AI. However, criminal liability is applied as ultimum remedium.
Keywords*: Criminal Liability; Artificial Intelligence*

INTRODUCTION

Technology that has progressed rapidly in recent decades has led to new discoveries that affect human life. One of the discoveries that changed the face of the world was Artificial Intelligence (AI).[1] Paulus Cerka *et all* argued that the emergence of a machine with artificial intelligence has in fact caused a disruptive effect on society.[2] Cerka has analysed that the disruptive effect on society has already happened far in the previous year. In 1981, a 37- year-old Japanese employee of a motorcycle factory was killed by an artificial-intelligence robot working near him.[3] In 2002, the Magna Science Centre ran a project called "Living Robots." During the experiment, a robot Gaak forced its way through the "prison" wall, found an exit and made an accident by hiting a car.[4] In 2018, self-driving Uber killed Arizona woman in first fatal crash involving pedestrian.
It can be seen that only AI with special features called autonomous capability can commit criminal act and caused harm. Those AI are able to rationally solve complex problems or take appropriate actions autonomously to achieve its goals in different circumstances. Related to that AI is complex issue, so that the definition refers to the AI taxonomy that is already provided the popular AI textbook written by Stuart Russell and Peter Norvig[5], AI can be categorised as: (1) systems that think like humans, (2) systems that act like humans, (3) systems that think rationally, and (4) systems that act rationally.
From above explanation and examples of AI crimes, numerous complex AIs have also been involved in accidents, which the contributions from the AIs themselves are questionable. For example, the emergence of a smart car – a car with complex AI technology – that can drive without human control. The consequences that arise from the act of smart car are no longer based on human factor, but from the actions of the smart car itself. Hence, when the smart car crashed or injured a person who was crossing the road, could the smart car be held liable in criminal law?

[1] See James Manyika, et. all., 2013, "Disruptive technologies: Advances that will transform life, business, and the global economy", McKinsey Global Institute, McKinsey & Company
[2] Paulius Cerka, Jurgita Grigiene, Gintare Sirbikyte, 2017'*is it possible to grant legal personality to artificial intelligence software systems?'*, Computer Law & Security Review: The International Journal of Technology Law and Practice, page 337
[3] Yueh-Hsuan Weng, Chien-Hsun Chen & Chuen-Tsai Sun, 2009, 'Toward the Human-Robot Co-Existence Society: On Safety Intelligence for Next Generation Robots', 1 INT. J. Soc. ROBOT, page 267-273
[4] *Ibid.*
[5] Stuart Russell and Peter Norvig, 2009, "Artificial Intelligence: A Modern Approach (3rd Edition)", Essex, England: Pearson.

Criminal law aims to prevent the occurrence of harm, embedded in communicating the wrongfulness and moral blame of the conduct that the crimes proscribe.[6] The moral directions that criminal law gives us humans somewhat require the potential offender to be morally attributable and to be deterred by the threat of penal sanctions.[7] The race towards creating a complex AI or maybe super-intelligent AI being challenges criminal law, as human control is one of the essential keys when holding a person liable for a crime.[8] When AI acts autonomously and the human only have limited control over the AI, will raised a problematic issue in examining the guilty act of the crime. The characteristics of AI will collide with the requirements for establishing liability, obviously.

The fact that the more people use AI in society, the greater the likelihood of various violations of law. Accordingly, AI development and its ever-growing practical use require changes in legal regulation, such as the need to restructure the legal system. Richard C. Sherman[9] argued that if Artificial Intelligence turns out as planned, i.e. a thinking human-like robot with feelings and emotions, then the laws would need to be altered to encompass the roles of robots in society. Due to the absence of guidance concerning liability of AI behavior from legislation and cases, criminal law and its principles will be the utmost constraint limiting how far we can stretch human responsibility over the AI. It means that lawmakers must review the existing legal framework and adapt it to the changing needs of society.

Many countries are already preparing their legal instruments related to the legal status of Artificial Intelligence. In the Europe, in 2012, the European Commission initiated a RoboLaw Project with the main objective of investigating the ways in which emerging technologies in the field of bio-robotics (including AI) bear on the national and European legal systems, challenging traditional legal categories and qualifications, posing risks to fundamental rights and freedoms that have to be considered, and more generally demanding a regulatory ground on which they can be developed and eventually launched.[10] In 2009, Yueh-Hsuan Weng from Peking University wrote that the governments of Japan and South Korea were preparing a legal order or regulation that made their citizens be able to live in harmony with the coexistence of smart robots.[11] The Japanese Ministry of Economy, Trade and Industry has published a series of "robot guides", which discuss business and safety issues for next generation robots.[12]

Several research regarding AI is also mentioned as resources of author's research, namely: **First**, the research conducted by Cerka, Grigiene, and Sirbikyte[13] entitled "Is it possible to grant legal personality to AI software systems?" This study only aims to determine the possibility of AI being considered a legal subject. **Second,** the research conducted by Peter Stone and others[14] entitled 'Artificial Intelligence and Life in 2030' *One Hundred Year Study on Artificial Intelligence*. His research also seems to focus on civil liability such as product and tort liability, although the problems that AI gives rise to are even worse in criminal law. **Third,** the research conducted by Matthew U. Scherer[15] entitled 'Regulating Artificial Intelligence Systems: Risks, Challenges, Competencies, and Strategies.' This research merely only discusses how to regulate AI within the legal framework.

From that explanation above, it can be concluded that the author research is different, because this research aims to understand the AI position in the existing legal rules, the implications might arise if AI is recognized as a new legal subject that can be ascribed criminal liability, and the challenges that will be faced when recognise AI. In addition, this research aims to examine several solutions

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[6] A P Simester and Andreas von Hirsch, 2014, 'Crimes, Harms, and Wrongs: On the Principles of Criminalization, Hart Publishing 2014, page 12.

[7] *Ibid*. page 18.

[8] George P Fletcher, 1998, 'Basic Concepts of Criminal Law', Oxford University Press, UK, page 44.

[9] Richard C. Sherman, 1998, 'The Surge of Artificial Intelligence: Time to Re-examine Ourselves. Implications: Why Create Artificial Intelligence?, http://www.units.muohio.edu/psybersite/cyberspace/aisurge/implications.shtml accessed 25 February 2019

[10] Paulius Cerka, Jurgita Grigiene, Gintare Sirbikyte, 2017, *Op. Cit*

[11] Yueh-Hsuan Weng, *et al*, 2009, 'Toward the Human-Robot Co-Existence Society: On Safety Intelligent for Next Generation Robots', Springer Science International Journal Social Robot, vol I, page. 267-282.

[12] *Ibid*.

[13] Cerka, Paulius, et.all., 2017, 'is it possible to grant legal personality to artificial intelligence software systems?', Computer Law & Security Review, The International Journal of Technology Law and Practice, Elsevier, UK

[14] Peter Stone, 2016, 'Artificial Intelligence and Life in 2030' *One Hundred Year Study on Artificial Intelligence One Hundred Year Study on Artificial Intelligence: Report of the 2015-2016 Study Panel*, Research Report, Stanford University.

[15] Matthew U. Scherer, 2016, 'Regulating Artificial Intelligence Systems: Risks, Challenges, Competencies, and Strategies', The Harvard Journal of Law and Technology, UK

that possibly can meet the future of AI technology and solve the liability problem. Hence, this research is important to respond the development of new technology in the world and to know the progress that has been made by other countries in welcoming the era of artificial intelligence.

1. The Development of AI Legal Concept in the Global Disruption Technology Era

The Current State of AI

AI are able to rationally solve complex problems or take appropriate actions autonomously to achieve its goals in different circumstances. Related to that AI is complex issue, so that the definition refers to the AI taxonomy that is already provided the popular AI textbook written by Stuart Russell and Peter Norvig[16], AI can be categorised as: (1) systems that think like humans, (2) systems that act like humans, (3) systems that think rationally, and (4) systems that act rationally.

To exercise the provided taxonomy, we should analyse from the existing AI that tends to be categorised as complex AI. The relevant example is Autonomous Car. AI brings a new paradigm in the automotive world. Manufacturers of the world's vehicles face a revolutionary moment as vehicles.[17] The deep learning as the most significant technology behind autonomous-driving AI. Deep learning, which mimics neuron activity, supports functions like voice and speech recognition, voice search, image recognition and processing, motion detection, and data analysis.[18] With a new development of AI, it helps vehicles recognise pedestrian traffic, other vehicles on the road, and traffic signals, and adhere to mapped-out routes.

In view of the above taxonomy and examples, it is clear that AI is not only capable of intelligence computerized system or intelligence computerized algorithms, but also have human intelligent behaviour. It can be seen that the development of AI is aimed at making it self-training (the ability to accumulate personal experience) or machine learning. This unique feature enables AI to act differently in the same situations, depending on the actions previously performed. Hence, we can conclude that today AI is an advanced AI which can runs autonomously with thinking, learning, and making independence decision based on their human intelligent behaviour.

The next question that emerged regarding the development of AI is about where the current state of AI in recent year is. To answer this question, we should look into the AI level category provided by Mikhail Batin and Alexey Turchin[19], namely: Narrow AI, Artificial General Intelligence (AGI), and superintelligence. The most existing and the most used complex AI today are considered as Narrow AI. Narrow AI (weak AI) is the level of a computer program that achieves above-human performance in a specific, narrow task[20]. Hence, the current state AI is on Narrow AI level, which it is the focus of this paper.

Legal Concept of Developed AI

The fact that Narrow AI can cause damage to persons. This issue was extensively analysed by Stephen M. Omohundro,[21] who stated that even AI with the ability to play chess may be dangerous, if not properly designed.[22] Most of the AIs were created with a good intention, yet some of them went rogue by committing criminal act or threatening human or causing damages. One could highlight some key features of disruptive AI namely: autonomy, unpredictability, and unaccountability.

The basic question of criminal law is the question of criminal liability; i.e., whether the specific entity (human or corporation) bears criminal liability for a specific offense committed at a specific point in time and space. In order to impose criminal liability upon a person, two main elements must exist. The first is the external or factual element; i.e., criminal conduct (*actus reus*), while the other

[16] Stuart Russell and Peter Norvig, 2009, "Artificial Intelligence: A Modern Approach (3rd Edition)", Essex, England: Pearson.

[17] D.A. Boehm-Davis, A. Marcus, et al, "The next revolution: vehicle user-interfaces and the global rider/driver experience", The ACM CHI Conference on Human Factors in Computing Systems, 2003, Pages 708-709.

[18] MIT Technology Review Insights, "Self-driving cars take the wheel", MIT Technology Review, https://www.technologyreview.com/s/612754/self-driving-cars-take-the-wheel/, accessed on 1 June 2019

[19] Mikhail Batin and Alexey Turchin, 2017, 'Artificial Intelligence in Life Extension: from Deep Learning to Superintelligence,' Journal Informatica 41, page 401-417.

[20] N. Bostrom. 2014. Superintelligence. Oxford University Press, Oxford.

[21] Stephen M. Omohundro, 'The Basic AI Drives. - Self-Aware Systems.' (2008) Proceedings of the 2008 conference on Artificial General Intelligence. Amsterdam: IOS Press 483-492.

[22] *Ibid*.

is the internal or mental element; i.e., knowledge or general intent vis-à-vis the conduct element (*mens rea*). If one of them is missing, no criminal liability can be imposed. The *actus reus* requirement is expressed mainly by acts or omissions.[23]

Following are important finding and analysis of proposed models for AI criminal liability:

1) Perpetrator-via-another Liability Model

This first model does not consider the AI entity possessing any human attributes. The AI entity is considered an innocent agent. There are two candidates who might be considered the perpetrator-via-another: the first is the programmer of the AI software and the second is the user or operator. From the author perspective, this first model includes cases in which an AI 'commits' a crime because it was deliberately programmed to do so. The fictive example is the 'autonomous killer machine'— it is likely the developed version of autonomous cars. The programmer designed it more sophisticatedly, yet it can analyse target with face recognition ability, learn the behaviour of the target, and calculate the best way to eliminate the target. In other ways it can kill someone in the street without being discovered and make it as if it were just an accident.

Based on the example mentioned above, the AI in this case is a simple tool to perpetrate the offense, the actual offense was committed by the human behind AI. The perpetrator deliberately programmes and instructs the AI how to behave from the beginning, whilst he does nothing more. The programmer or the user do not perform any action conforming to the definition of a specific offense, therefore, they do not meet the actus reus requirement of the specific offense. The legal result of applying this model is that the programmer and the user are fully criminally liable for the specific offense committed, while the AI entity has no criminal liability whatsoever.

Accordingly, Perpetrator-via-another liability model is the embodiment from the doctrine of vicarious liability. Vicarious liability simply means indirect, and this generally indicates that this sort of liability is in contrast to personal liability, whereby a person is liable for his own misbehaviour with strict liability, then it will exclude the doctrine of personal liability in criminal law based on adagium "nemo punitur pro alineo delicto" (no one has been convicted for the actions of others).[24]

The question that raised is about "what if the AI spontaneously causes harm? Is it possible for the defendant to be still liable for ex post illegal behaviour from AIs?" In the example of "autonomous killer machine", we understand that the perpetrator intended to program the AI to kill someone quietly. In case example, when the AI attacks a man, unfortunately his daughter sees the accident. Then, AI deliberately also attacks his daughter and kills both of them. In this example, AI kills another person without any intention from the perpetrator. In this example, what AI can be categorized as acting dolus subsequence. [25] There is a risk for dolus subsequens, i.e. the intention appears after the crime, as it is impossible to withdraw or avoid harm that has already occurred. The AI actually can avoid harm for the daughter if the AI attack is as it is planned. Then, the AI decision in attacking the daughter is purely based on the ability from AI to do self-learning. AI decides to commit an offense based on its own accumulated experience or knowledge. Even though such cases are not common at the moment, they will certainly be more common in the case in The Natural-Probable-Consequence Liability Model

2) The Natural-Probable-Consequence Liability Model

The second model of criminal liability assumes deep involvement of the programmers or users/operators in the AI entity's daily activities, but without any intention of committing any offense via the AI entity. This model is based upon the ability of the programmers or users to foresee the potential commission of offenses. However, the legal results of applying the natural-probable-consequence liability model to the programmer or user differ in two different types of scenario.

The first type of scenario is when the programmers or users are negligent while programming or using the AI entity but have no criminal intent to commit any offense. The first type scenario includes cases in which an AI 'commits' a crime because of faulty of programming. Example is "failed to recognize child in the street". In this case, the negligence of programmer or manufacturers/corporation fails in making categorization of threat in the street. The programmer sets the system and makes the cars be able to recognize a robber. The cars will run with full speed without care of the robber safety if

[23] Walter Harrison Hitchler, The Physical Element of Crime, in Gabriel Hallevy, 2010, *Op. Cit.*, pages 10-31
[24] Eddy O.S. Hiariej, 2016, Prinsip-prinsip Hukum Pidana, Cahaya Atma Pustaka, Yogyakarta. Pages 194 - 206
[25] A P Simester and Andreas von Hirsch, *Op.Cit.* pages 216

the robber is found out by the car bringing a weapon. In fact, the cars fails to recognize a child with a pistol toys in the street. The cars recognizes the child as a threat and hits the child with full speed. In addition, the first scenario also includes cases in which an AI 'commits' a crime, which AI makes a decision in a case representing a classical moral dilemma or in which the programmer has already made a decision and there is a concrete instance in which a damage occurs because of that decision. An example is a case in which the autonomous car with an emergency patient hits pedestrian because it deliberately turns of its speed limiter. The car does that because its own consideration, it assumes that if following the speed limiter, it cannot arrive on time so that it can cause the patient to die.

For further analysis, it will be easier to analyse from the examples. In this model, when the programmers or operators/users or even manufacturers/corporations are negligent while programming or using the AI entity but have no criminal intent to commit any offense. In this type of case, the perpetrator behaviour can be categorized as unconscious culpability, namely negligentia.[26] The perpetrator has no idea that the consequences of his actions is prohibited. In this case, the perpetrator does not have any thoughts at all about the possible consequences that will arise. The relevant case example for this type is "failed to recognize child in the street" case.

In addition, it is also can be categorized as realized culpability, namely luxuries.[27] The example scenario is "desert autonomous car incident". The super autonomous cars are tested and trained to function in even the most extreme kinds of weather. Thus, the cars can handle all situation in all condition area. When the cars are used in the deserts area, there is a risk the sensors of the cars will be affected by all the dust and sand. Thus, someday, the cars are risk misjudging their environment, with accidents as a result. In this scenario, the programmers or manufacturers/corporations believe that the cars can manage any situation, yet in fact the cars still cannot avoid accident.

However, to make the manufacturers/corporations liable for the accident is not easy. There is some standard that should be fulfilled. In addition, it also needs to prove that there is causation between the manufacturers/corporations behaviour in any circumstance and legal consequences. In such cases, the standard is that the defendant should behave in a way that causes a duty to act to avoid harm, yet fails to act. There are two duties to act that should fulfilled, namely A duty to act assumes that the defendant has a particular responsibility over a risk and a duty to act because of special relationship to the harm. Then, the causation here is to prove that a consequence is the result of the defendant's behaviour, i.e. the behaviour must cause the harm. Hence, the failure to apply those duties to act and the causation condition is fulfilled, the manufacturers/corporations should be liable.

Accordingly, there is lack of mens rea in this model. Hence, Natural-Probable-Consequence Liability Model, especially in first type of case, is the embodiment from the doctrine of strict liability. Strict liability is liability without wrongdoing, those offences requiring no mens rea at all as imposing absolute liability and those requiring no mens rea as to an element of the actus reus as imposing strict liability.[28] Liability is "strict" because the prosecution is relieved of the necessity of proving mens rea in relation to one or more of the elements of actus reus, action that causes harm is all that is required. [29]

In the Natural-Probable-Consequence Liability Model it is also possible to apply the second scenario, namely when the programmers or users programmed or used the AI entity knowingly and will-fully in order to commit one offense via the AI entity, but the AI entity deviates from the plan and commit some other offense, in addition to or instead of the planned offense. For example, is "Robber Killer Robot", in this case a programmer programs an AI entity to commit a violent robbery in a bank, but the programmer does not program the AI entity to kill anyone. During the execution of the violent robbery, the AI entity kills one of the people present at the bank who resists the robbery.

In such cases, the criminal culpability alone is insufficient for the killing. The danger posed by such a situation far exceeds culpability in this scenario, the AI behaviour is categorized as dolus "intentionality as certainty" (opzet bij noodzakelijkheids of zekerheidsbewustzijn)[30], "intentionality

[26] Jan remelink, in Edy O.S. Hiariej, *Op. Cit*. pages 191
[27] *Ibid*.
[28] John C.P. Goldberg and Benjamin C. Zipursky, 2016, The Strict Liability in Fault and the Fault in Strict Liability, 85 Fordham L. Rev. 743, pages 744-746
[29] Clarkson and Keating, *Loc. Cit*.
[30] Jan remelink, in Edy O.S. Hiariej, *Op. Cit*. pages 192

as certainty" is dolus that causes two consequences. The first result is desired by the perpetrator, while the second result is unwanted but eventually occurs. Regarding the liability doctrine that could be applied is likely the same as Perpetrator-via-another Liability Model, namely vicarious liability.

3) Direct Liability Model

The third model does not assume any dependence of the AI entity on a specific programmer or user. The third model focuses on the AI entity itself.[31] As discussed above, criminal liability for a specific offense is mainly comprised of the external element (actus reus) and the internal element (mens rea) of that offense.[32] Any person attributed to both elements of the specific offense is held criminally accountable for that specific offense. No other criteria are required in order to impose criminal liability. A person might possess further capabilities, but in order to impose criminal liability, the existence of the external element and the internal element required to impose liability for the specific offense is quite enough. Hence, direct liability model is not different from the relevant criminal liability of a human.

From the author perspective, a sharp consideration should be given for direct liability model. The author agrees that there is opportunity AI can fulfil the scenario condition mentioned before. However, based on the discussion on the development of AI, it is clear that nowadays AI is still in the Narrow AI level. The complicated act from AI that can be considered as a crime only possible minimum held by AI in the AGI Level or even Superintelligence level. Accordingly, due to that legal viewpoint, an artificial intelligence in the Narrow AI level is only artificial entity, yet it is never comparable as human. However, one cannot ignore an AI entity's capabilities, as mentioned above.

Concerning criminal liability, the relevant issue is regarding why we should find a liable person for narrow AI crimes. The answer is because criminal law in general targets only humans and human behaviour. The general basis for criminal liability is usually the act requirement. However, only human acts can be a ground for imposing a punishment.[33] Hence, there must be a human to whom the AI's crime can be attributed, as it is generally considered that only humans can commit a criminal act.[34]

Another relevant comment for liability in discussions of autonomous robots, is provided by judge Curtis Karnow who proposes the concept of an "electronic personality"[35] (see the European Union's discussion of the concept[36]). He notes that corporations, partnerships, and associations have substantive rights, and also have procedural rights to bring suit. Similarly, if autonomous robots were granted rights, perhaps they could be held liable for their actions, opening up several tort theories to evaluate their liability. Rights for robots may happen eventuality, but for now, determining liability for autonomous robots Unauthenticated Liability for autonomous and artificially intelligent robots remains difficult and under some circumstances impossible, thus motivating the need for more debate and legislative action.

4) Corporate Liability

This corporate liability model is excluded from three proposed liability that discussed before. Thus, in this part will discuss about the opportunity to implement corporate liability for AI crimes. From the case example of "Desert Autonomous Car Incident", it can be seen that manufacturers or corporations can commit corporate crime – a corporate crime is any act committed by corporation that is punished by state, regardless of whether it is punished under administrative, civil, or criminal law.[37]

Accordingly, a company is a legal entity or subject of laws. It has a legal personality. It can sue and be sued in its own name and, it can be held criminally liable. Similar to individuals, corporations have

[31] Gabriel Hallevy, 2010, *Op. Cit.*, pages 21
[32] *Ibid.*
[33] George P Fletcher, 1998, "Basic Concepts of Criminal Law", Oxford University Press, pages 44.
[34] *Ibid.*
[35] C. E. A. Karnow, The encrypted self: fleshing out the rights of electronic personalities, The John Marshall Journal of Information Technology & Privacy Law, 1994, pages 13
[36] G. Prodhan, Europe's robots to become 'electronic persons' under draft plan, Science News, 2016, https://www.reuters.com/ article/us-europe-robotics lawmaking-idUSKCN0Z72AY
[37] H. Setiyono, 2005, "Kejahatan Korporasi: Analisis Victimologi dan Pertanggungjawaban Korporasi dalam Hukum Pidana Indonesia, BayuMedia Publishing, Malang, pages 20

an identifiable persona and the capacity to express moral judgments.[38] Moreover, corporations are recognized as passive legal subjects in criminal law; a corporation has a cause of action against an individual who harmed it. It would be at least bizarre to accept that a corporation is a reality when it is harmed the others.[39]

Although manufacturers/corporations can be liable based on Natural-Probable-Consequence Liability Model, but that model only can be applied in certain or specific condition and there is some standard that should be fulfilled. In fact, the liability of manufacturers or corporations in corporate liability is not easy, because there is a complex relation in the organizational crime between board of directors, executive and manager in one side and parent corporation, corporate division, and subsidiaries in other side. This reason is raised because there is a change with the growth and development of the corporate entities in the modern business world, and today it is almost universally conceded that a corporation may be criminally liable for action or omission of its agent on its behalf.[40]

At the doctrinal level, there are several theories and many are adopted as theories used to assess corporate criminal liability, namely: first, the doctrine of strict liability, so corporate responsibility is solely merely based on what law says without regard to who makes mistakes, in strict liability the element of errorless or culpability does not need to be proven.[41] Second, vicarious liability, which is more emphasis on the liability of corporate managers as agents of the corporation's actions. This doctrine is from the superior respondent's doctrine, based on the employment principle and the delegation principle. This doctrine is an exception to the individual liability adopted in criminal law based on adagium "nemo punitur pro alineo delicto" (no one has been convicted for the actions of others).[42] Hence, this doctrine makes the corporation be able to be liable for the errorless or culpability held by the programmer or operator of corporation. Third, direct corporate criminal liability.[43] According to this doctrine, corporations can conduct a number of offenses directly through people who are closely related to the company and people who are seen as the representative of the company itself. Strictly speaking, the errorless or culpability of senior officers are identified as corporate crime.[44]

Regarding the punishment, some ask how any of the legitimate penalties imposed upon humans could be applicable to corporations. The answer is simple and legally applicable. When a punishment can be imposed on a corporation as it is on humans, it is imposed without change.[45] When the court adjudicates a fine, the corporation pays the fine in the same way that a human pays the fine and in the same way that a corporation pays its bills in a civil context.[46] However, when punishment of a corporation cannot be carried out in the same way as with humans, an adjustment is required.

The special sanctions for corporations are the imposition of fines, the seizure of corporate assets, and even liquidation decisions against corporations.[47] Thus, fictional thinking about the nature of legal entities (rechpersoonlijkheid) is not enforced in criminal law.[48] However, if the corporation cannot pay losses whether the property is money (a fine) or other property (forfeiture), the obligation is delegated to the individual. This is based on adagium qui non habet in aere, luat in corpore, ne quis peccetur impune.[49] It means, the corporations that cannot pay losses, the obligation is delegated to their individual, to prevent impunity.[50]

2. The Global Challenges in Conceptualizing Criminal Liability for AI Crimes

[38] According Lawrence Friedman, In Defense of Corporate Criminal Liability (2000) in Anca Iulia Pop, 2006, 'Criminal Liability of Corporations—Comparative Jurisprudence', Michigan State University College of Law

[39] According Streteanu & Chirita in Anca Iulia Pop, 2006, 'Criminal Liability of Corporations—Comparative Jurisprudence', Michigan State University College of Law

[40] Waina R La fave in Edy O.S. Hiariej, *Op. Cit*. pages 203

[41] Edy O.S. Hiariej, *Op. Cit*. pages 206

[42] Eddy O.S. Hiariej, 2016, Prinsip-prinsip Hukum Pidana, Cahaya Atma Pustaka, Yogyakarta. Pages 194 - 206

[43] Amanda Pinto and Martin Evans, 2003, "Corporate Criminal Liability", London Sweet and Maxwell, pages 46

[44] *Ibid*.

[45] Gerard E. Lynch, 1997, "*The Role of Criminal Law in Policing Corporate Misconduct"*, LAW & CONTEMP PROB Vol. 60, pages 23

[46] *Ibid*.

[47] Jan remelink, in Edy O.S. Hiariej, *Op. Cit*. pages 199

[48] D. Schaffmeister, N. Keijzer, E. PH. Sutorius in Edy O.S. Hiariej, *Op. Cit*. pages 199

[49] Edy O.S. Hiariej, *Op. Cit*. pages 199

[50] *Ibid*.

a. Europe

In 2012, the European Commission initiated a RoboLaw Project (full title: Regulating Emerging Robotic Technologies in Europe: Robotics Facing Law and Ethics)[51] with the main objective of investigating the ways in which emerging technologies in the field of bio-robotics (including AI) bear on the national and European legal systems, challenging traditional legal categories and qualifications, posing risks to fundamental rights and freedoms that have to be considered, and more generally demanding a regulatory ground on which they can be developed and eventually launched.
The most important outcome of RoboLaw is a final report containing the "Guidelines on Regulating Robotics," which was presented on 22 September 2014. It is addressed to the European Commission, in order to establish a solid legal framework for the development of robotic technologies in Europe. The guidelines are meant for use by the European Commission in order to respond to the ethical and practical concerns regarding the application of emerging technologies.
Regarding the liability issue, the Guidelines on Regulating Robotics realized that ultimately, robots' autonomy raises the question of their nature in the light of the existing legal categories – of whether they should be regarded as natural persons, legal persons, animals or objects – or whether a new category should be created, with its own specific features and implications as regards the attribution of rights and duties, including liability for damage.[52] Thus, under the current legal framework robots cannot be held liable per se for acts or omissions that cause damage to third parties. Hence, the existing rules on liability cover cases where the cause of the robot's act or omission can be traced back to a specific human agent such as the manufacturer/corporation and/or the user/operator. For those perpetrators could be held strictly liable for acts or omissions of a robot.
In addition, Guidelines on Regulating Robotics considered that, whatever legal solution it applies to robots' liability in cases other than those of damage to property, the future legislative instrument should provide for the application of strict liability as a rule, thus requiring only proof that damage has occurred and the establishment of a causal link between the harmful behaviour of the robot and the damage suffered by the injured party.[53] Here, it can be concluded that Europe prefer to use robots' civil liability.

b. Amerika

As a contribution toward preparing the United States (U.S.) for a future in which Artificial Intelligence (AI) plays a growing role, Executive Office of the President, National Science and Technology Council Committee on Technology held research called "Preparing for The Future of Artificial Intelligence"[54]. This research focused on survey regarding the current state of AI, its existing and potential applications, and the questions that are raised for society and public policy by progress in AI. Yet, also concerned about regulatory challenges associated with new AI-based products on automated vehicles and unmanned aircraft systems (UAS, or "drones").[55] It can be concluded that this research is only initial research aimed to understand what AI is and the potential risk in regulating AI.
The second research is prepared by National Science and Technology Council, Networking and Information Technology Research and Development Subcommittee, namely "The National Artificial Intelligence Research and Development Strategic Plan".[56] The ultimate goal of this research is to produce new AI knowledge and technologies that provide a range of positive benefits to society, while minimizing the negative impacts. This research is limited in discuss regarding AI liability. The AI R&D Strategic Plan also does not set policy on regulation nor does it explore the broader concerns about the liability of AI. In addition, rather than regulating AI liability, the U.S. government instead focused more on regulating artificial intelligence in the sense of National security. U.S. National Défense Strategy, released in January 2018, identified artificial intelligence as one of the key technologies that "ensure [the United States] will be able to fight and win the wars of the future".[57]

c. Asia

[51] Erica Palmerini, 'The interplay between law and technology, or the RoboLaw' In Law and Technology. The Challenge of Regulating Technological Development (Pisa University Press 2012), Pages 7-8.
[52] Committee on Legal Affairs European Parliament 2014-2019, "DRAFT REPORT: with recommendations to the Commission on Civil Law Rules on Robotics (2015/2103(INL)), 31 May 2016, pages 5
[53] *Ibid.* pages 10
[54] Executive Office of the President, National Science and Technology Council Committee on Technology, "Preparing for The Future of Artificial Intelligence", 2016
[55] *Ibid.*
[56] National Science and Technology Council, Networking and Information Technology Research and Development Subcommittee, "The National Artificial Intelligence Research and Development Strategic Plan", 2016
[57] U.S. Government, Department of Défense, *Summary of the 2018 National Défense Strategy*, p.3

China governments in the Asia-Pacific region have been at the forefront of developing and implementing innovative policies and strategies for AI development. In July 2017, China published a comprehensive AI development policy with the overarching goal to make the country "the front-runner and global innovation centre in AI" by 2030.[58] China government embodied the policy regarding AI through Beijing's AI policy called "The Next Generation Artificial Intelligence Development Plan".[59] The plan called for China to lead the way in developing a regulatory environment to both encourage AI development and to mitigate the potential downsides of AI.[60] Accordingly, recent China's AI policy has emphasized on promoting AI technological development and industrial applications and has not given due attention to such issues as ethics and security regulation. Hence, China government still not yet have any specific regulations regarding AI liability. What China have is still in the big plan, yet it has not discussed how to respond to the trend of AI as disruptive technology.

Besides China, Japan government are also known as developed country in Asia that has innovative policies and strategies for AI development. Japan has the most in-depth legal strategy out of the selected economies to confront the increasing presence of robots, called "Japan's New Robot Strategy," published in 2015. This strategy outlined everything from Japan's current status as a robotics superpower to a five-year plan that addressed policies on the global standardization of robotics, the establishment of a "Robot Revolution Initiative," and the implementation of robot regulatory reform, among other areas.[61]

The liability issue instead embedded in Japan's New Robot Strategy was consumer safety in the use of new autonomous or remote-controlled household robots for everyday use, how to collect formation and investigate cause, if and when robots cause serious accidents, what technological standard should before devices be treated as household electric appliances, on the basis of technological development and trend of development for specific products. Regarding liability, this document emphasized in how to determine the range of manufacturers' liability. Hence, the AI liability in Japan is still regulated for producer or manufacturer.

CONCLUSION

Todays, we can define AI as an advanced machine which can run autonomously with think, learn, and make independence decision based on their human intelligent behaviour. The most existing and the most used AI todays are considered as Narrow AI. Most of the AI were created with a good intention, yet some of them went rogue by committing criminal act or threatening human or causing damages. Regarding criminal liability, Hallevy proposed the imposition of criminal liability on AI entities using three possible models of liability, namely The Perpetration-by-Another liability model; the Natural-Probable-Consequence liability model; and the Direct liability model. What Hallevy proposed is still in the matter of individual liability, yet there is lack of discussion regarding corporate liability. Thus, it is also important to consider corporate liability as the possible liability model.

The Perpetration-by-Another liability does not consider the AI entity as possessing any human attributes. The AI entity is considered an innocent agent. In this version, the programmer and operator or user are the most relevant to be liable for the AI crime. The Natural-Probable-Consequence liability model assumes deep involvement of the programmers or users/operators in the AI entity's daily activities, but without any intention of committing any offense via the AI entity. In this model, the programmer and the corporate are the most relevant to be liable for the AI crime. Direct liability model does not assume any dependence of the AI entity on a specific programmer or user. This model is not different from the relevant criminal liability of a human. Lastly, corporate liability opens the possibility to manufacturers/ corporation can be liable for action or omission of its agent on its behalf.

From the four proposed liability, it can be seen that the most applicable liability model is The Natural-Probable-Consequence model. As consequence of Narrow AI only has medium autonomous level, so if AI involve as physical perpetrator of the specific crime, but that very offense was not planned to be perpetrated, then AI is not merely legally accountable for its conduct. Then, we need to trace the

[58] Shamshad Akhtar, "Artificial Intelligence in Asia and the Pacific", United Nations Economic and Social Commission for Asia and Pacific (ESCAP), 2018

[59] Dr. Kai-Fu Lee, Sinovation Ventures, and Paul Triolo, "China embraces AI: A Close Look and A Long View", Eurasia Group, 2017

[60] *Ibid.* pages 9

[61] The Headquarters for Japan's Economic Revitalization, "New Robot Strategy", 2015, pages 6-7

criminal behaviour back to a human behind the AI. Hence, it is suggested that the programmer and operator or user are the closest liable actor for AI crime.

The government in all-round the world faced similar challenges in conceptualizing criminal liability for AI crimes. They decided to focus on making legal policy regarding AI which can monitor the safety and fairness of AI, and adapt regulatory frameworks to encourage innovation while protecting the public. Regarding liability, as AI is organized to directly affect the world, even physically, liability for harms caused by AI will increase in salience. The focus will be to find the liability of the human actor even when liability is better located on AI itself for reasons of the feasibility of AI personhood. Liability would then fall by default on the person behind AI, namely producers or manufacturers, programmer or supervisor, and user or operator. However, if civil law expects harms to be foreseeable, criminal law goes further to expect that harms are intended. Hence, criminal liability is applied as *ultimum remedium*, means it should be the last effort in law enforcement.

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