

Artificial Intelligence Contract: How Algorithms and Machines have Disrupted the way Law is Practices^{1, 2}

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ABSTRACT

Artificial Intelligence, machine learning, algorithms...These innovations have disrupted every industry in our society. As this technological revolution also affected the legal environment, because of its essence (in other words, because it needs to be regulated), and especially how the law is practiced. Thus, in our study, we will investigate AI related contracts and what is the effect of algorithms on contracts. We will consider five main options linked with the purpose of our study: the creation of an "electronic personality" in order to recognize AI value creation, improving "smart contracts", emphasizing on the working relationship between machines and lawyers, and imposing a ban on AI. To rank these alternatives, we will use several criteria to evaluate them, and we will refine our analysis through a qualitative and quantitative analysis. At the end of our study, we will conclude that making "smart contracts" smart stands out as the best way to improve how the law is practiced today. Indeed, as an intelligent machine, it is able to outperform a human. Nonetheless, the lawyer profession is still needed to make smart contracts intelligent.

Key words: Artificial Intelligence, AI, Contract, Technology, Law, Dat, Machine Learning, Algorithms

INTRODUCTION

Our society has known many revolutions, from the industrial one in the XVIIIth century to the IT one during the XXth century. Nowadays we are assisting in the evolution of how humans interact with their connected environment³. Indeed, we are living in a world where technology has a

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³ Giulio Coraggio (2018), How artificial is changing the world around us. Retrieved from: <https://www.gamingtechlaw.com/2016/10/artificial-intelligence-world-change.html>

major impact in many fields: health, finance, law, security, etc. Artificial Intelligence (AI) is the product that can define the most how intelligent algorithms are helping us to better improve.

Moreover, AI is a product that can also be considered as a project, a program, or a portfolio⁴. Indeed, we can see in our table some examples^{5,6,7}

		Guild Definition	Example
Project		A special environment created in order to deliver one or several businesses outcome, in a frame of specified resources	Daisy is the latest disassembly robot that Apple has created in order to make new devices out of recycled ones. This robot, thanks to Artificial Intelligence enable the mass customisation and personalisation as it can recognize the Iphone's model and its different characteristics ³ .
Program	Operational Program	An interdependent constituent project aiming to affect the sponsor's day-to-day operations.	AI can be used in day-to-day operations such as upgrading customer service. Chatbots interact everyday with real customers, and thanks to machine learning algorithms, they will be able to serve them with better answers ⁴ .
	Strategic Program	A set of projects which are related, combined with the purpose to attain the sponsor's future state. The program is linked to a specific strategic goal and its early results influence in the further decision-making process.	An ERP software as an impact on decision making by providing the right data to the right person when they need it in order to gain and take advantages of opportunities . AI and ML are changing ERP in many ways: warehouse management, financial management and automation, customer service, talent acquisition and human resources management, sales automation and tracking activity ⁵ .
	Multi-project Program	A created interdependence of constituent project in order to receive benefits from this synergy.	Indeed, if Daisy is a robot only capable of disassembling Iphones, we can imagine in the future a robot able to disassemble different other products such as Macbook, AirPods, or Apple's Keyboards
	Mega-project	A project with a significantly larger scale than the typical sponsor's projects has.	Uber developping 100% driveless cars can be seen as a mega project. Indeed, Uber's objective was to link drivers with customers, as it will be fully automatized thanks to AI we can consider that this project far overreach Uber's
Portfolio	Project Portfolio	An investment portfolio in which the main objective is to minimize risks and maximize returns.	Apple's dismantling robot can be seen as a Portofolio. Indeed, if Apple install them in their different factories, thus different countries, it can be seen as the creation of the same disassembly lines in different locations.
	Asset Portfolio	Set of resources dedicated to projects, owned by the Owner or the Contractor. The objective is to generate those resources with the most desirable return on investment.	

Figure 1 - Guild definitions and example on project and programme⁸

⁴ Planning Planet (2015), GUILD OF PROJECT CONTROLS COMPENDIUM and REFERENCE (CaR). Retrieved from: <http://www.planningplanet.com/guild/gpccar/introduction-to-managing-people>

⁵ Patrick Moorhead (2018), Apple's New iPhone Recycling Robot 'Daisy' Is Impressive, And In Austin. Retrieved from: <https://www.forbes.com/sites/patrickmoorhead/2018/04/19/apples-new-iphone-recycling-robot-daisy-is-impressive-and-in-austin/#a9c0adf7f2e4>

⁶ Daffodil Software (2017), 9 Applications of Machine Learning from Day-to-Day Life. Retrieved from: <https://medium.com/app-affairs/9-applications-of-machine-learning-from-day-to-day-life-112a47a429d0>

⁷ Andres Richter (2018), How Artificial Intelligence Is Changing ERP. Retrieved from: <https://www.industryweek.com/technology-and-iiot/how-artificial-intelligence-changing-erp>

⁸ By Author

Also, we can identify some assets deeply rooted in our study's essence.

Information Assets	terms of contract, personal datas and
Human Assets	lawyers, contractors, developers, engineers
Physical Assets	computers, data warehouses
Financial Assets	invested budget
Intangible Assets	blockchain, data flows, algorithms

Figure 2 - AI assets⁹

As the digitalized era made business more and more competitive, AI is now a tool that must be mastered in order to thrive. Organizations must learn how to make use of these new innovations and they must incorporate them in their core businesses. But what is the essence of an organization? At first sight, many can think of money is at the center of every operation, and it can be considered as right. Yet the very root of company contracts. Indeed, "a written contract plays a vital role in any business transaction. Apart from making the agreement between concerned parties legally binding, contracts can also serve as future references, part of the business' policies, as well serve as proof in the event of misunderstandings, complaints or disputes needing litigation proceedings"¹⁰. In more details, a contract is a written document describing what is the business relationship and scope of work in a very precise manner so that no party can claim that there were any misunderstandings afterward. Then it is a legal bind that protects the client and the organization, and an enforcing tool that also mentions what are the rights and terms of the deals. Finally, it is a must use practice in order to define the payment terms and to minimize risks¹¹. In other words, contracting is on what the company should focus, but it is a tough challenge to overcome. As a matter of fact, between 5% to 40% of value is lost when signing a deal¹². What are the sources of this lost value? Is it due to the human factor? Does AI can take over human intelligence? Is it accurate to say that AI achieved an accuracy level

⁹ By Author

¹⁰ Nico Apfelbaum (n.d), The True Importance of Written Contracts in Businesses & Transactions. Retrieved from: <https://www.hg.org/legal-articles/the-true-importance-of-written-contracts-in-businesses-and-transactions-39639>

¹¹ Neil Swaab (2014), The Importance of Contracts. Retrieved from: <http://businessofillustration.com/the-importance-of-contracts/>

¹² Beverly Rich (2018), How AI Is Changing Contracts. Retrieved from: <https://hbr.org/2018/02/how-ai-is-changing-contracts>

of 94% regarding the review and the approval of contracts while experienced lawyers only achieved to obtain a level of 85% of accuracy¹³ ?

Comparing the performance of humans and AI is difficult because we are living and evolving in a period where the use of machine learning and algorithms is skyrocketing. We need to take some hindsight, but we can be sure that contracts management artificial intelligence is a real thing that needs to be studied. Thereby studying the flaws of contracting in a traditional way and how AI can solve the problems is required (cf. diagram)^{14, 15}.

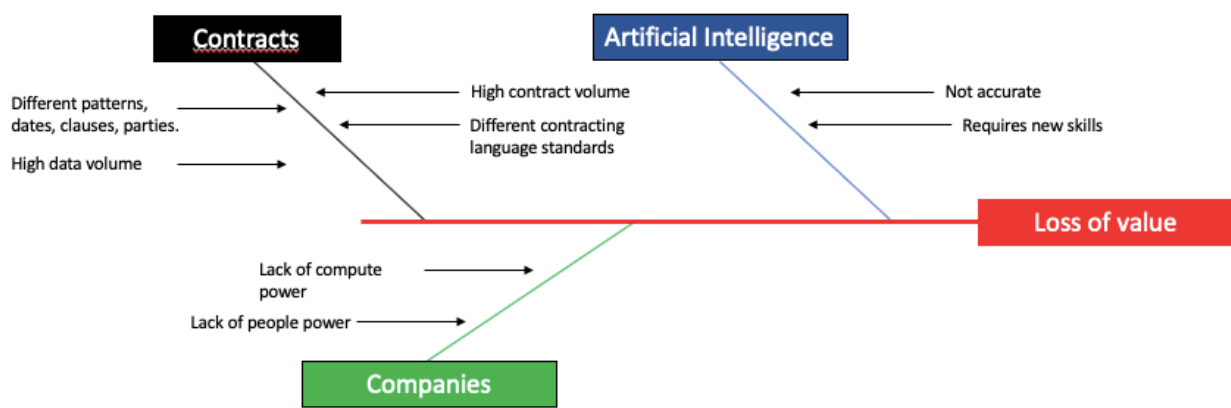


Figure 3 - Fishbone Diagram¹⁶

Furthermore, we can identify another challenge for companies regarding AI and contracts. Indeed, even if AI's development and quality will bloom in a near future, there is a lack of regulations regarding the matter¹⁷. According to Gray Scott, "the real question is, when will we draft an artificial intelligence bill of rights? What will that consist of? And who will get to decide

¹³ LawGeex (2018), AI vs. Lawyers. Retrieved from: <https://www.lawgeex.com/AIvsLawyer/>

¹⁴ ASQ (n.d), Fish bone diagram. Retrieved from: <http://asq.org/learn-about-quality/cause-analysis-tools/overview/fishbone.html>

¹⁵ Yogen Kapadia (2018), Why existing AI techniques are not suitable for Contract Analytics. Retrieved from: <http://infinote.com/early-ai-contract-analytics/>

¹⁶ By Author

¹⁷ Raghav Bharadwaj (2018), Applying AI to Legal Contracts – What's Possible Now. Retrieved from: <https://www.techemergence.com/applying-ai-legal-contracts-whats-possible-now/>

that?”¹⁸. Many questions on how to regulate AI are still being investigated. Laws and policies must be created while promoting innovation and protecting the population.

AI is revolutionizing law in itself and in the way, it is practiced (cf. graphic)¹⁹

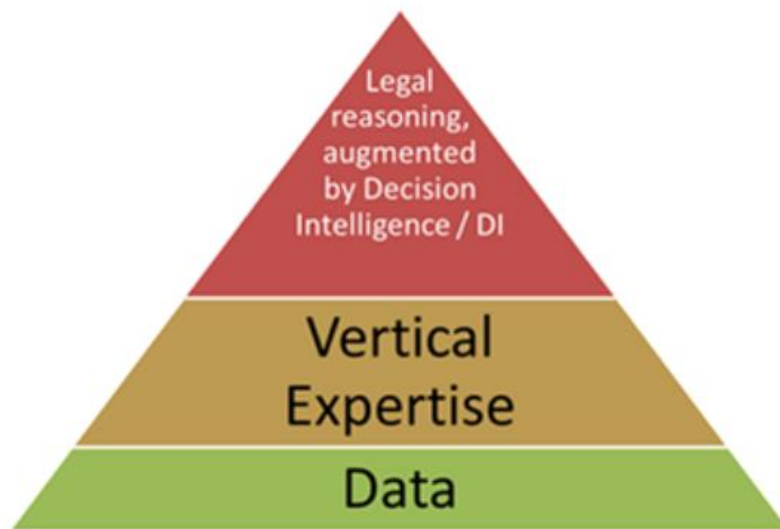


Figure 4 - AI in Law Pyramid

Data can be used as the basis to support a vertical expertise in order to make a lawyer more efficient. To some extent AI in law has not been applied in a practical way, it is still a theory. Indeed, the pinnacle of the robotic laws has been described by *Isaac Asimov* in its novels. Indeed, he describes how should be the interactions between humans and robots. But do we really need to regulate technology in such a way?²⁰

In this paper, we will discuss and discover a really thriving question. In which way can technology help a traditional profession like the lawyer one? How can AI help improve contracts? Our goal will be to understand all the interactions between the most important thing a company has to master, the act of contracting, and how Artificial Intelligence has disrupted the business game.

¹⁸ Gray Scott (2017), 28 Best Quotes About Artificial Intelligence. Retrieved from: <https://www.forbes.com/sites/bernardmarr/2017/07/25/28-best-quotes-about-artificial-intelligence/#60a2aa434a6f>

¹⁹ Michelle Colucci (2018), AI in law Pyramid. Retrieved from: <https://www.digitalistmag.com/digital-economy/2018/04/03/ai-is-disrupting-law-06030693>

²⁰ Emerging Technology from the AiXiv (2014), Do We Need Asimov’s Laws? Retrieved from: <https://www.technologyreview.com/s/527336/do-we-need-asimovs-laws/>

METHODOLOGY

Step 1: Problem Recognition

Law and Artificial Intelligence are permanently affecting each other's development. This phenomenon of transformation is still ongoing and is essential to be understood to thrive in our society. The goal of this paper is to provide a step back and some hindsight regarding all these new relationships. Indeed, as we are living in this new computed era as actors of this movement, we can wonder:

- How Artificial Intelligence is currently improving contracts?
- What is the future of Artificial Intelligent contracts?
- What are the consequences and the liability of such a transformation for a company and regarding Law in itself?
- Will Artificial Intelligence replace contract managers?

Step 2.a: Feasible Alternatives

Artificial Intelligence is a thing that is not perfectly framed by the law. Indeed, it appears that to understand their benefits and make them tangible, we need to create and to improve its regulation. As a non-human being, AI is quite controverted. Indeed, it is not considered as a person having rights and duty. Thus, how can we be sure that AI creation of value is accounted for? We are facing a tough problem to overcome. If AI's future is to replace the human worker and to help a company maximize its value creation, how can an organization succeed in performing if there is no legal status to take into account their work?

Before looking into the relationship between AI and contracts, we must discuss AI legal status on value creation.

Alternative 1: Incorporate AI value creation by developing an "electronic personality"

Recently the EU Parliament and Commission gave a ruling on the creation of what they called an "electronic personality", in other words, the capacity for Artificial Intelligence to bear rights and duties as a normal Human being. Unfortunately, the European Commission did take the Parliament up on that offer for one main reason. Each nation has to define which entity can become a "legal person" and the EU as a gathering of states has still not the right to interfere with this matter²¹. Artificial Intelligence is seen as a liability risks creator, and that is why some organizations are not inclined to regulating them.

It is obvious that AI has businesses outcomes, but can they be attributed to AI as a person or are they the result of the user behind it.

²¹ Thomas Burri (2018), The EU is right to refuse legal personality for Artificial Intelligence. Retrieved from: <https://www.euractiv.com/section/digital/opinion/the-eu-is-right-to-refuse-legal-personality-for-artificial-intelligence/>

As AI is steadily growing, the question of a Universal Basic Income (UBI) is becoming more and more relevant. According to Elon Musk, "Universal income will be necessary over time if AI takes over most human jobs."²² The jobs 'automation has disrupted the economy and a cash handout will be necessary to be distributed to people unemployed because of the technology breakthrough.

Thus, by considering Artificial Intelligence and robots as a "person" we will be able to impose a tax. By doing that companies will be able to capture a new value. Organizations will have the power to regulate machines as the same as a human worker. People who lost a job because of this new revolution will not be afraid of competing against AI, as they will be treated in the same way, especially since they will be provided a financial help.

In conclusion, by giving a human legal status to AI, we can overcome the fact that created value is not perceived and that human competitiveness will decrease. As such, if robots are given a personality they will be accounted for as a "normal" resource in a contract.

Alternative 2: Emphasizing on the human-AI relationship and making mentalities evolve

As we have seen earlier, it was proven that has some point AI can be more efficient than a lawyer. Systems are optimized and have a proficiency beyond a human capability. But in the most recent years, it appears that the Human being is able to outperform machines. Knowledge work systems have greatly improved the productivity of intellectual human activities.²³ By assigning a backbreaking task (most linked to data mining or analysis), it is possible for the human worker to shift its value potential creation towards more creative activities.

By using both parties' abilities to its peak, companies will be able to maximize their value creation. On the one hand, humans are essential to machines. AI systems must be trained by humans on how interacting, making decisions for example. AI are assistants that need to learn from humans in order to develop human traits of thinking. Then there is a need for "explainers": in law, for example, we need experts to translate what AI is trying to assess. Deep learning, machine learning, algorithms are seen here as a support for human thinking. Finally, AI systems need humans in order to be sustainable, to be able to function properly²⁴. On the other hand, Artificial Intelligence is a support tool that can enhance human capabilities beyond reasoning.

Cooperation between robots and humans must not be feared, especially since we can observe the many benefits of this new partnership. Indeed, we can illustrate this empirically and in many

²² Catherine Clifford (2018), Elon Musk: Free cash handouts will be necessary if robots take human jobs. Retrieved from: <https://www.cnn.com/2018/06/18/elon-musk-automated-jobs-could-make-ubi-cash-handouts-necessary.html>

²³ Akio Yamada (2016), NEC's Vision for AI In Social Value Creation. Retrieved from: <https://www.nec.com/en/global/techrep/journal/g16/n01/160103.html>

²⁴ H. James Wilson, Paul R. Daugherty (2018), Collaborative Intelligence: Humans and AI are joining forces. Retrieved from: <https://hbr.org/2018/07/collaborative-intelligence-humans-and-ai-are-joining-forces>

industries. As an example, BMW found out that robot/humans teams were 85% more productive than teams where this mix was not in place²⁵.

By underlining that the human-AI relationship is not detrimental at all, more organizations will embrace this new work organization, thus optimizing their outcomes and the creation of value.

The AI adoption regarding the general opinion is not only about laws, but also about mentalities.

Now that we have reviewed two major alternatives that represent a prerequisite for our subject, we can deepen our thoughts. As we told earlier, there is a relationship between AI and Law, but the solutions that are already adopted are they really efficient?

Alternative 3: Making “smart contracts” smarts in reality

The term “blockchain”- “an incorruptible digital ledger of economic transactions that can be programmed to record not just financial transactions value but everything of value”²⁶ – first appeared in the 1990s and was often linked with the notion of cryptography²⁷ (*i.d* a way to secure information and communication). This notion evolved over the years and particularly with the emergence of cryptocurrencies such as Bitcoin or Ethereum in 2016. The blockchain is expected to radically transform social and economic structures through the removal of flattening organization or intermediary. It has many benefits: it provides a greater transparency, it increases security, it improves traceability, it helps reduce costs and it improves efficiency²⁸. If this technology was considered as only useful in the financial sector, it appears now as a game-changer in every industry and most of all blockchain is an upheaval regarding Law.

"Smart contracts" are becoming more and more popular because of blockchain technology. According to Huu Nguyen, smarts contracts "are programs that execute based on parameters agreed by two or more counterparties"²⁹. Based on the Delaware General Corporation Law which allows issuing of distributed ledger shares³⁰, the Ethereum cryptocurrency has helped to build this new type of AI-based contract. Etherparty is a blockchain party which objective is to

²⁵ Knowledge Warton (2018), Humans Plus Robots: Why the two are better than either one alone. Retrieved from: <http://knowledge.wharton.upenn.edu/article/reimagining-work-age-ai/>

²⁶ Don & Alex Tapscott (2016), Blockchain Revolution. Retrieved from: <https://blockgeeks.com/guides/what-is-blockchain-technology/>

²⁷ Bitnews Today (2017), Blockchain and Bitcoin. History of appearance and development. Retrieved from: <https://bitnewstoday.com/how-to-start/guides/blockchain-and-bitcoin-history-of-appearance/>

²⁸ Matthew Hooper (2018), Top five blockchain benefits transforming your industry. Retrieved from: <https://www.ibm.com/blogs/blockchain/2018/02/top-five-blockchain-benefits-transforming-your-industry/>

²⁹ Sue Daley (2018), How AI will make smart contract « smart ». Retrieved from: <https://www.techuk.org/insights/opinions/item/12960-how-ai-will-make-smart-contract-smart>

³⁰ Wikipedia (n.d), Delaware General Corporation Law. Retrieved from: https://en.wikipedia.org/wiki/Delaware_General_Corporation_Law

simplify and help in the creation of agreements between different parties³¹. In other words, it binds legally two entities with the use of AI. As this technology is still developing, we can begin to assume that there are many benefits. Indeed, not only they seem to eliminate intermediaries such as financial, legal and professional services, but Humans in general. Then, of course, they enhance paperwork reduction and cost reduction. And as blockchain do, smart contracts improve security and speed and strengthen verification and accuracy³². Nonetheless, as they are still recent, they may have many defaults which need to be resolved. Undeniably, they are legally questionable and the structure of the contract is only known by coders. Moreover, they are difficult to implement, hackable and inflexible³¹.

To solve these issues, and to make “smart contracts” smart, we should lay down an efficient legal basis for electronic contracts. If a contract can be defined as “a voluntary arrangement between two or more parties that is enforceable by law as a binding legal agreement. [...] Formation of a contract generally requires an offer, acceptance, consideration, and a mutual intent to be bound.³³”, a smart contract, then, cannot be considered as a “contract” in itself, especially on one point: there is no desire to be bound by law as it comes from the blockchain technology which aims to delete any source of governance.

To set the scene for our legal foundation we should first address the lack of flexibility and the lack of control from humans. Moreover, we must not forget that as smart contracts are not legally viable: a legal support system and legal rights regarding AI-based contracts must be created.

If smart contracts are to replace traditionally contracts, we need to make some adjustments on several points:

- Emphasizing on Human understanding: as traditional contracts are often difficult to understand and require a professional training to be understood, smart agreements should be intellectually reachable for all, understood and used by everyone.
- Making smart contracts legally applicable: to be viable their structure must serve as a proof of acceptance and they must describe the offer, the mutual intent constrained by its terms, and describes the necessary acceptance.
- Bolstering interactivity: smart agreements must allow the user to manage them during the entire contract's lifecycle. By doing that users would be able to confirm that the other side has or has not met the specified obligations, or it would serve as a proof that all that was written has been satisfied.

³¹ Etherparty (n.d), What is Etherparty? Retrieved from: <https://etherparty.com/>

³² Thomson Reuters (2018), Use of artificial intelligence for smart contracts and blockchain. Retrieved from: Use of artificial intelligence for smart contracts and blockchain

³³ Wikipedia (n.d), Contract. Retrieved from: <https://en.wikipedia.org/wiki/Contract>

- Favoring flexibility and control: smart agreements have to be adapted to the business environment, and thus they have to be inclined to be managed or subject to adaptation or renegotiation.
- Being analyzable: to best their traditional counterpart, and to overcome the dense paperwork written contracts can encounter, smart contracts could and should be analyzable by an AI party. Afterward, in the same way, a human lawyer would do, insights should be used to improve the next course of action³⁴.

Alternative 4: Divide the work between AI and traditional lawyers

As we have seen, blockchain and smart contracts have a great future, but the question here is whether they will fundamentally change our society. Will smart agreements transform and elevate the lawyer profession? Will they disrupt Law and to what extent? In this part, we will first explain why a smart contract cannot replace a lawyer, and then we will analyze how the two of them can collaborate.

For some advocators of the smart agreement, there are many reasons on the essential character of a lawyer.

Indeed, according to Brett Cenkus, an outstanding attorney³⁵:

- By definition, a smart contract is a line of code, and someone will have to intervene to convert a deal into legally binding principles. As contract lawyers and managers are expert in the practice, this means that they are the most adapted entity to do it.
- As it is not still quite legal and risky, clients can be afraid of making a smart deal. Smart contracts, in essence, are not fully enforceable on their own. A side signed agreement will be needed to support the smart agreement and to abide by the Law.
- AI cannot replace a lawyer as business contexts are unique. Certainly, a major part of a lawyer's job is to draft custom contracts. Smart contracts often follow a predetermined template that is applied to every demand, regardless of the business context. There are no one-size fits all in Law.
- Contracts are intentionally suggestive at some points: if we dig into many contracts, it appears that many subjective measurements are included as is it tough to identify

³⁴ Agrello (2017), How to make Smart Contracts Worthy of Their Name Using Artificial Intelligence. Retrieved from: <https://blog.agrello.org/how-to-make-smart-contracts-worthy-of-their-name-using-artificial-intelligence-3a90e4dd3c47>

³⁵ Brett Cenkus (2018), Will smart contracts finally rid the world of lawyers. Retrieved from: <https://hackernoon.com/even-the-best-smart-contracts-wont-put-lawyers-out-of-work-anytime-soon-a224736e0235>

every situation or exception. Contracts are indeed flexible in their wording in order to maintain their relational nature – relationships often evolve, and contracts need to follow this movement – and because of their contextual character: to avoid a breach of contract when speaking of time, generally the law gives a little bit of flexibility. There is no judge that will support a breach of contract clause if there is a one-day delay. The code environment is a logic one that is quite opposite with the notion of subjectivity. There is a need for human interpretation as they predetermined actions cannot exist in a smart contract.

- Uncertainty can arise after the contract has been signed: it is not unusual to negotiate after the contract has been signed. Paper contracts are not an obstacle to renegotiation as we only need to make amendments, but since smart contracts are not programmed in a way that they allow pre-determined modifications, it will be a challenge to deal with post-deal negotiations.
- We cannot avoid conflict: what smart contracts has not its grip off is the conflict management. What happens if a party does not follow the terms of the contract? If negotiations go well, it will be the same on the blockchain. But what if not?

As we have seen, the human side and character of a human lawyer are undeniably essential to input into a smart contract. Code cannot always be right when dealing with humans. But the real value of a lawyer has not been stated yet. Indeed, what characterizes a lawyer is that his main function is to counsel its client. AI is not able to perform this task yet. Robotics will have a tough time to deal with a human reasoning. One thing is sure is that lawyers will need to take some insight and to work closely with developers in order to create custom-made smart contracts.

Alternative 5: Protecting the lawyer profession, imposing a ban on AI and preserving traditional paper contracts

In our era of innovation and technological progress, this alternative might sound too extreme. Can we sacrifice such a core and traditional profession and bet our future on AI? According to Joseph Schumpeter in his book "Capitalism, Socialism and Democracy" in 1942 innovation will deconstruct long-standing arrangements and free resources to be deployed elsewhere³⁶. Indeed, our society is based on capitalism, and capitalism is embodied in this notion of "creative destruction", as we fight for innovation to make this economical model survive. No one has ever thought that they would be ready to put a stop on innovation and emerging technologies. It would mean returning in the past and write off all that has been already accomplished.

³⁶ Investopedia (n.d), Creative destruction. Retrieved from:
<https://www.investopedia.com/terms/c/creativedestruction.asp>

Step 2.b: Attributes to measure

So that we can measure and assess all our already listed feasible alternatives, we will set a list of attributes to compare them and to rank them from the best option to the worst when dealing with AI and contracts.

As a project is a “planned set of interrelated tasks to be executed over a fixed period and within certain cost and other limitations.”³⁷, a contract can be considered as a project in essence, and that is why contract management is included in project management

In first and foremost, when planning a project, we should develop several goals in order to be successful. Indeed, goals should be Specific, Measurable, Agreed Upon, Realistic and Time-bound³⁸.

Attribute 1: Specific

Goals are well defined and clear to everyone that has a basic knowledge of the project

Attribute 2: Measurable

A goal should be measurable, it is the metrics that are used to measure the project's benefits and progression when completion is achieved.

Attribute 3: Agreed upon

Agreements are made with all the stakeholders on the achievable objectives.

Attribute 4: Realistic

Each objective is realistic in terms of resources, knowledge and time.

Attribute 5: Time-based

The whole project implies that there is enough time, but not too much, to achieve a goal; objectives and tasks are time-based.

³⁷ BusinessDictionary (n.d), project. Retrieved from: set of interrelated tasks to be executed over a fixed period and within certain cost and other limitations.

³⁸ Duncan Haughey (n.d), SMART GOALS. Retrieved from: https://www.projectsmart.co.uk/smart-goals.php?fbclid=IwAR31wEC7z_wD8H78_i75wvDSvmVybsjBIkqDhJLUGUBjwkXb-673Xav0rg0

Attribute 6: risk mitigation

The emergence of new technologies has proven that innovation could lead to the improvement of the social and economic situations of many. Unfortunately, we must not overlook that they also create disparities that will be manifested in different ways. Supporting the emergence of new technologies induced many risks that must be mitigated.

- Risk of worsening unemployment: as we told earlier when discussing the "creative destruction" of Joseph Schumpeter, innovation and especially AI will create a major job loss. More than that, they are also disrupting and restructuring every industry.
- Risk of increasing economic disparities: many countries are particularly known for their wealth gap within the population. Moreover, the elite will be more inclined to make use of new technologies and especially AI because of their easier access to innovation. With a firm grasp on new technologies, rich people will be able to assert their domination on businesses and on the economy.
- Risk of bias regarding algorithm: most of AI entities are developed in rich countries. Algorithms may not reflect the contexts and biases of developing countries. We must ensure that AI algorithms are properly developed and adapted to every country's context.

To face these issues, governments need to act and impose different regulations. They should address different policies which include intellectual property, work and adaptation³⁹.

Attribute 7: data security

Data security is "protective digital privacy measures that are applied to prevent unauthorized access to computers, databases, and websites. Data security also protects data from corruption"⁴⁰.

As Artificial Intelligence and Machine Learning encounter a lot of challenges regarding data security, we should make all it takes to improve this aspect.

Indeed:

- An enormous amount of business data is involved and depending on the domain it can have a different amount.

³⁹ Ralph Hamann (2018), New technologies present risks for developing countries. Retrieved from: <https://www.iafrikan.com/2018/01/05/developing-countries-need-to-wake-up-to-the-risks-of-new-technologies/>

⁴⁰ Techopedia (n.d), What does Data Security mean? Retrieved from: <https://www.techopedia.com/definition/26464/data-security>

- We must consider every aspect of data and respect privacy: as we have seen earlier, privacy is one of the smart contracts challenges.
- AI and ML are technologies that are hackable and that can be hindered by bugs if bad developed.
- The fact that data implies the involvement of different stakeholders and different systems handling the data in itself, a lack of data governance could disrupt many businesses.

To overcome these obstacles, we need to improve data security on several points:

- Informing all stakeholders on how data privacy and security works so that everyone knows and understands standards and policies.
- Given that AI and ML induced a lot of data flows, we should establish a strong and solid governance.
- Ensuring that solutions follow good practices when developed and implemented to avoid and to mitigate vulnerabilities.
- Identify every risk and threat by performing security testing and penetration assessment, and plan on how to act in case of an attack or a disfunction.
- A solid threat model has to be built in order to: verify any assumptions, make sure the system will be fully operational, all security requirements are met⁴¹.

Attribute 8: Flexibility

Being flexible is a must-be in our business environment. Indeed, this means embracing change in order to increase human-task performance, and so increase value creation. As contracts, and maybe in the future AI-based contracts, are truly the core of a company, they should be flexible in order to support businesses objectives. The solutions we will analyze in our next part need to be easy to handle in order to see they can help a company thrive⁴².

Attribute 9: Communication

Communication appears as one of AI success factors. Indeed, to elaborate a performant algorithm, developers need to work with those who will use them. As we have seen earlier, in our feasible alternatives, a good smart contract will be one that is tailor-made with lawyers. The

⁴¹ Manish Prahbu (2018), Security and Privacy in Artificial Intelligence and Machine Learning – Part 1: Lay of the land. Retrieved from: <https://towardsdatascience.com/security-and-privacy-in-artificial-intelligence-and-machine-learning-part-1-c6f607feb94b>

⁴² James Vincent (2016), What counts as artificially intelligent? AI and deep-learning explained. Retrieved from: <https://www.theverge.com/2016/2/29/11133682/deep-learning-ai-explained-machine-learning>

better the engineering team will know of the user's priorities, the more they will be able to make good decisions⁴³.

Attribute 10: Effectiveness

This attribute will help us in the measurement regarding the implementation of our feasible alternatives and their initial investment. Indeed, as AI is still recent, we need to measure its impact on our society.

Attribute 11: Innovation

It does not represent how innovative AI and ML are, but it measures how innovative the induced transformation is and how it is implemented company-wide.⁴⁴

Attribute 12: Complexity management

AI's development has raised many questions regarding management. Indeed, according to Prof. Jordi Canals "Artificial intelligence has huge potential to help managers make better decisions. Senior executives have the responsibility to learn to use it. And we must be careful to use it in a way that empowers people, not threatens them. Even if AI can challenge paradigms, we still need to address fundamental and human questions: What is our purpose? How do we serve? And how do we engage our employees, so they can grow with us?"⁴⁵

The question here is: how managers deal with these solutions day-to-day?

Attribute 13: Costs

It refers to the implementing costs of our different alternatives. Indeed, Money is at the center of our subject. If AI is known for reducing costs, we tend to forget that its implementation can be very expensive. We need money to cover our developing and computing costs⁴⁶.

Attribute 14: Trust

The fourth technological revolution has shaken our society. But how far are we willing to pursue the innovation phenomenon? If we insist in innovating it is because we want to create

⁴³ Datarevenue (n.d), The 4 Success Factor of any AI Project. Retrieved from:
<https://www.datarevenue.com/en/blog/ai-project-success-factors>

⁴⁴ Wilem Peter De Ridder (2018), 4 Best practices for the formulation and implementation of an AI strategy. Part 10 of the series 'Perspectives on Artificial Intelligence'. Retrieved from: <https://futuresstudies.nl/en/2018/05/06/4-best-practices-for-the-formulation-and-implementation-of-an-ai-strategy-part-10-of-the-series-perspectives-on-artificial-intelligence/>

⁴⁵ Jordi Canals (2018), 10 ways Artificial Intelligence Is Transforming Management. Retrieved from:
<https://www.iese.edu/stories/10-ways-artificial-intelligence-is-transforming-management/>

⁴⁶ David Vandergrift (2016), The cost of automation of AI. Retrieved from:
<https://medium.com/@DavidVandegrift/the-costs-of-automation-through-ai-bddce416c4d7>

solutions that users will adopt willingly. To succeed we need to understand and listen to every concern of the population and experience has proven that mistrusted solutions will fail.⁴⁷

Step 3: Pair-wise comparison

In order to compare these attributes, we will use the Pair-Wise comparison technique⁴⁸.

	Specific	Measurable	Agreed upon	Realistic	Time-based	Risk mitigation	Data security	Flexibility	Communication	Effectiveness	Innovation	Complexity management	Costs	Trust	Sum	Rank
Specific		0	1	0	1	0	0	0	0	1	0	0	0	0	3	10
Measurable	1		1	0	1	0	0	0	0	1	0	0	0	0	4	9
Agreed upon	0	0		1	1	0	0	0	0	0	0	0	0	0	1	12
Realistic	1	1	0		0	0	0	0	0	0	0	0	0	0	2	11
Time-based	0	0	0	0		0	0	0	0	0	0	0	0	0	0	13
Risk mitigation	1	1	1	1	0		1	1	0	0	0	0	1	0	6	7
Data security	1	1	1	1	1	0		0	0	0	0	1	1	0	7	6
Flexibility	1	1	1	1	1	0	1		0	0	0	1	1	0	8	5
Communication	1	1	1	1	1	1	1	1		1	0	0	1	0	10	3
Effectiveness	1	0	1	0	1	1	1	1	0		0	1	1	0	8	5
Innovation	1	1	1	1	1	1	1	1	1	1		1	1	0	12	2
Complexity management	1	1	1	1	1	1	0	0	1	0	0		1	0	9	4
Costs	1	1	1	1	1	0	0	0	0	0	0	0		0	5	8
Trust	1	1	1	1	1	1	1	1	1	1	1	1	1		13	1

Figure 5 - Pair-Wise Comparison of the Criteria⁴⁹

Now we can understand that, when dealing with AI and contracts, the most important criterion is trust. Indeed, as Artificial intelligent is a new discovery, we still need to gain the public’s trust in order to further innovate and develop a relationship between Law and algorithms.

⁴⁷ Liset Molenaar (2018), Trust in technologies: 5 guiding principles. Retrieved from: <https://uxplanet.org/trust-in-new-technologies-5-guiding-principles-bda531cd9bb>

⁴⁸ Sullivan, Wickes & Kroelling, Engineering Economics (2014). Retrieved from: <http://www.planningplanet.com/guild/gpccar/managing-change-the-owners-perspective>

⁴⁹ By Author

Step 4: Sorting and weighting

Now we will refine our analysis by using a multi-attribute decision-making model based on a qualitative analysis⁴⁷. Indeed, we need to sort our attributes to find which is the best possible regarding our criteria and our problematic.

	Electronic Personality	Evolve Mentalities	Smart "smart contracts"	Divide the work between AI/lawyer	Ban on AI
Specific	Medium	Low	Medium	Medium	Medium
Measurable	Medium	Low	Low	Medium	Medium
Agreed upon	Medium	Medium	Strong	Strong	Medium
Realistic	Strong	Medium	Strong	Strong	Low
Time-based	Low	Low	Low	Low	Low
Risk mitigation	Strong	Strong	Strong	Strong	Strong
Data security	Medium	Strong	Strong	Strong	Low
Flexibility	Strong	Low	Strong	Strong	Low
Communication	Strong	Strong	Strong	Strong	Medium
Effectiveness	Medium	Medium	Medium	Medium	Medium
Innovation	Strong	Strong	Strong	Medium	Low
Complexity management	Strong	Strong	Strong	Strong	Strong
Costs	Medium	Low	Medium	Low	Medium
Trust	Strong	Strong	Strong	Strong	Low

Figure 6 - Qualitative Analysis⁵⁰

⁵⁰ By Author

To better understand our analysis, we weighted each attribute.

	Electronic Personality	Evolve Mentalities	Smart "smart contracts"	Divide the work between AI/lawyer	Ban on AI
Specific	Medium	Low	Medium	Medium	Medium
Measurable	Medium	Low	Low	Medium	Medium
Agreed upon	Medium	Medium	Strong	Strong	Medium
Realistic	Strong	Medium	Strong	Strong	Low
Time-based	Low	Low	Low	Low	Low
Risk mitigation	Strong	Strong	Strong	Strong	Strong
Data security	Medium	Strong	Strong	Strong	Low
Flexibility	Strong	Low	Strong	Strong	Low
Communication	Strong	Strong	Strong	Strong	Medium
Effectiveness	Medium	Medium	Medium	Medium	Medium
Innovation	Strong	Strong	Strong	Medium	Low
Complexity management	Strong	Strong	Strong	Strong	Strong
Costs	Medium	Low	Medium	Low	Medium
Trust	Strong	Strong	Strong	Strong	Low

Figure 7 - Weighted Qualitative Analysis⁵¹

After weighting our attributes, we can conclude on which alternative might be the best regarding our subject, by eliminating the one with a score under 10.

Indeed, the best options to improve the relationship between AI and Law might be the creation of an electronic personality, the improvement of smart contracts and a better understanding on how a lawyer and AI could cooperate. But an interrogation still remains: why does a change in mentalities has not a better score? The human mind is complex, and this ranking is undeniably linked with the fact that we need tangible and concrete proof to accept and embrace change. According Bill Gates “mindset[s] of the government and people have not adjusted to view the future, even though technology is exploding this decade into a world of the Internet of Things and the propulsion into artificial intelligence.”⁵². As for imposing a ban on AI, it is obvious, that

⁵¹ By Author

⁵² Bill Gates (2014), San Diego Technology Examiner. Retrieved from:
<https://www.wired.com/insights/2014/07/artificial-intelligence-changing-world-humankind-must-adapt/>

this will be totally unproductive and inefficient, as we are thriving for innovation and discovery of new pieces of knowledge.

Disruption is inevitable, and to accept it we need to see what the benefits of such a movement will be. The evolution of how intelligence is performed is quite hard to manage. To make AI and Law evolve we need for some leaders to prove with their ideas, their innovations, to create visible results so that the public opinions and government will, in return, favor and help to pursue the objective of creating a better-added value and changing the traditional society we live in.

FINDINGS

Step 5: Additive Weighting Technique

To refine our analysis and our decision-making we decided to use an additive weighting technique⁵³. Indeed, we compared the rank of our criteria, by normalizing them, with the weight of our feasible alternatives.

	Step 1	Step 2	Electronic Personality		Evolve Mentalities		Smart "smart contracts"		Divide the work between AI/lawyer		Ban on AI	
	Relative Ranking	Normalize weight (A)	B	B*A	C	C*A	D	D*A	E	E*A	F	F*A
Specific	10	0,10	0,6	0,06	0,2	0,02	0,6	0,06	0,6	0,06	0,6	0,06
Measurable	9	0,09	0,6	0,06	0,2	0,02	0,2	0,02	0,6	0,05	0,6	0,06
Agreed upon	12	0,13	0,6	0,08	0,6	0,08	1	0,12	1	0,12	0,6	0,08
Realistic	11	0,11	1	0,11	0,6	0,07	1	0,11	1	0,11	0,2	0,02
Time-based	13	0,14	0,2	0,03	0,2	0,03	0,2	0,03	0,2	0,03	0,2	0,03
Risk mitigation	7	0,07	1	0,07	1	0,07	1	0,07	1	0,07	1	0,07
Data security	6	0,06	0,6	0,04	1	0,06	1	0,06	1	0,06	0,2	0,01
Flexibility	5	0,05	1	0,05	0,2	0,01	1	0,05	1	0,05	0,2	0,01
Communication	3	0,03	1	0,03	1	0,03	1	0,03	1	0,03	0,6	0,02
Effectiveness	5	0,05	0,6	0,03	0,6	0,03	0,6	0,03	0,6	0,03	0,6	0,03
Innovation	2	0,02	1	0,02	1	0,02	1	0,02	0,6	0,01	0,2	0,004
Complexity management	4	0,04	1	0,04	1	0,04	1	0,04	1	0,04	1	0,04
Costs	8	0,08	0,2	0,02	0,2	0,02	0,6	0,05	0,2	0,01	0,6	0,05
Trust	1	0,01	1	0,01	1	0,01	1	0,01	1	0,01	0,2	0,002
TOTAL	96	1	10,4	0,650	8,8	0,51	11,2	0,70	10,8	0,68	6,8	0,486

Figure 3 - Additive Weighting Technique⁵⁴

⁵² Sullivan, Wickes & Kroelling Engineering Economics (2014). Retrieved from: <http://www.planningplanet.com/guild/gpccar/managing-change-the-owners-perspective>

This additive weighting technique confirmed our findings: creating an electronic personality, emphasizing of making smart contracts smart and further developing a work-relationship between AI and lawyers are the most suited alternatives to support the evolution of this traditional activity such as contracting, to create value, and to make Law evolve in order to maximize quality.

Step 6: Selection of the preferred alternative

In the light of our study, we can conclude that according to our criteria, the best solution was the improvement of "smart contracts" in 70% of the cases.

Indeed, this innovation can be seen as the future of Law, Justice, and contracts. With the advent of the blockchain, machine learning, algorithms, and artificial intelligence, there is no doubt that the legal ecosystem is in total disruption. Smarts contracts are simplifying everything while possessing abilities over pushing the boundaries of Human capabilities.

Moreover, we have seen that "smart contracts" will not threaten the lawyer profession as we still need a Human mind to performer other activities such as counseling. Using an algorithm is just a formal step that Law has to undergo. By just reviewing quickly Law's history we can see that it has known many evolutionary steps: from the popular trials used in Greece, to the witchcraft burning case in the Middle Age for example.

As we told earlier in our study, we need to lay the foundations to make mentalities evolve in order to accept this innovation movement. We can start seeing the benefits of the smart contract in many cases, but they still need improvements. According to Amara's law: "We tend to overestimate the effect of a technology in the short run and underestimate the effect in the long run."⁵⁵ We can undeniably apply this philosophy to smart contracts (regarding our objective of improving them). Although they will still need to evolve, they have the potential to revolutionize how party contract. What we need to envision is the smart contract's future, we should not focus on their present benefits and a potential hindrance because we are still green on the matter.

Step 7: Monitoring performance

First and foremost, it is obvious that we need to set up a framework in order to monitor the improvement of "smart contracts". Indeed, we need to narrow down which problem to address: how can we fix them? There are many flaws we can assign to intelligent agreements, but most of them are related to data privacy and sensitivity, digitized assets of all description and compromising funds⁵⁶.

⁵⁵ Wikipedia (n.d), Roy Amara, Amara's Law. Retrieved from: https://en.wikipedia.org/wiki/Roy_Amara

⁵⁶ Sherman Lee (2018), Blockchain smart contracts: more trouble than they are worth? Retrieved from: <https://www.forbes.com/sites/shermanlee/2018/07/10/blockchain-smart-contracts-more-trouble-than-they-are-worth/#3c0d391523a6>

Should this alternative be implemented, we need to focus on two major points:

1. Solidity
2. Security

As Ethereum is a network relying on more than 1.700 decentralized apps⁵⁷, it is sure that smart contracts will be vulnerable to many hacks and bugs. To write smart contracts, a specific code language is required: Solidity. A wrongdoing in the Solidity application can lead to dire errors and crisis. This weak character has many impacts and one of the biggest affected elements is trust from organizations and the public opinion. As the Ethereum Network is hardly working on the matter, we should not be afraid of this issue⁵⁸.

One of our other obstacles is security. Data privacy and security has always been a problem when dealing with innovation. According to SECBIT, a company focusing on researching on smart contracts and formal proofs, for a long-time, vulnerabilities in smart contracts are threatening blockchain projects⁵⁹.

But what is a formal proof? It is undeniably a solution to our security issue, but also: “in the context of hardware and software systems, formal verification is the act of proving or disproving the correctness of intended algorithms underlying a system with respect to a certain formal specification or property, using formal methods of mathematics.

The verification of these systems is done by providing a formal proof on an abstract mathematical model of the system, the correspondence between the mathematical model and the nature of the system being otherwise known by construction.”⁶⁰

In other words, a formal proof is a way to prove that smart contracts have a good behavior and are running well. By following a program logic, smart contracts are proving they are respecting the contract specification.

But more than a technical aspect, we must not forget the human character. Our study has proven that Humans have an impact on smart contracts. We need to train lawyers and all the parties

⁵⁷ Ethereum network (n.d), Build a new kind of decentralized application. Retrieved from: <https://www.ethereum.org/>

⁵⁸ Rachel Wolfson (2018), Smart Contracts on Steroids: Solving the Problems Facing Ethereum's Solidity. Retrieved from: <https://hackernoon.com/smart-contracts-on-steroids-solving-the-problems-facing-ethereums-solidity-a1f71cc260ce>

⁵⁹ SECBIT (2018), Improve Smarts contract by Formal Proofs. Retrieved from: <https://hackernoon.com/improve-smart-contract-security-by-formal-proofs-c0b377288e2e>

⁶⁰ Wikipedia (n.d), Formal Proof. Retrieved from: https://en.wikipedia.org/wiki/Formal_proof

that will have to deal with smart agreements on several points: data use, data sensitivity, data privacy, and security.

CONCLUSION

Throughout our study, our main objective was to answer several questions. "In which way can technology help a traditional profession like the lawyer one? How can AI help improve contracts? Our goal will be to understand all the interactions between the most important thing a company has to master, the act of contracting, and how Artificial Intelligence has disrupted the business game."

It appears that now we have all the elements necessary to answer them. We studied many alternatives, but we chose to only keep three of them: creating an electronic personality, emphasizing of the relationship between Artificial Intelligence and lawyers, and improving smart contracts. This choice was supported by our qualitative and quantitative analysis, and we can state that these alternatives are the best regarding innovation and Law.

Indeed, AI will not be able to replace lawyers as it is now. Not only it will help them, but algorithms can be considered as a huge improvement regarding contracts. Artificial Intelligence is disrupting the act of contracting and making it more efficient. With a human cooperation, we will maximize our benefits regarding this approach.

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Y-son Nguyễn is a young Project Manager of 23 years old and a former PGE Student at SKEMA Business School where he did the MSC Project and Program Management and Business Development. He has a strong international background since he lived in France, USA, Brazil, and he is deeply rooted with Vietnamese culture

After graduating from High school and passed his economical and social “baccalaureate” with honors; he did a Preparatory class for competitive entrance into French Business School during 2 years Paris. He integrated the “Programme Grande Ecole” of SKEMA BS in Management in 2015. During his time in SKEMA BS, Y-son also had several significant work experiences.

Attracted by the consulting environment and project management, he dedicated myself to develop an intellectual curiosity necessary to both of these sectors since he was 16 years old. Indeed, his different experiences in other cultures such as in Vietnam (2013) or in the United States (2017) and Brazil (2018) allowed him to take a step back from our society.

Indeed, he worked as a project manager in two associations. This commitment allowed him to take part to many projects related to sports and music. Then he worked as a project manager for 9 months in an IT consulting firm, currently located in Paris.

For now, Y-son is a consultant at Accenture in Paris.

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