



**Department
of Economics and Finance**

Course of Principles of Civil Law

Artificial Intelligence and Civil Liability

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*Alla mia famiglia
e ai grandi amici che ho incontrato
per avermi supportato e dato forza.*

*A me stesso, per essere riuscito
ad andare avanti nonostante tutto.*

Grazie

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Artificial Intelligence and Civil Liability

Introduction

ETYMOLOGY

When talking about something, I believe it's always appropriate to start from the **etymology**.

The word “artificial” comes from Latin, “*artifex*” and “*artificium*”, meaning something related to craftsmanship, art, making;¹ the word “intelligence” finds its origin in the Latin “*intellegentia*”, which is knowledge, understanding and comprehension.²

Therefore an Artificial Intelligence is an ability to understand, realize and receive information, and this ability is not genetic, innate, but rather it comes from the work and craft of someone else.

When it comes to Civil Liability, the word “civil” also comes from Latin: “*civilis*”, which means something related to public life and the benefit of citizens;³ “liability” is a newer word that was first used at the end of the 18th century but it comes from “liable”, which emanates from the Latin word “*ligare*”, meaning “to tie, bind”.⁴

From this we can reach the conclusion that Civil Liability is the condition of being linked and connected to your actions specifically with respect to the impact those actions have on the benefit of others who live in a society.

ABSTRACT

In the following pages, we will analyze the relationship between the two titular concepts.

In the **first** chapter, we will see what Artificial Intelligence is and will travel across a bit of its history, from its earlier examples to now. The process behind it will be explained, as well as the advantages and disadvantages of its current use.

In the **second** chapter, we will analyze the other half of the study, strictly related to subjects of Principles of Civil Law: possible legal issues that may arise in the field of Artificial

¹ <https://www.etymonline.com/word/artificial>

² https://www.etymonline.com/word/intelligence#etymonline_v_9381

³ https://www.etymonline.com/word/civil#etymonline_v_13745

⁴ <https://www.etymonline.com/word/liable>

Intelligence, with a more detailed discourse on what Civil Liability actually is and everything that revolves around it.

In the **third** chapter, the two parts will come together as we will describe how different legislations and studies consider the relationship between the Artificial Intelligence and Civil Liability, with different legal models and comparisons.

Finally, in the **fourth** chapter, we will reflect on what has been said and I will give a personal opinion on what the present, and the future, should look like.

Chapter 1

What is Artificial Intelligence: the History of AI, the advantages and disadvantages of its development

1.1 EARLY EXAMPLES

The concept of Artificial Intelligence dates back to Greek culture and mythology.

Machines and creations, made by men, were said to complete actions on their own will, have feelings and emotions.

One of the first ever examples is **Talos**, a giant machine made by Hephaestus using bronze, which had the purpose of guarding and protecting the island of Crete, going around it multiple times every day in search of enemies, and being stronger than any human.

Reality gradually took over myth in the field of advanced technology and automated machines.⁵

In 1770, **The Mechanical Turk** was created by German inventor Wolfgang von Kempelen. The machine resembled a Turk wizard sitting at a chess table, and it was able to move its arms and seemingly play chess against the most skilled players of the time.

The Mechanical Turk, however, turned out to be a scam: although able to move chess pieces around on the board, the machine did not have the capacity of knowing what moves to make in order to win, and the only reason why it was a strong opponent was that expert human players would hide inside the table, under The Turk, and operate it.⁶

While not exactly being the best example of AI, The Turk, and chess, became a major topic of research and study for future AI programmers.

1.2 ALAN TURING

It was really after World War II and **Alan Turing**'s development of the Turing machine that Artificial Intelligence became what we know today.

The English scientist asked himself the question 'Can machines think?' and realized that it was a somehow meaningless unknown.

He substituted it with another question, which was whether a machine could play the 'Imitation Game': in this game one person, deemed interrogator, has to guess the identity of

⁵ <https://news.stanford.edu/2019/02/28/ancient-myths-reveal-early-fantasies-artificial-life/>

⁶ <https://www.chess.com/terms/turk-chess-automaton#what-was-the-turk>

two other players, one of which is a human and the other is a machine. The machine must mislead the interrogator into thinking the human is actually the machine, while the human has to help the interrogator guess correctly.⁷

Turing predicted that around 50 years from his time, machines would be so developed and intelligent that an average interrogator would be able to guess correctly after five minutes in less than 70% of cases, because machines would learn more and more to ‘act like humans’.

The term ‘Artificial Intelligence’ was first used in 1956 by **John McCarthy**, who stated that such an intelligence could be claimed when a machine would be made to do things that ‘are said to involve intelligence’ when done by humans.⁸

In 2016, ‘Sophia’ was created by Hanson Robotics: a humanoid robot capable of social interactions that was given the citizenship of Saudi Arabia.

1.3 THE PROCESS

Generally speaking, the process which makes Artificial Intelligence possible involves creating a machine (computer science) and exposing it to a considerable amount of **data**, so that the machine can analyze it and create patterns and links of it, through algorithms, to make informed decisions on how to act in different possible situations.

Decisions do not have to be exclusively pre-determined, and real-time data can be used and analyzed instantly.

More specifically, Artificial Intelligence is connected to Machine Learning and Deep Learning: both can be considered sub-fields of AI, with the latter also being a sub-field of the former.

Machine Learning is the process of inputting the training data into the algorithm, and mostly depends on human intervention and aid, while **Deep Learning** takes advantage of more complex artificial neural networks and the process makes machines able to start their analysis even if the data has not been previously structured or labeled by humans.⁹

⁷ A. M. Turing, “Computing Machinery and Intelligence”

⁸ B. G. Buchanan, “A (Very) Brief History of Artificial Intelligence”

⁹ <https://www.ibm.com/cloud/learn/what-is-artificial-intelligence>

1.4 NOWADAYS: ADVANTAGES AND DISADVANTAGES

There are many examples of Artificial Intelligence that can be found and used in our **daily life**: entertaining and fun-inducing chatbots, digital maps that show real-time traffic, roadblocks and calculate the fastest route to reach a location; even the ‘Face ID’, a facial recognition system which automatically unlocks iPhones when their owner is looking at the screen.

There are also more advanced AI devices: technologies like self-driving cars, human-sized robots used for personal assistance and education, or new discoveries in the field of Healthcare and Surgery, such as systems that are able to detect cancer cells or nanotechnology which allows medical operations to be more precise and less invasive. All of these promise to make the future one where machines will have the role of completing tasks no one ever thought they could.¹⁰

There are many **advantages** to an ever-growing application of Artificial Intelligence: as previously mentioned, the process of decision-making in Artificial Intelligence technologies is based on data, which means mistakes made by humans due to distraction would be avoided as the machine is applying algorithms; furthermore, humans have the physical need of sleeping and being rested, as well as the emotional desire to avoid tasks that may seem extremely boring and repetitive: AI can fix both of these issues, as it is always available to work and would obviously not complain about a less exciting job.

Finally, digital assistance and just the overall speed of specific processes would greatly improve.

However, it would be incautious not to highlight the **disadvantages** of such a revolution, which involve many different fields:

- Artificial Intelligence can be extremely expensive: billions of dollars are spent in research and production of the actual machines;
- Excessively substituting humans with robots would cause humans to become lazy or limit the availability of jobs on the market, leading to unemployment;
- The data gathered by machines may be **biased**, filled with personal beliefs regarding race, religion, gender or sexuality: for example, James Zou, a Stanford University professor, conducted a research on an AI program called GPT-3, finding ‘persistent anti-

¹⁰ <https://www.iotforall.com/8-helpful-everyday-examples-of-artificial-intelligence>

Muslim bias' in it, with the program mostly suggesting violent and death-related words when asked to complete a sentence regarding Muslims.¹¹

More precisely, the main issues of Artificial Intelligence, and surely the most relevant ones in this analysis, are connected to the **legal challenges** of AI.

Legal systems have the purpose of trying to guide individuals and corporations on how to behave in society, as well as what to expect from others.

But what happens if Artificial Intelligence becomes unpredictable? What happens if biases in data lead to extreme Ethical problems? And while it is true that AI reduces to chance of human-made errors on the job, who will take the blame for errors and miscalculations made by the machine itself?

¹¹ <https://towardsdatascience.com/advantages-and-disadvantages-of-artificial-intelligence-182a5ef6588c>

Chapter 2

The legal issues: different legal challenges of Artificial Intelligence and their relevancy

A **legal system** can be described as a set of rules which have the aim of ‘*balancing and pursuing the interests of the members of the social group and of the group as such*’ (institutionalist theory).

These rules cover many different aspects of our day-to-day lives: from the moment we are born to the moment we die, Civil Law is embedded in all of our actions and life events.

With technology becoming such a fundamental part of the World, which is clear when we consider that an average adult living in the USA uses their mobile devices for around 4 hours per day¹², it is no surprise that legal issues and challenges would soon start to cover digital matters as well, including the topic at hand, Artificial Intelligence.

There are different legal challenges to take into consideration.¹³

2.1 DATA PRIVACY

First, the aforementioned data, which is the basis of Artificial Intelligence, could be at risk of being used for unethical purposes in the wrong hands, leading to breaches of privacy and security.

While it should be in everyone’s best interest to guarantee **data privacy**, that is clearly not often the case, as retention of confidential data is a controversial but effective way of gaining power even in fields that differ from AI.

The European Union, for instance, is considered a world leader in privacy standards, deeming as fundamental the right of privacy for EU citizens. Its ‘General Data Protection Regulation’, or **GDPR**, is a powerful tool and can represent a threat for corporation that develop AI, due to its provisions and rights.

The *right to consent*, for example, states that data controllers and processors have the burden of proving that consent was given by data subjects; said consent can also be withdrawn at any time, which leads to the *right to erasure*, meaning the obligation to

¹² <https://elitecontentmarketer.com/screen-time-statistics/>

¹³ V. C. Romano: “Principles of Civil Law” - Slide 1

eliminate, erase, all the stored data of the subject, and even try to remove any public evidence and copy, if any, of the data.

The *right to data portability*, another important part of the GDPR, allows data subjects to take all their personal data from a controller and give it to another controller: giving subjects the possibility of easily switching who to give data to will make corporations more aware that they need to prove the information would be secure with them.

As previously mentioned, Artificial Intelligence does not always need human intervention for its learning process: these automated processes are likely to be hindered by the focus that the European Union puts on another provision, the *right to explanation*, which avoids that subjects may become such without being able to have humans provide them with relevant information on the processes and the logic.

Other parts of the World do not follow the same policy, at times even leading to substantial popular discontent: in 2019, protesters in Hong Kong destroyed lampposts on the streets which were equipped of a facial recognition, Big-Brother-style, surveillance system using Artificial Intelligence, and the uproar caused controversy and conversations on the use of such technologies by governments.^{14 15}

2.2 INTELLECTUAL PROPERTY

The second major legal issue regarding Artificial Intelligence is **Intellectual Property**.

In Civil Law, Intellectual Property is the set of exclusive rights that manufacturers, makers and corporations have over the use of their own ‘distinctive signs’, which differentiate their products from the ones of a competitor: elements like name, trademarks and commercial signs, which companies own and take advantage of.

It is important to remember that Intellectual Property is a right of both natural persons (individuals) and legal persons (entities), so the challenges that start to arise in regards to Artificial Intelligence are not simply related to the collective nature of their creation, but rather to a deeper issue: Artificial Intelligence can create **itself**.

¹⁴ <https://www.forbes.com/sites/zakdoffman/2019/08/26/hong-kong-exposes-both-sides-of-chinas-relentless-facial-recognition-machine/?sh=40462fd242b7>

¹⁵ M. Humerick: “Taking AI Personally: How the E.U. Must Learn to Balance the Interests of Personal Data Privacy & Artificial Intelligence”

With a traditional software that requires human intervention and utilization to create something, it is easy to place property but, as repeatedly stated, that is not always the case for AI, as it is able to become an independent creator without supervision of mankind, leading to an unclear path and different views on how to proceed:

- A first approach states that property should not be applied at all in the field of AI and non-human made creations, making all of them **public domain** with no copyright. An interesting example is the ‘Naruto VS Slater’ case, which involved a monkey, Naruto, taking a picture with the camera of David Slater, a photographer. Ownership of the photograph was denied to Slater, as well as to the monkey. Although some may consider this approach fair, it may lead to quite problematic consequences, as it could decrease the incentive of working for the development of AI if it is impossible to enjoy certain benefits of the results, potentially pushing away major funders in the field.
- Another approach is to separate the role of the **author** from the one of the owner: the machine would become the author, and the ownership would go to either the major developers, the technology owners or such. This perspective could be described as somewhat symbolical and not the most practical: the role and rights of the author would have to be completely modified, as the machine would not be able to exercise them. This approach is rejected by many jurisdictions (USA, EU and more) which state that the author must be a natural or legal person.
- The final approach links the relationship between an **employee** and their employer, to the balance between Artificial Intelligence and its creator and/or owner. The result of this comparison is that, just like an employee’s creation goes under the authorship of the employer, the same can happen with AI, and the role of being an author can easily be carried through by a person.

While this third approach mostly fixes the property issues related to AI creations, there is a fundamental unknown that arises, considering the nature of AI: machines can be immortal, or at least outlive their owners by a lot, so what happens then?

An answer to this question would be to give authorship to the developing corporation of the machine, but that could result in funding companies and third-parties who had major roles

in the final product to feel under-appreciated and have less incentive to continue to invest in AI. The question therefore does not have a clear answer.^{16 17}

2.3 CIVIL LIABILITY

The third and main issue in the realm of Artificial Intelligence and Civil Law is **Civil Liability**.

Let's first dive into the characteristics of Civil Liability before analyzing its relationships with Artificial Intelligence.

In general, Liability is a fundamental concept in Law because it creates a way to protect people who have been hurt and, furthermore, defines the ways in which the person that did the hurting is held liable for their actions.

Liability can be Criminal or Civil:

- Criminal Liability requires the government to prosecute an individual for a violation of the Criminal Code, with punishments like fines or imprisonment;
- Civil Liability, on the other hand, is specifically about an individual (plaintiff) suing another individual (defendant), with the aim of receiving a monetary compensation for the damages caused by the latter.

There are two main types of Civil Liability:

1. Contractual
2. Extra-Contractual

The **contractual** liability, as the name suggests, relates to contracts, therefore it arises when there is a previous relationship between the plaintiff and the defendant (parties), and the obligations and terms involved in this relationship have not been performed (breach of contract).

The **extra-contractual** liability is instead connected to **torts**, wrongdoings that happen when the parties do not have a contract or previous relationship, and in which it is important to calculate the degree of the damage and compensate (indemnify) the plaintiff accordingly.

¹⁶ V. C. Romano: "Principles of Civil Law" - Slide 14

¹⁷ G. Gürkaynak, I. Yılmaz, T. Doygun, E. Ince of ELIG Law Firm, Istanbul: "Questions of Intellectual Property in the Artificial Intelligence Realm"

Tort Law can, at times, lean into certain principles and ways of Criminal Law rather than regular Civil Law, which means the lines are not always clearly drawn (specific wrongs may be dealt with through both Criminal and Civil Law).

For example, the burden of proof, which is the duty that the plaintiff (and their attorney) has of proving causation and bringing evidence, is much lower in strictly Civil cases (contractual) than when dealing with torts.

Wrongdoings against the plaintiff can happen for different reasons.

Article 2043 of the Italian Civil Code, for instance, states regarding compensation for unlawful acts:

“Any intentional or negligent act, that causes an unjustified injury to another, obliges the person who has committed the act to pay damages.”

Two key words in this statement are ‘intentional’ and ‘negligent’:

- intention means that the action has been done purposefully and with the knowledge that it would harm the plaintiff and possibly benefit the defendant;
- **negligence**, on the flip side, is more-so a breach of the duty of care as the defendant failed to act with diligence and prudence, leading to damages.

The aforementioned word **causation** is extremely relevant too: liability is given when it can be proved that certain actions made by the defendant were the causes of the damages and that, because of that, said damages would not have occurred had the causes not happened.

This view is known as the ‘*condicio-sine-qua-non*’ theory and, while useful, it can turn out to be problematic in cases where probability is a factor: out-of-the-ordinary consequences may derive from an action, which were not expected by the defendant; this leads to the ‘*adequate causality*’ theory, according to which causation exists when evidence proves that, more likely than not, the behavior and conduct of the defendant caused the damages.

As previously stated, proving causation in Criminal Law is actually much more difficult, as it has to be proven ‘beyond any reasonable doubt’.

A defendant may also be deemed liable in different ways:

- When they are liable for actions or lack thereof made by themselves, Liability is defined as **Strict**;

- When they are liable for actions of other people (their employees, children, etc...), Liability is defined as **Vicarious**.

Finally, the main goal of Civil Law and lawsuits is to indemnify the plaintiff.

The defendant will have to pay **Damages**, which can be both monetary/economic and non-economic:

- Economic damages are the most common, and they include reimbursement of lost money, compensation for emotional distress, attorneys' fees, hospital bills, etc...
- Non-economics damages are more of an exception since they have to be ordered by a court as additional measures, in cases that draw near the border of Civil Law and Criminal Law.

Now that there is clarity over the context of what Civil Liability is and what it entails, is possible to have a discourse over the relationships it has with Artificial Intelligence.

In a World where machines could truly start to substitute human workers, it is crucial to determine who would take the blame in a situation where a machine acts in a way that injures someone, whether that is by making them lose money, or actual physical damages.

Infamous is the discourse and example about the self-driving car possibly hitting someone, either in a case of complete malfunction, or in calculating the algorithms and outside circumstances and having to take a sudden measure to avoid an accident.

Furthermore, the development of Surgical AI techniques may also lead to potentially life-threatening scenarios.

In the following chapter, we will analyze different views and theories regarding the subject.

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¹⁸ V. C. Romano: "Principles of Civil Law" - Slide 15

¹⁹ <https://www.criminaldefenselawyer.com/resources/civil-liability.htm>

Chapter 3

The theories: relationship between AI & Civil Liability

Artificial Intelligence is a technology.

As such, it has an entire team behind it: programmers, developers, sellers and users.

A malfunction in AI devices can be caused by many different things, and the Liability for the consequences of the malfunction depend on a multitude of factors as well: jurisdictions, type of malfunction, type of technology, type of injury.

As mentioned above, an infamous example of this type of analysis is the self-driving car: what happens if such a vehicle kills a pedestrian? Which law applies?

We are going to analyze different proposals and legal methods that focus on the general issue.

3.1 HALLEVY'S THREE LEGAL MODELS

One of the best known researchers in the field of Artificial Intelligence and Liability is **Gabriel Hallevy**, a Criminal Law professor who works in Israel.

In his studies, Hallevy defines **three legal ways** in which actions made by Artificial Intelligence may be analyzed in regards to **Criminal Law**.

He considers the concepts of '*actus reus*' and '*mens rea*', where the former is the action itself, or lack thereof, while the latter is the intention, information and knowledge behind an action, which also includes the aforementioned concept of negligence.

1. The first legal model is called the '**perpetrator via another**' model, which compares the actions of Artificial Intelligence to the ones of so-called 'innocent agents', like animals, children or mentally deficient individuals: both categories are unable to have the information and knowledge needed (*mens rea*), and may be guided and instructed by someone else. Therefore parents, tutors, pet owners or, in the case of Artificial Intelligence, programmers and/or users are likely to be held liable.
2. The second legal model is called the '**natural probable consequence**' model. As the name suggests, this model takes into considerations consequences of specific actions that could have been foreseen by sellers, programmers and even users, especially if the product instructions stated the risks. A dramatic example made by Hallevy is the one of

Kenji Urada, a Japanese factory worker who holds the unfortunate distinction of being the first human killed by a robot in Japan, and second overall, in 1981. He was killed by a robot implemented in the factory which mistakenly deemed the worker a threat and used its hydraulic arm to kill Urada.

3. The third legal model is called the ‘**direct liability**’ model. This model specifically considers strict liability offences, like committing actions that under no doubt can be considered violations of the law: going back to the example of self-driving cars, if the car was found going over the speed limit, that would trigger a strict liability offence, holding the AI criminally liable and, in turn, its programmers.²⁰

3.2 LIMITATIONS OF ARTIFICIAL INTELLIGENCE

Generally speaking, Artificial Intelligence systems have **limitations**.

The nature of such limitations and whether or not they were known by the purchasers are an important part of this analysis.

There are two main types of limitation:

1. Limitations that affect both humans (programmers and experts) and Artificial Intelligence;
2. Limitations that solely affect Artificial Intelligence.

The first kind of limitation is especially relevant when it comes to information: **knowledge**, specifically in the cyber world, is ever-changing, hard to keep up with, and may consider an almost infinite amount of variables.

That makes it extremely hard, if not impossible, for humans to constantly be updated on the status of their information and whether it still is ‘up-to-date’. One may argue that AI systems should be able to fix this issue themselves since they can quickly scan and get access to huge amounts of data, but in specific cases, infinite variables represent an issue for machines as well. The result of this is that, while a system would still be able to complete an action, it may not do it in the best possible way.

Two things can be done to try and fix this limitation:

- The first is to inform vendors and users of such limitations;

²⁰ https://www.researchgate.net/profile/John-Kingston-6/publication/309695295_Artificial_Intelligence_and_Legal_Liability/links/5a39397caca27208acc79e70/Artificial-Intelligence-and-Legal-Liability.pdf

- The second is to provide constant updates to the machine and its database, but that can prove to be inefficient, as sometimes additional information has to change the entire system of the machine in order to be relevant.

Courts might not deem ‘unreasonable’ for a vendor to avoid automatic and constant updates of AI knowledge, if those would require a complete overhaul of the system itself.

Nevertheless, AI developers incur in liability if they fail to select workers with sufficient expertise, or if they fail to provide relevant information to users related to the machine and to the specifics of the workers’ expertise.

The second type of limitations is exclusively for Artificial Intelligence, and not humans.

While the main issue of the limitation is the same, knowledge, what differs is the kind of it: humans have **general knowledge** that, while not directly useful for a specific task, may still come in handy for it or just become a piece of the entire puzzle, so to speak.

In the example of self-driving cars, a human may have the knowledge that certain groups of people, like children, have less developed skills when it comes to road safety and it is important to drive carefully around areas with kids.

An AI system clearly cannot come to the same conclusion, and a way for it to not incur into trouble would be to pinpoint the specific locations in its database and classify them as potentially more dangerous.

In situations that previously sounded impossible, humans will at least try to act a certain way to lead to positive results, while AI have a tendency to shut down and not act at all. On the other hand, in other situations, **human thought processes** may prove resourceful in quick-thinking situations that involve previously unconsidered variables, while AI automatic plan of action could prove dangerous.

An interesting example of this happened in 1983, when satellites of the USSR identified five different nuclear missiles launched from the United States.

Despite the period of tension between the two nations, the Soviet officer in charge decided to consider the notice as a false alarm, thinking that five missiles was a too small amount to launch, if the USA wanted to start a war.

His thought process proved to be correct, as the identified five missiles were simply reflections of the Sun on the clouds that triggered the heat control system, with the miscalculation being due to the position of the satellite in the September Equinox.

That scenario could have had extremely different consequences had Artificial Intelligence been in charge, because the standard plan was to respond with Soviet missiles, leading to liability for the unnecessary launch of missiles and destruction, and who knows what else.

Finally, quality and non-symbolic information may present an issue for Artificial Intelligence: unspoken and culturally relevant actions (like high beams being quickly flashed at a driver as a signal) might not be perceived by machines, or even body language, which is fundamental in certain fields.

There are also defence strategies against claims of liability regarding Artificial Intelligence, which come from a much more specific limitation of AI: the exposures to unpredictable and undesired malfunctions like viruses and malware

The main example of this are the **Trojan horses**, whose name derives from Greek mythology: just like the wooden horse masked as a gift and used by the Greeks to invade the city of Troy, a Trojan virus will mislead users of its purpose and even delete itself from a device after completing an action.

In such case, the defendant may not be held liable. ²¹

3.3 GERSTNER & COLE

American lawyer M. E. Gerstner indicates that there are specific scenarios that need to be proved in order for a legal proceeding - regarding injury due to use of defective software - to be treated as a **negligence** claim rather than Criminal Law:

1. First, she explains how it is important to analyze the **duty of care** that the defendant had, and what that would imply: a vendor, for example, owes customers the duty of care, with a peculiar attention on the expertise and on the standard of care of an expert, needed in the field;
2. Second, she focuses on an analysis about whether or not the duty was **breached**, through malfunctions of the Artificial Intelligence system that might have been predicted, insufficient or incorrect warnings and information, or failure to update the database and knowledge of the system;

²¹ https://www.researchgate.net/profile/John-Kingston-6/publication/309695295_Artificial_Intelligence_and_Legal_Liability/links/5a39397caca27208acc79e70/Artificial-Intelligence-and-Legal-Liability.pdf

3. The final point Gerstner indicates is a question: did the AI system simply operate and act, or did it recommend an action to another agent? In this analysis, **causation** is a key element, and it may be hard to prove in the latter case.

Another discussion which is relevant to the topic is about the role of AI systems compared to their users: more specifically, whether they are a **product** or a **service**.

In his 1990 publication “Tort Liability for Artificial Intelligence and Expert Systems”, **George S. Cole** admits his preference in considering AI systems as services rather than products, but that it is not a clear matter.

If AI systems are considered products, then their sale is connected to a warranty, even if only implied: such warranty could be made void by certain jurisdictions and contracts, but that becomes much more difficult if the AI machine is a built-in part of another material good.²²

3.4 THE ITALIAN APPROACH

Many Italian businesses are smaller in size compared to their European competitors, and they have to rely on advanced techniques and machines to survive and thrive.

Attention to research and development in the field of AI has increased considerably in the last few years in Italy, and just as much have the occurrences of issues between AI and Civil Liability in the country.

Despite this, the current approach does not include creating new extensive laws regarding the field of Artificial Intelligence, but rather adapting the statutes that already exist to all the specific situations.

There are two main reasons for this: the first is that the current legislations are deemed to be efficient enough, the second is that newer, more specialized legislations might turn out to be too inelastic for a field like Artificial Intelligence which is often changing and evolving - becoming obsolete by the time they are fully in place.

Therefore any incident that may arise which causes damage will be dealt with using the general rules for liability for damage, and AI technologies that help employers in the duty of monitoring the rest of the workers will be subject to laws regarding standard monitoring.

²² https://www.researchgate.net/profile/John-Kingston-6/publication/309695295_Artificial_Intelligence_and_Legal_Liability/links/5a39397caca27208acc79e70/Artificial-Intelligence-and-Legal-Liability.pdf

According to Article 2050 of the **Italian Civil Code**, “*whoever causes injury to another in the performance of an activity dangerous by its nature or by reason of the instrumentalities employed, is liable for damages, unless they prove that they have taken all suitable measures to avoid the injury*”.²³

There is mostly a consensus in viewing the use of Artificial Intelligence tools as a dangerous activity, especially due to the fact that the consequences of a universal use of AI are still not clear, but the nature and behind-the-scenes of the processes that lead to AI creates different opinions on the liability holders: for example, because the makers and providers of AI technologies do not always let businesses get access to the algorithm processes, holding the businesses liable for issues caused by the algorithm may not be just.²⁴

3.5 THE EUROPEAN UNION

In October of 2020, the European Parliament discussed and made resolutions for the topic of Civil Liability connected to Artificial Intelligence, and some key points give us great insight on how the issue is dealt with by the institution.

First, it is stated that giving AI legal personality is **not a necessity**: although it might be hard to define the specific human culprit of the damage due to the independence of AI, the solution should be to hold everyone who was involved liable in some capacity;

The Parliament also highlights the role of the **operator** of AI, who is liable regardless of the nature of the operation, both physical or virtual. Two types of operators are defined:

- the front-end operator, who has immediate control over the risks related to the use of a specific Artificial Intelligence technology and benefits from the operation;
- the back-end operator, who supplies data, support and is involved in the features of the system in a continuous fashion.

Operators can be multiple: as a matter of fact, many cases involve at least one front-end and one back-end operator, and liability can either be equally distributed or based on the degree of control of the individual operators.

²³ <http://italiantortlaw.altervista.org/civilcode.html>

²⁴ <https://www.globallegalinsights.com/practice-areas/ai-machine-learning-and-big-data-laws-and-regulations/italy#chaptercontent6>

Another important difference discussed by the European Parliament is the **level of risk** involved in the operation, and the different rules of liability that come with it.

Artificial Intelligence is considered to involve high risk when the damage is significant and affects multiple people, when it has a sufficient level of autonomy and when the possibility of the damage to occur is high enough: these kinds of AI require common strict liability.

All the **high risk machines** and systems should be catalogued in a timely fashion: the European Commission should start the process of determining whether the system can be considered high risk while assessing the general safety of the product, in order to avoid it reaching the market before its full risk level is stated; a system that has not yet been classified as high risk but has repeatedly caused serious issues should still lead to application of strict liability.

Finally, the October resolution touched upon the points of compensation and insurances.

The European Commission should re-define a threshold of economic loss that leads to compensation, as well as the amount and periods of the latter, obviously in line with the liability rules of the EU States.

And since it is not considered appropriate to create a fund for compensation using public money, the Commission should also work with insurance companies to study and monitor data regarding the field to come up with policies that will be helpful while not becoming barriers for future development of the industry.

As a matter of fact, it is highly recommended to the operators as well to hold insurance for liability, so that they can continue to work and develop AI, simultaneously making the general public more trusting of the technology because compensation in case of damage happens becomes easier.²⁵

3.6 THE ENTITY OF ARTIFICIAL INTELLIGENCE

Among European countries, **Poland's Code of Civil Procedure** (or PCCP) is a useful source of information regarding liability: the PCCP was adopted in 1964, so it does not directly contain content about Artificial Intelligence, however it still contains rules of Civil Law related to liability for injury and damage caused by misconduct and risk, which have been more and more applied to contemporary technological and AI cases.

²⁵ https://www.europarl.europa.eu/doceo/document/TA-9-2020-0276_EN.html

The first question that needs to be analyzed and answered is whether Artificial Intelligence can be considered a **legal entity**, because only in that case it would be liable independently for injury and damages caused: if it can't, the second step is to determine who will bear the liability.

Let's try to answer the first question.

Clearly, it is not possible to consider Artificial Intelligence as a **natural** person, since it lacks biological and social properties that are inherent to humans and that only humans themselves can add into an AI system. AI does not have natural legal capacity, but rather normative legal capacity, since it is completely based on Law and provisions.

The concept of **legal** person, on the other hand, is much more applicable: while it is debated whether a legal person also has to be a real entity and not just a legal one, generally it is simply described as an entity that makes actions which are based on the intention of a natural person and even depend on said natural person, either in a direct or indirect way.

Because of this, it is the natural person that in many cases is subject to liability

But while it is easier to grant the status of legal person to something like a corporation, the view regarding Artificial Intelligence is more divided: this is because, unlike regular legal entities, AI is not an organisational unit with statutory bodies that make its actions possible.

The European Commission in 2019 doubted the necessity of giving legal personality to AI, because the principles of liability would be unclear and undefined, while it would be much more straight-forward to simply consider liable AI producers, developers and users.

The biggest issue with this view is that Artificial Intelligence is becoming more and more advanced and independent from human action, making the machines at times unpredictable, and the liability incredibly less clear to assign.

The European Parliament therefore wanted to create a new identification for Artificial Intelligence, a different type of legal entity: the **electronic person**.

An electronic person can complete actions which will be considered mostly independent, but that would still be possibly blamed on developers and owners - the change would be in a new body of detailed provisions about liability, which would determine the scope of liability based on the scope of autonomy of the machine.

Because this view is also quite connected with the concept of legal person and entity, it's not surprising that the response to it has been mixed, with the idea that, no matter what, the

ultimate goal has to be to facilitate the assignment of Legal Liability for issues caused by AI, especially with a future that will intertwine AI use with fields and topics with a stronger and stronger ethical relevance.²⁶

3.7 DIFFERENT COMPARISONS

Certain legislations, like Italy or the aforementioned PCCP, cover a topic we have previously introduced, which is the possible view of AI developers as supervisor of the machines, almost like **supervisors** of other people who are either minors or mentally disabled.

Specifically, people people of those categories cannot hold liability, the supervisors will be liable in their place, and compensate the damage.

The similarity comes from the fact that AI machines that act on a substantial base of autonomy may be just as unpredictable as people with disabilities or of very young age.

Other articles of the PCCP explain how a person that has delegated an action and entrusted the performance of another person, will be held liable for the consequences of the action - unless they have valid reasons in believing that the person they trusted could easily carry out the action as it was part of their area of professional expertise. This does not apply if the **delegator** has a supervising role during the actions and gave directions and instructions to the person that actually completed the task.

In the field of AI, these rules can lead to the conclusion that a user who wrongfully selected an AI system for an action - despite recommendations and disclosure from the developers about the abilities of the system - would be held liable for damages.

Similarly, it is possible to compare the liability related to **animals** and pets included in the PCCP to Artificial Intelligence.

Humans who own animals will always have to compensate the damages caused by them, one way or the other, following both the principles of fault and equity (financial condition of the owner and of the injured party).

²⁶ <https://policyreview.info/articles/analysis/civil-legal-personality-artificial-intelligence-future-or-utopia>

While the rules in Polish Law are quite specifically tailored for animals, and therefore not easily applicable to Artificial Intelligence, they can constitute a basis for how - in a future with an even more common use of AI - issues like this may be treated.²⁷

3.8 DANGEROUS PRODUCTS

A product is defined as **dangerous** when its standard use will not guarantee safety.

Manufacturers of dangerous products are held responsible through strict liability, based on risk; release from liability might happen if the dangerous attributes of the product - that could not have been foreseen - are only discovered after its introduction on the market or if the products are sold in a market unrelated to the intended business field.

We have previously stated, through Cole's theory, that Artificial Intelligence is not always considered a product, so it is important to mention that the assumption needed to adapt these rules to AI machines is that they have to be classified as products rather than services.

The definition of product, however, is still quite limited in most cases, due to it requiring the object to be tangible and separated, hence why we mostly consider AI as being part of products, rather than being a product itself.

Nevertheless, regulations about dangerous products are extremely relevant in the analysis of AI injuries and scenarios like faulty designs in self-driving cars will usually be dealt with through these provisions, attributing responsibility to the manufacturers - unless there are exceptional cases like the users modifying the software on their own.

3.9 COMPLETE INDEPENDENCY OF AI

When it comes to Artificial Intelligence that works in a fully **independent** way from its developers, manufacturers and users, attribution of Liability is trickier as there's no direct causality between the injuries and the conduct of the people that would be deemed responsible.

Nonetheless, **Tort Liability** can be applied, which does not require a strict causal relationship: through Tort Liability, the roles of manufacturers and users, and their responsibilities, are specifically defined:

- The manufacturer has to bring reliable AI machines of quality on the market;
- The user has to correctly utilize the machinery and systems.

²⁷ <https://policyreview.info/articles/analysis/civil-legal-personality-artificial-intelligence-future-or-utopia>

It cannot be ruled out that in the future, the level of independency of AI will lead to a change in policy which will allow Artificial Intelligence to obtain legal personality and bear an considerable amount of blame, albeit debates and controversies regarding whether - and to what extent - the machines would have to compensate the damages themselves through specific **funds**.

Clearly, the amount of financial capital included in these funds would have to be collected through insurances and payments of the users and the developers, but the act of compensation to the injured party would be independent.

Chapter 4

Personal opinion: can the issue be fixed once and for all?

4.1 THE PRESENT

The ever-growing use of Artificial Intelligence in every aspect of human life seems unavoidable.

We have especially seen this in recent times, with the pandemic caused by **COVID-19** and the mass digitalization of society: online schools, video call services for work meetings, and digital identification for vaccinated people are just some of the examples of what life has looked like for most people from the beginning of 2020.

It is clear to me that, even when the health emergency will eventually become a forgotten memory, what has been introduced to us in this time period will remain and likely evolve, surrounding us with more and more developed new technologies and Artificial Intelligence. Does that mean humans should be scared and fear the upcoming robot takeover? I don't believe so.

It's important to remember that AI is, first of all, extremely **useful**. In the aforementioned example of the pandemic caused by COVID-19, Artificial Intelligence has played a key role in the diagnosis and monitoring of the infection, as well as in the development of the vaccine.

It has helped healthcare workers in a time when work overload has been extremely overwhelming and exhausting, actively saving human lives.

For years now, Artificial Intelligence has also become fundamental in multiple industries, like transportation, manufacturing and in the cleaning processes of private and public spaces.²⁸

I believe it is important to highlight all of this because nowadays the tendency of certain groups of the population is to condemn technologies a priori, without truly reflecting on the exciting advantages and comfort that they bring.

4.2 THE BALANCE

With that said, it would obviously be silly and incautious not to consider that interactions between creators, manufacturers and users of Artificial Intelligence are business deals and

²⁸ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7195043/>

involve money, usually a lot of it; in order to get money and conduct a successful business deal, sometimes a blind eye is turned at the expense of users and their **wellbeing**.

This is a focal point in this whole discussion: how to maximize the enjoyment one can get from the objective comfort that AI can get without having no one to turn to if things go wrong, if the technologies cause damage.

Discourse and laws on Liability exist for this exact reason, and we have previously analyzed some of them and their conceptual bases; however, we have seen that certain scenarios and legislations may be overly abstract and unclear to guarantee efficiency and safety for users.

I think the first and most important step that needs to be taken is that legislation needs to be thorough regarding every single aspect of Artificial Intelligence.

Fairness and impartiality are a **sine qua non** in collecting data for AI: an example of a situation that should be not only avoided but punished is facial recognition devices analyzing the facial features of potential employees and choosing who to hire based on algorithms that take them into account, giving companies an excuse to possibly discriminate people of color by picking certain features rather than others.

Artificial Intelligence can be at times described as a '**Black Box**', meaning a device that shows input and output, but hides the process that lead from one step to the other.

The issue with this characteristic is that when the process of an action is less specified and unclear, so is assigning the blame when things don't go as planned.

European Institutions in particular have shone light on this topic, but the general sentiment - one I tend to agree with - is that existing provisions and laws on the matter need to be developed and new ones need to be added.²⁹

4.3 THE FUTURE

In Chapter 3 we have stated that discourse on compensation for damages depends on whether Artificial Intelligence can be classified as a dangerous product, or a product at all.

A future development could lead to extending the title of legal personality to AI machines. Although this may lead to easier legislations, I don't particularly agree with it as it would overly simplify the issue and lead to unfair results, as it could completely excuse the humans involved in the accidents.

²⁹ <https://www.thinkautomation.com/bots-and-ai/the-ai-black-box-problem/>

Furthermore, I am of the opinion that it's necessary not to put too much pressure on developing companies when it comes to liability, in order to keep them interested in studying and creating new technologies without having to fear their every move.

On the other hand, clearly a minimum of responsibility must be demanded.

Generally speaking, I believe that - because technology is constantly changing in ways that seem unpredictable to the general public - a true solution to the issue may **never** come.

That is because, in my opinion, the time needed to apply rules that would cover every single aspect of issue of Artificial Intelligence when it comes to liability might be more than the time it takes for a new type of technology, the actions of which may not fit with the legislation, to arrive and spread on the market.

Conclusion

In this thesis we have analyzed the relationship between Artificial Intelligence and Civil Liability, starting from their own individual definitions, to the complicated ways in which they intertwine and the ways some jurisdictions deal with it.

We have learned that the topic is not as easy as it may look, and that a definite answer is not yet found, although progress continues to be made everyday.

The analysis on the process behind Artificial Intelligence has given us insight and knowledge on a technology we hear daily about but might not be completely familiar with, and the description of the multiple legal issues that can arise from the use of AI can lead us to a greater understanding of what those issues look like and the way they may occur in other fields.

The central part of the thesis was surely the third chapter, where each paragraph is a piece of the puzzle we are trying to finish but isn't quite finished yet: the pieces of the puzzle are different, sometimes it is difficult to understand how they go together, but once the big picture is clear, we as a society can make what we want of it.

Is Artificial Intelligence the future we all want? Or do we want to avoid it? These are questions that cause turmoil and discussions, because they require a balance of economic reasons, civil reasons and personal thoughts.

Speaking of which, the final chapter of the thesis was my personal opinion, and I decided to end in a bit of an open way without discrediting what has been said before and the progress that legislators, economists and scientists have made, because so much more is yet to come and it's going to be very interesting to watch.

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