



# *An Ideal Regulatory Framework for Robotic Surgery Utilization In Indonesia*

**Suryo Wahyu Raharjo**

Doctoral Program in Law, Universitas Sebelas Maret  
Jalan Ir. Sutami 36 Kentingan, Jebres, Surakarta, Jawa Tengah. Indonesia 57126  
[suryowahyuraharjo@student.uns.ac.id](mailto:suryowahyuraharjo@student.uns.ac.id)

**Pujiyono Suwadi**

Doctoral Program in Law, Universitas Sebelas Maret  
Jalan Ir. Sutami 36 Kentingan, Jebres, Surakarta, Jawa Tengah. Indonesia 57126  
[pujifhuns@staff.uns.ac.id](mailto:pujifhuns@staff.uns.ac.id)

**Widodo Tresno Novianto**

Doctoral Program in Law, Universitas Sebelas Maret  
Jalan Ir. Sutami 36 Kentingan, Jebres, Surakarta, Jawa Tengah. Indonesia 57126  
[fh.uns@uns.ac.id](mailto:fh.uns@uns.ac.id)

**Abstract-** Artificial Intelligence (AI) is one of the innovations of the Industrial Revolution 4.0, which emerged from the convergence of information technology and the industrial world. Artificial intelligence (AI) in healthcare settings, such as robotic surgery, raises the standard and efficacy of patient care. The application of robotic surgery raises legal concerns about potential legal ramifications for the integration of robotic surgery into clinical practice. Furthermore, when robotic surgery is applied in a medical setting, concerns about legal liability are brought up. Furthermore, there are still very few legal regulations in Indonesia governing this subject. To analyze this research normatively, a comparative approach and a statutory approach will be employed. The goal of this prescriptive research is to use a deductive syllogism to provide an analytical knife. The findings of this study are: First off, if the Artificial Intelligence (AI) system developed by a third party contains flaws, using robotic surgery in clinical settings could lead to issues. Virus-infected systems, infrequently updated systems, and physicians lacking the necessary skills to perform robotic surgery are a few examples of these risks. Secondly, it is imperative to establish a specialized committee comprising legal specialists, medical professionals, and government representatives, whose job it is to examine mistakes made during the execution robotic surgery procedures.

**Keywords-** Robotic Surgery, Artificial Intelligence, Health Law

## I. INTRODUCTION

The field of medicine is among the many areas in which artificial intelligence (AI), in line with increasing technological and individual intelligence. It is thought that clinical procedures can experience effects through intelligent artificial intelligence (AI) in the medical sector.[1] This (AI) is a form of consistent technological change in medical coverage in the medical sector. then (AI) is the convergence of computer systems with intelligence comparable to human intellect.[2] This system's artificial intelligence (AI) can explore and analyze and also use and observe personal data. technology that can collaborate people's thought processes and actions to handle a known role (AI).

Type two AI is used to heal both physical and virtual. in virtual scope is neurotechnology as well as medical data used to make treatment decisions. The mechanical kind has to do with operation-assisting robots.[3] The use of this kind of robotics then presents potential issues, specifically legal ones pertaining to the potential legal ramifications of introducing robotic surgery into the medical field, specifically with regard to legal liability. Furthermore, there are still very few legal restrictions in Indonesia that govern this issue.

In the health sector, especially in the surgical sector, robotic surgery has been used since 50 years ago, to be precise around 1980. At that time it started with surgery to replace hip prosthetics. Then technology developed in urology for prostate surgery, neurosurgery for stereotatics, and otolaryngology. Initially, robotic technology was developed during war. On the battlefield, medical personnel play a very important role in treating and providing life support to injured troops. The primary medical purpose is primarily the stabilization and evacuation of injured victims.

The cause of death during combat is due to hemorrhagic shock and multiple trauma which is often associated with difficulties in transferring patients on the battlefield. Apart from that, patients often experience hidden injuries

and secondary injuries. War conditions make time very valuable, there is the term "Golden Hour" where the focus of the medical team's treatment is focused on controlling bleeding and reducing contamination by carrying out damage control surgery. Humans are starting to think about using technology to support war and reduce the deaths of military members or civilians.

Through continuous evaluation, AI technology is increasingly advanced and is starting to be developed in a non-military direction. Surgeries which initially all used wide wound incisions (open surgery) are slowly being replaced by minimally invasive ones with laparoscopic tools. After that, it developed into robotic surgery technology which already uses AI technology. Basically, robotic surgery is made to make it easier for surgical operators, reduce the risk of surgery, minimize patient injuries and pain, and shorten hospital stays. The long-term goal is the use of telesurgery technology, where the operator and patient can be separated by quite a distance. In 2001, for the first time, telesurgery was applied for gallbladder removal surgery with the patient being in Strasbourg, France, while the operator doctor was in New York, United States.

Indonesia is an archipelagic country separated by distance and infrastructure that is very different between regions. With the development of telesurgery, it can be a solution to health problems in Indonesia's geographical conditions. Patients who experience an emergency can immediately receive surgical assistance even though they are separated by distance and time. The government must immediately prioritize the distribution of infrastructure, especially medical equipment, in every district/municipality hospital. Apart from that, the legal umbrella for immediate application of technology is also one of the problems that the government must immediately resolve to support patient safety.

## II. METHODS

Normative juridical legal research is the research methodology used in this type of thesis; that is, The main discussion is checked through policies related to the judicial termination of existing legal elements. Policy files and related MA decisions, through secondary, in the form of dictionaries, books and journals are used carefully. There is also use of standard legal documentation.

## III. RESULTS AND DISCUSSION

AI in the healthcare industry can support a range of tasks associated with the medical field. It is believed that the use of AI can expedite and streamline the processes involved in evaluating vast volumes of patient data in a cost-effective and efficient manner. AI applications are very helpful for many different kinds of medical needs, including prognosis analysis, diagnosis analysis, using medical images, and supporting surgical procedures like robotic arm surgical camera. using rattan through Auris Health, Accuray Cyberknife System and Vicarious Surgical, are one example.[4]

Naturally, artificial intelligence (AI), being a human-created tool or system, is susceptible to mistakes or malfunctions. According to US medical data, the total number of malpractices due to robot-assisted surgery has increased by a total of 250% in the last 7 years. According to Westlaw's data, which was obtained through court rulings, through 169 data relating to robots, 82.2% acted arbitrarily, 46.7% involved incorrect diagnoses, 35.6% involved slow healing and 31.1% lack of consent data. agreement).[5] Data on injuries and fatalities indicate that robotic surgery has been associated with more than 144 fatalities, 1,391 injuries, and 8,061 malfunctions of devices. Common device malfunctions include burns or damage to patient-specific instruments, programming errors, and problems with video and imaging.[6]

Out of all the cases that have happened, these issues are rarely resolved through litigation. In essence, AI can be considered a legal topic by the law, but it needs to be governed by explicit legislation. Laws governing this subject may include provisions stating that artificial intelligence may be acknowledged as a legal subject on par with humans or other legal entities.[7] It has been demonstrated that artificial intelligence that can perform tasks performed by humans is just as capable as humans, if not more so. This is the rationale behind the recognition of artificial intelligence as a subject of law. But there should also be legal accountability for the existence of artificial intelligence. This includes Realizers, planners determine authenticity as a characteristic and also include other obligations throughout the artificial intelligence's use.

In Indonesia, there is currently no legislation that establishes artificial intelligence as a legal topic. Artificial intelligence refers to any electronic device that collects, analyzes, stores, and disseminates electronic data. This definition only applies to the specific laws covered by Law Number 19 of 2016, which amended Regulation of Electronic Transactions and Information Act, Number 11 of 2008. There are no more stringent legal

restrictions on artificial intelligence than there are in the ITE Law. The use of artificial intelligence in Indonesian healthcare is still heavily reliant on other laws governing the delivery of traditional medical care. Furthermore, there is currently no law in Indonesia that expressly governs the use of artificial intelligence—even for basic health services—in this regard. As a result, we currently require a legal product that specifies how artificial intelligence is to be treated under Indonesian law. The focus is related to how to create an accountability model for CSR implementation to fill the current legal vacuum. [8]

It is highly probable that in the near future, the Indonesian health service system will employ artificial intelligence more extensively. Nonetheless, in the absence of regulations that expressly state that artificial intelligence is a recognized legal topic, only medical professionals will be held legally accountable for malpractice that results from mistakes made by the AI system. Artificial intelligence creators, who ought to be held legally accountable as well, have not been subjected to more stringent regulations since the technology is still viewed as merely a tool that health professionals utilize and follow their instructions exclusively.

A relevant agency must be created that includes a group of highly accomplished experts to research the wrongs of using robotic surgery. The Ministry of health in 2022 plans to open the center of robotic surgery in Indonesia. Dr. Sardjito Hospital Yogyakarta and Dr. Hasan Sadikin Hospital Bandung serve as key representatives. Dubbed the Robotic Telesurgery 2021–2024 plan, it is multi-stakeholder and annual, through Professor Laksono Trisnantoro, this plan is proof of the Ministry of Health's vision for medical change. medical budget, medical repairs, medical media retention, and medical personnel make up the initiative's four primary parts. Referral services are changing, which is another. Although basically the patient-doctor relationship is a civil law relationship, it does not rule out the possibility that doctors' medical services outside professional standards can be categorized/fall into the realm of criminal law and administrative law. [9]

#### IV. CONCLUSION

AI is highly useful in performing tasks that are typically completed by doctors. Naturally, this can facilitate and expedite the completion of the task, but it must be weighed against the imposition of regulations that may restrict how the AI itself runs the program. Aside from that, a precise legal point about accountability for the actions of AI and who bears liability in the event that the AI malfunctions needs to be made. In order for AI to be used as a system that supports experts in its field, a number of issues must be further investigated and regulated. Who gets punished in the event that the AI malfunctions can be decided by the programmer or expert responsible for finishing the robot's knowledge. A unique body made up of legal, medical, government representatives are necessary also be established in order to examine the robotic surgery procedure.

#### V. REFERENCES

- [1] W Halim and P Mudjihartono, "Artificial Intelligence in Medical Technology: Survey Paper," *KONSTELLASI: Convergence of Technology and Information Systems* 2, no. 1 (2022).
- [2] Ross Gruetzemacher and Jess Whittlestone, "The Transformative Potential of Artificial Intelligence," *Futures* 135 (2022), <https://doi.org/10.1016/j.futures.2021.102884>.
- [3] Rafael E. Perez and Steven D. Schwaizberg, "Robotic Surgery: Finding Value in 2019 and Beyond," *Annals of Laparoscopic and Endoscopic Surgery*, 2019, <https://doi.org/10.21037/ales.2019.05.02>.
- [4] Guillermo Maza and Arun Sharma, "Past, Present, and Future of Robotic Surgery," *Otolaryngologic Clinics of North America*, 2020, <https://doi.org/10.1016/j.otc.2020.07.005>.
- [5] Scott Thiebes, Sebastian Lins, and Ali Sunyaev, "Trustworthy Artificial Intelligence," *Electronic Markets* 31, no. 2 (2021), <https://doi.org/10.1007/s12525-020-00441-2>.
- [6] Jinpei Han et al., "A Systematic Review of Robotic Surgery: From Supervised Paradigms to Fully Autonomous Robotic Approaches," *International Journal of Medical Robotics and Computer Assisted Surgery*, 2022, <https://doi.org/10.1002/rcs.2358>.
- [7] Eka Nanda Ravizki and Lintang Yudhantaka, "Artificial Intelligence as a Legal Subject: Conceptual Overview and Regulatory Challenges in Indonesia," *Notaire* 5, no. 3 (2022), <https://doi.org/10.20473/ntr.v5i3.39063>.
- [8] Pujiyono, P., Wiwoho, J., & Triyanto, T. (2016). MODEL PERTANGGUNGJAWABAN HUKUM PELAKSANAAN CORPORATE SOSIAL RESPONSIBILITY (CSR) UNTUK MENINGKATKAN KESEJAHTERAAN MASYARAKAT. *Yustisia*, 5(1), 73-91. doi:<http://dx.doi.org/10.20961/yustisia.v5i1.8716>
- [9] Widodo Tresno Novianto. (2017). SENGKETA MEDIK PERGULATAN HUKUM DALAM MENENTUKAN UNSUR KELALAIAN MEDIK. Surakarta : UNS Press, cetakan 1, edisi 1. ISBN 978-602-397-171-8.

**Open Access** This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

