GPAI Intellectual Property (IP) Primer

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GPAI | THE GLOBAL PARTNERSHIP ON ARTIFICIAL INTELLIGENCE

Disclaimer

This document does not seek to make any legal assessment on whether, in a given case, intermediate and final products or outputs of Artificial Intelligence (AI) development and utilization qualify for protection under applicable intellectual property or trade secrets laws; whether AI developers holding IP or trade secrets can successfully assert legal protection against unauthorized use of the subject-matter of protection by third parties, or whether AI developers using input from other sources will or will not infringe third party rights or trade secrets.

Whether IP or trade secrets protection exists for specific subject-matter will need to be assessed in the light of the concrete legal requirements of the applicable national law. Moreover, in AI contexts, legal practice is currently challenged by most difficult questions of interpretation and application of statutory provisions drafted prior to the advent of AI. National courts may take years to finally settle these questions, and the legislature may further intervene at any time to adapt existing IP and trade secrets laws to the needs of AI development. Thus, this document must be read against the backdrop of the legal situation existing at the time of its drafting.

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Introduction

This is a simple and practical guide to intellectual property (IP) for AI practitioners. The targeted audience is small and medium-sized enterprises (SMEs) who plan to develop or employ AI technologies, but it is also useful for anyone who is interested in AI. In this document, "AI" is synonymous to an information system that uses machine learning (ML) technologies in some part of the system. An AI system is a machine-based system that is capable of influencing the environment by producing an output (detections, predictions, recommendations, or decisions) for a given set of objectives. It uses machine and/or human-based data and inputs to:

(i) perceive real and/or virtual environments;

(ii) abstract these perceptions into models through analysis in an automated manner (e.g., with machine learning), or manually, and

(iii) use model inference to formulate options for outcomes. AI systems are designed to operate with varying levels of autonomy.

This document consists of five sections. Chapter 1 (*What is Intellectual Property (IP)?)* gives a high-level overview of the concepts of intellectual property. Chapter 2 (*IP Issues in AI*) describes IP issues specific to AI. Chapter 3 (*Difference Between Jurisdictions*) is on regulations, with a special focus on differences between different jurisdictions. Chapter 4 (*IP Management for SMEs*) has tips for SMEs on how to manage IP. Each section is concluded with a list of useful resources. The readers are encouraged to follow these links to further understand the topics. Finally, the last chapter, Chapter 5, is dedicated to FAQs.

1. What is Intellectual Property (IP)?

Intellectual property (IP) is a general term for anything that is the product of human mental activity and has property value. Of these, some are protected as intellectual property rights and others are not. For example, if an idea for an invention is not registered as a patent and is not a trade secret, it is not protected as an intellectual property right.

In this way, intellectual property itself and intellectual property rights are to be considered separately. Intellectual property and intangible property are also somewhat different in their nuances. However, the term "intangible property" may be used to refer to intellectual property. In any case, intellectual property, or intangible property, plays an important role in the survival of SMEs, and whether or not to protect it via intellectual property rights is also an important concern of them.

Intellectual property rights (IPR) are legal instruments giving a form of legal protection to any innovator and/or creator, such protection, to be used by such innovator and/or creator as they prefer, i.e. to protect their products/services, facilitate partnership or open innovation, license their innovation/creation, or any other use.

Various forms exist depending on the innovation and/or creation to be considered, with such tools constantly adapted to new form of innovation. For example, software development required some evolutions of patent legislation/practices and similarly for copyright. The same evolution is happening at the moment with the emergence of AI and all related technologies.

1.1. A brief overview of the various forms of intellectual property rights

We will focus here on the type of intellectual property rights that may be relevant to protect AI-related technologies. Please note that other forms can be considered, such as trademarks, to protect the brand value of a company or product. Furthermore, if you design a product (hardware or software) one may consider, as well, protection by design rights (design patents under US law) that may be helpful to protect a specific user interface (UI) (only the esthetic aspects).

1.1.1. Patent

It will require a specific patent-filing procedure in each country for which you need protection. It will also require going through a specific filing and examination process that requires time and financial resources in order to obtain a 20-year protection from the date of the first filing. For illustration, see below an example of a patent timeline.

Timeline for Patent application

A very fundamental aspect of a patent is that a patent will only be granted to the first person who has filed a patent describing an invention. That is to say, an invention needs to be novel. In order to do so, it is important for any inventor not to disclose its invention to any person who is not bound by a confidentiality agreement. It may therefore be helpful to understand the patents previously filed in order to avoid wasting financial resources.

The patentability of new technologies when they arrive is always a challenge. It has indeed been the case for software with legislation and jurisprudence getting increasingly stable. This however comes with differences among jurisdictions. The same phenomenon is happening now with new emerging technologies, such as AI. What may be considered as important at this stage, is to understand that a patent addresses protecting a technical solution to a technical problem by technical means. Whether such means are through software or a hardware is generally irrelevant.

A utility model is a form of a lightweight-patent that may be helpful to quickly secure a less expensive legal protection, yet offers a lesser degree of protection.

1.1.2. Copyright

Contrary to patents, copyright offers an inexpensive and automatic form of protection of an original creation. Copyright protection has been extended to any form of software (to a certain extent), and any software can therefore be protected under copyright laws, with some specific requirements depending on geographies (see *Chapter 3*).

This is a rather long form of protection (70 years postmortem), and well above any technological obsolescence. The only requirement to benefit from such protection is primarily to be able to secure the evidence of the content of the work created and its date of creation.

1.1.3. Trade Secret

Trade secret, or know-how, is generally defined as confidential information that is commercially valuable (as it is secret). Legislation generally requires that the owner ensures the protection of the secrecy of such information.

The level of protection of such trade secret can differ depending on jurisdiction, and in some jurisdictions, it may

even be exposed to some criminal sanctions[1]. With technologies becoming increasingly more complex, we can notice that trade secrets are also becoming increasingly more important, and therefore subject to disputes. This is especially the case when an employee leaves a company to move to a competitor.

1.1.4. Protection of Data

Except in a very specific protection offered to databases in the EU (see *Chapter 3*), data is not protected by a specific form of legislation for intellectual property. We can note that some data, such as pictures or other forms of artistic creation, can be protected by copyright. The access or the use of certain data may also be restricted by contractual arrangements. It is also important to bear in mind that any personal data is subject to various privacy laws around the world.

1.2. What are the benefits of intellectual property rights?

In general, intellectual property rights provide those who hold them with exclusive control based on their content. This will happen through the right to prevent anyone else from primarily using the protected work.

Under certain conditions, the owner of such right will benefit from a right to seek injunctive relief preventing somebody using or copying the protected work from continuing to infringe the intellectual property rights protecting such work. More generally, the right-holder will be able to ask for financial compensation to a court for such infringement. Exact details of such ability to enforce intellectual property rights depend on the type of rights asserted and the specific country or region legislation. A right-holder also needs to understand that any form of monopoly needs to be assessed against antitrust law considerations in certain cases.

It is also fundamental to understand that it is a right to enforce, and not an obligation. Through licensing, intellectual property rights can be used to foster more access to certain work. For example, open source licensing is restricting the right of any licensee to restrict the access to the source code of a software. Certain patent holders will also pledge to offer their patents for free, but with certain expectations that others will do the same[2].

More specific to AI, we can also notice some initiatives to foster more collaboration and data sharing. For example, many algorithms are available under open source licenses, as well as some licenses for open data collaboration[3].

1.3. Why intellectual property rights matter

Intellectual property legislation is always aimed at fostering more creation and innovation by giving some form of protection to such creators or innovators so they can be rewarded for their creativeness.

At a more macro-economic level, the challenge is more so to organize a balance between protection and collaboration. Besides some legislative discussions about certain aspects, when the market calls for more collaboration, we generally see some initiatives such as standardization, open source, collaboration so that IP can be more freely accessible.

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[1] Star Technologist Who Crossed Google Sentenced to 18 Months in Prison, https://www.nytimes.com/2020/08/04/technology/levandowski-google-uber-sentencing-trade-secrets.html
[2] Idem.
[3] https://venturebeat.com/2021/06/23/linux-foundation-unveils-new-permissive-license-for-open-data-collaboration

Now, when it comes to artificial intelligence, as any new technology, the challenges are to understand how it will be protected and how such protection will affect the development of the technologies and their deployment in the market.

1.4. Resources

- WIPO e-Learning center: https://welc.wipo.int/
- European IPR helpdesk: https://intellectual-property-helpdesk.ec.europa.eu/regional-helpdesks/european-ip-helpdesk_en

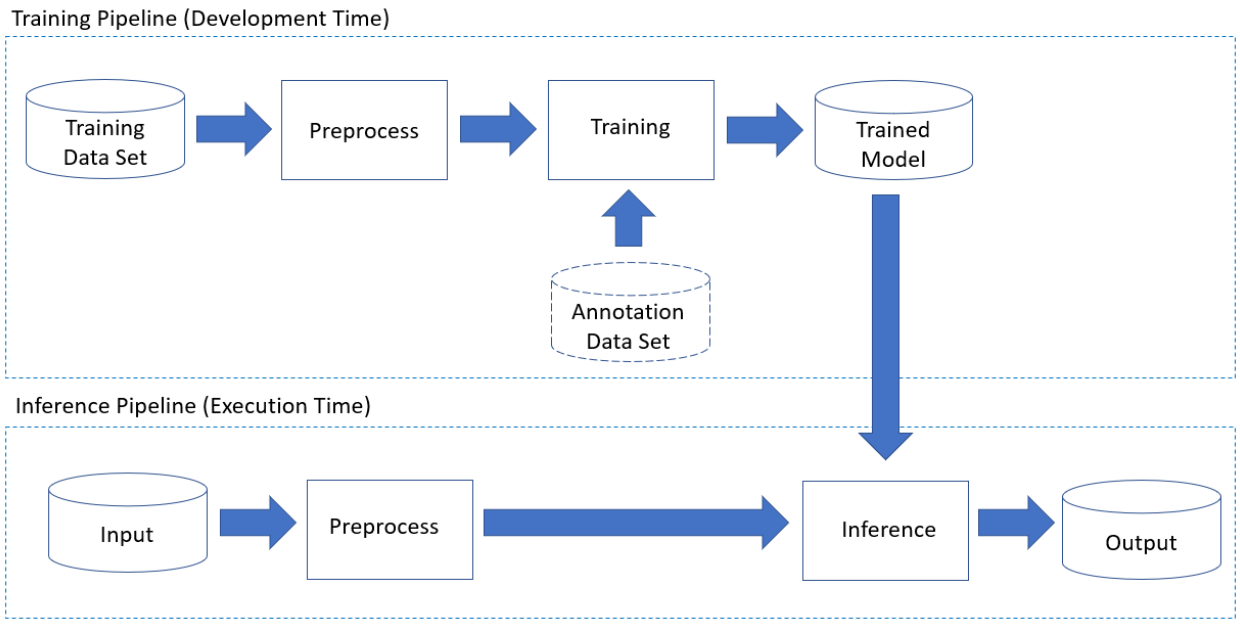
2. IP Issues in AI

Let's look first at how an AI system works so we can identify the key concepts about which we may consider intellectual property and how they may be applicable.

2.1. How does it work?

At a very high level, an AI system will consist of using data (annotated or not) with tools (i.e., pipelines, algorithms) to develop a trained model.

The development of an AI system, or an ML system, is divided in two main phases. The first phase is the training phase where the algorithm is provided with training data (**Training Data Set**) to learn from. During the training process, the training algorithm finds patterns between the input data with its labels and the wanted output data. It results in a **Trained Model**, the parameters and the predictions algorithm (a mechanism fed on past data to predict future information). Then the parameters of the trained model are frozen, thus becoming the **Inference Model**. The second phase consists of providing new inputs to obtain predictions, which is the output.



2.2. A closer look at AI work products

An AI system should be seen as a composition of different parts, not as a whole and unique system. Each of these parts can singly be considered in this analysis. From an IP point of view, the following work products need protection:

- **Training dataset:** As the initial element of the training, the performance of an AI system depends heavily on the size and the quality of the training dataset and its annotations. Building such a dataset requires many processes such as collecting/recording, cleaning, filtering, labeling, and/or aggregating by data scientists. Most of them will be annotated. For example, pictures of animals tagged with the name of the animal. Such data set can be built by an individual or a company collecting its own data (for example, operating data of its factories) or can be licensed. Protecting such dataset with IPR could be an incentive to create high-quality datasets. Indeed, as highlighted in a 2020 Gartner report[4], poor data quality can cost up to $12.8 million USD per year.
- **Trained model:** The training process is very computationally expensive. As an example, the cloud computing cost for training AlphaGo is estimated to be $35m USD[5]. In addition, the trained model can be endlessly retrained with new datasets, hence it can be reused in various ways.
- **Software code:** The software, as the orchestra conductor, enables the whole system to function by implementing the pipelines and all the phases to develop the AI.
- **Output:** The output is what will come out of the inference pipeline. For example, if you train an AI system to identify animals over some pictures, the output will be the identification of the animals on a new set of pictures. It may have some value as it is enriched data. In some cases, it can even go further, as it may generate new creation or work. For example, some AI-assisted tools may help to create new music (for example, applying the rhythm of Beethoven's 5th symphony of to a recent song). We can also consider several inventions generated by AI.

2.3. The challenges of AI in IP

As is the case with any new technology, AI raises new questions and challenges that are currently addressed by legislators and practitioners around the world.

Patenting AI

Patent applications in AI have drastically increased in recent years. The WIPO registered 12,473 AI patent applications in 2011. At the end of 2017, 55,660 AI patent applications were filed[6]. However, filing does not mean that the patent will be granted if it does not meet the patentability criteria. The key problem lies in the different practices and approaches of patent offices, as some are still very reluctant to grant a patent on AI.

In general, AI-related inventions will be considered as computer-implemented inventions with specific conditions (and depending on legislation around the world) to benefit from patent protection. For example, an AI invention based on computational models and mathematical algorithms is not likely to be patentable, but a specific application of such AI to solve a specific technical problem may be patentable (for example, the use of a neural network in a heart-monitoring apparatus for the purpose of identifying irregular heartbeats makes a technical contribution). Another source of patents can be the specific technical invention to make AI systems work more efficiently (for example, a specific technical implementation of neural networks by means of graphics processing units (GPUs))[7].

But many questions remain about some of the validity requirements for such inventions: How to assess the non-obviousness of the AI invention? Is a human who is skilled in the field enough to assess this condition? How do you meet the disclosure requirements?

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[4] Magic Quadrant for Data Quality Solutions, 2020
[5] https://deepmind.com/research/case-studies/alphago-the-story-so-far
[6] WIPO (2019). WIPO Technology Trends 2019: Artificial Intelligence.
[7] https://www.epo.org/news-events/in-focus/ict/artificial-intelligence.html

Ownership of data

As previously discussed, the efficiency of an AI system relies on the dataset. Thus, the access to and ownership of a dataset is essential. One of the major problems is that most of the data is retained by companies, in fear that distributing their data would make them lose competitiveness. It is still not clear whether data or datasets can be subjected to any IPR, or the database *sui generis* right.

The question of the ownership of data used to train an algorithm is even more important than how data can be protected by copyright or any other applicable IP rights (i.e. dataset of photos or text). So, how to deal with an AI system that was trained on a dataset infringing IP rights? To take the analysis one step further, does the use of protected data to train an algorithm fall within the scope of rights that can be restricted by the owner of the data (i.e. reproduction, adaptation, distribute, etc.)?

Inference model

Being composed of parameters and weights, the nature of the inference model is quite complicated to assess. It is still unsure whether this unknown legal object falls within the scope of copyright, database *sui generis* right, or even patent. It could be qualified as a trade secret, provided that the conditions are met. Yet, a protection is needed: with the new technological advancements, AI systems are not impenetrable "black-boxes" anymore. In fact, it is now possible to reverse engineer a model. So, without some strong IP protection, one that redeveloped an identical AI model could use it without infringing any IP rights.

Patentability of the trained model/inference model

Before the inference phase, the model is frozen in order to stop it from training indefinitely. But if the algorithm is perpetually training, the question is, how to protect an endlessly changing model? To illustrate this issue, if a patent is filed for an AI invention, is the inference model covered by this patent? If yes, what if the model is retrained but no specific changes have been made to the global AI system?

Protection of the output

The issue of granting IP rights on the output has already been addressed several times. The nature of protection might differ whether the output is AI-assisted or AI-generated.

As a creative work of mind, it has been evaluated that solely AI-generated works cannot be protected as they imply no human involvement. But, as explained before, the development of an AI invention involves human steering and controlling influence. Thus, it could be argued that a copyright protection may be relevant.

Concerning AI-generated inventions, the recent case of DABUS, where two patent applications designating an AI invention as the inventor were filed, shook the patent world. With no surprise, patent offices unanimously rejected the applications on the grounds that only a natural person can be designated as an inventor. Somehow, nothing was stated concerning the inventions themselves, thus leaving an uncertainty or a half-open door for AI-generated inventions. Additionally, it is important to keep in mind that there was a work of arranging, preparing the data and training the AI system with the intervention of a human.

2.4. Resources

- ITIF's response to USPTO RFC (https://itif.org/publications/2020/01/10/comments-us-patent-and-trademark-office-impact-artificial-intelligence)
- Artificial Intelligence and Intellectual Property Law Position Statement of the Max Planck Institute for Innovation and Competition of 9 April 2021 on the Current Debate: https://www.ip.mpg.de/fileadmin/ipmpg/content/stellungnahmen/MPI_PositionPaper__SSRN_21-10.pdf
- http://startup-together.com/startup-together-com-contributions/20190709-protecting-ai-related-innovation/

3. Difference Between Jurisdictions

3.1. Outline of different jurisdictions

We believe that it would be valuable to share information on each country's practices of AI in order to enhance innovation and commercialization of AI and to efficiently promote contract practices regarding IP. This would act to minimize the risk of infringing IPR belonging to another in the process of developing and providing AI solutions, as well as to raise awareness and capability of protection of work (or results) originally created by inventors or developers.

Although the statutes related to IPR in each country are to some degree harmonized, partially as a result of international law obligations, it still depends on policy makers and decisions by the courts in each state whether certain information is qualified as a copyrighted work[8].

It further complicates business under circumstances where the international or national legislation still does not fully cover AI-related matters. From the AI-systems perspective, there is also a need to see rules regarding access to information, data, libraries of algorithms or AI architecture, and for computer infrastructure that are an object of competition law. This is despite some elements of AI systems that could be an object of not only factual, but legal, monopoly as IP. The open source platforms are established under local, but overseas, jurisdictions, and offer their service under chosen private law and the localization of court. They deal with business under contractual law, often called the rules of community.

The threshold of whether some specific know-how can be protected as a trade secret may also be different in different countries because it is also determined by local legislators and courts. In the AI era, it is of significant importance that actual legal treatments in states might vary in different courts, though the statutes look the same among the different countries.

Since direct unification of international *hard laws* at this time is unrealistic, it is better to boost AI business by proposing some guidelines for contracts relating to AI data from the perspective of *soft law*, and to minimize the risk of IPR infringement from the viewpoint of hard law.

We should compare practices of IP law among different states, and introduce the guidelines about data contracts regarding AI in each country (if they exist).

From the above, in this discussion, we will make comparisons of patent rights, copyrights, trade secret, and other relating IPR among different states, and introduce the guidelines proposed by some countries.

- **Patent:** Generally speaking, a patent is a legal monopoly given by an official agency for any invention that is new, not-obvious, and capable of industrial application, but directed by non-judicial exceptions including: law of nature, natural phenomena, discoveries, abstract ideas or scientific theories and mathematical methods, aesthetic creations and presentation of information, as well as rules and methods for performing a mental act, playing games, or doing business. The differences among initially compared legal systems belong to accounting for a program for computers (software) as a patentable invention (EU vs. USA, Canada, and Japan). We can notice the fragmentation of legal systems in patenting hardware with embedded AI systems, or patenting software of AI systems. This is a matter of competitiveness of legal systems, but also a barrier to go on the market and scale innovation up without a risk of infringement on others' patented rights.
- **Copyright:** From a general point of view, copyright also means legal monopoly, but nascent by creation of original results of activity individuals. It refers to art, design, and also other inventions even if its object is not patentable, but with exclusion of ideas and concepts. In some jurisdictions the original expression of the architecture of a database is also covered by copyright law (e.g., in the EU, for example). However, every jurisdiction also sees a

[8] https://www.wipo.int/edocs/pubdocs/en/wipo_pub_464.pdf

computer program as an object of this monopoly on every stage of developing, (e.g., preparatory materials, projects of logic and model, source-code, object-code or user manuals). Some of jurisdiction allows TDM (text and data mining) as exceptions of the monopoly of copyright, which allows machine learning on copyrighted materials, but it is usually required to get the license from copyright holder (it is the case in the EU). Copyright law does not cover raw data that is not enriched by the results of original creation. The legal systems are enabled to extend IP rights by holders for users via copyleft framework as creative commons, or open source licenses that allow a use of others' IP on mutual recognized rules of community of creators or coders. It usually does not refer to commercial usage, except for when the rules are respected and proper compensation is guaranteed.

- **Trade secret:** Despite the fragmentation of a common understanding of the scope of an institution of "trade secret", it is seen and protected by many of jurisdictions as an object of competition law. It could include a production method, sales method, or any other technical or operational information useful for business activities when it is controlled as a secret and not publicly known. From a data perspective, the object of trade secret is usually data that is generated by internal works of those keeping trade secret. However, no jurisdictions explicitly express that data collected from an external environment could be limited of access by keepers of what especially could be referred to as data collected by sensors from public space, or other private or personal resources or characteristics. If the legal system allows to limit the access to trade secrets, the transfer of it takes place under a contractual license between the keeper and user. The regulations of trade secrets allow us to protect AI systems as a 'know-how', where transfer is restricted on the conditions of a license.
- **Data:** Raw data (as digitized information) is not an object of IP law and IP rights if it is not enriched by original creation of individuals. There are samples of jurisdiction that protect data sets as a whole (e.g., in the EU). If it is a personal one, it is protected by personal data protection regulations (e.g., the GDPR in the EU). Furthermore, if it is generated by companies, it could be protected by trade secrets. Some countries ensure free flow of personal or non-personal data in between boarders under mutually recognized rules established by regional law, by free trade agreements, or a specific partnership of like-minded countries. This kind of asset could be an object worth sharing among possessors and users in order to increase productivity and innovations, and to avoid to not fall into a technological debt. For these proposes, the framework of licensing is useful to enable lawful access to data if it is established on fair values.
- **Trademark and utility model:** AI systems can also be protected by trademarks, which refers specifically to the name, but also to an aesthetic expression of interface between the AI system and user. It is an additional option to get legal monopoly for IP in parallel to copyright of this expression of original creativity. It is, however, worthwhile to note that, as in the patent system, the system of trademarks depends on jurisdictions and requires obtaining a confirmation of monopoly by official agencies. Fiscal expression of interface as a shape of structure or an embodied set of functions could be also an object of utility model if it is new, durable, and is suitable for industry implementation (e.g., the EU, Japan, etc.).

3.2. Differences by jurisdictions (the European Union, the United States, Canada, and Japan)

In this section, we share basic information of several jurisdictions, notably the European Union (EU), the United States (US), Canada, and Japan for reference by experts coming from tech companies, business, and law. We believe that an introduction to these jurisdictions will be able to help us understand most characteristics of law and regulations in regards to IP law because these countries have laws sufficiently containing common law concepts, continental law concepts, and Asian law concepts. Of course, different countries have different laws even if both countries laws are based on common law. However, for the purpose of demonstrating the overview of comparison of laws in countries, we believe it is enough.

Tables 1 to 5 in the Annex summarize statutes related to IP in each country and gives some examples.

3.3. Resources

- WIPO site URL: https://www.wipo.int/edocs/pubdocs/en/wipo_pub_1055.pdf

4. IP Management for SMEs

After introducing the different types of intellectual property rights and how they apply to AI, we would like to guide you as an entrepreneur to define and to understand how intellectual property rights can help your business; how to define your IP strategy and how to execute it. Obviously, this document only describes some of the fundamental aspects and will never replace a thorough and detailed work with the appropriate professionals.

4.1. Understand your business

First, you should understand your business. The goal of this step is to analyze your business and identify the key assets that contribute to the success to your business and how intellectual property rights can help you to achieve your business objectives.

What is your business model? Who are your customers? What values do you provide to them? Who are the ones you need to partner with? Who are your competitors? What differentiates your business from them? What are the internal key assets that contribute to the valuation of your company? Are they your people, customer base, unique technology, or business model? Also, what are the third-party assets you are depending upon?

If your key assets include unique technologies and/or business models, ask the following questions to yourself:

- Is your technology/business model simple and clear enough that your competitor can easily replicate? Or, is it a complex set of know-how's that are hard to document and transfer?
- Is speed of penetration into the market the essential driver of your success? And therefore, a more open approach about your technology and its adoption can help?
- What is the patent landscape in your field of operation?
- Is your business dependent on third party IPR?

For example, I am developing a new AI technology to help some companies with their predictive maintenance, and I may consider various options depending on my business context:

- My technology will not be accessible to my customers (e.g., it will be hosted on my server without any access to it) – does it make sense to file a patent about all the details with the risk to explain to my competitors what my technology is about? (I may consider a patent on some of the generic aspects without entering into the details.)
- The success of my company will depend on the quality of the AI that I can provide my customers with, thereby fostering access and sharing of data is crucial (and my early entry and speed of execution will be sufficient). So, in such case, would it make more sense to open source some of my technology, so that people are more open to share their data?

4.2. Setting your IP strategy

Having now a clear picture of your key assets, of your business environment and your business goals, the question is now how intellectual property rights can help you there with some specific considerations around AI:

- The availability of certain intellectual property rights is not certain, and more than that, their enforceability is a question mark and,
- The access to certain data sets may create some specific constraints.

Create your own IPR

Generally, in most jurisdictions, a company will own the intellectual property created by its own employees and some specific provisions may be required in such employment agreements, and it will generally be your main source of IPR.

Partnering with a third party may be also a very good source of intellectual property; this can be with customers,

suppliers, universities, or others, but it will require to set up the appropriate agreements including provisions to deal with the ownership and the exploitation of the intellectual property created.

Finally, intellectual property rights can be acquired, too. For example, if you need specific technology. But just but as well more generally, we noticed some companies acquiring some patents (especially if they need to hold a patent portfolio for defensive reasons) and it has happened with companies such as Twitter, Facebook, and/or others (generally in a pre-IPO context).

Protect your IPR

As highlighted in Chapter 1 and with considerations in Chapters 2 and 3 about AI related technologies and geographical differences, different intellectual property rights are available to protect your assets.
It is important to keep in mind that protecting an asset does not necessarily mean that one will have a proprietary strategy and enforce it strictly. We will explain in more details about different strategies available to create value with your intellectual property rights later on.

Access third party IPR

You may need to access certain IPR owned by a third party and this may cover different types of situations:

- You need to access to certain technologies and you will consider buy or make decision depending on various usual criteria. This is a rather straight forward situation and you may consider very various choices as the technology may be also available under open source license.
- More difficult to assess is the risk of infringing third party patents as you will develop your own product or service and you may infringe patent filed by other companies. In a study released in 2019, WIPO indicates that the number of AI-related patents grew by an average of 28 percent annually between 2012 and 2017, reaching a number exceeding 50,000 patent families in 2017[9].

As a startup, your investors will generally request a study of your freedom to exploit, and more generally, it may make sense for you to understand your patent landscape and to understand your risks and to consider various mitigation actions:

- Securing an access to such patent through a license, whether directly or through some form of partnership, joint-venture, or even acquisition.
- Adopting a defensive strategy and securing a cross-license. This will mean developing a patent portfolio you will leverage only for defensive purposes and to secure cross-licenses with companies owning patents you may infringe yourselves.
- Accessing the technology through the patent holder or under its protection: For example, many cloud service providers will offer AI functions such as image or voice recognition, and using such functionalities will give you access to all their patents related to them, or the patents for which they secured access to (generally they offer some form of IP indemnity should you be accused of infringing third party patents). The same form of protection exists when you buy certain hardware as well.
- Leveraging open source implementation of certain technologies: In general, we can consider that open source software benefits from some form of patent protection, because of the patent license, all users and contributors have to agree for licenses, including specific patent provisions and more generally as the open source community is likely to react strongly any patent assertion against an open source software.
- Securing a license of certain patent pools: primarily for audio and video technologies such as MPEG4, some patent holders agree to offer all their patents under a one stop shop offering. This may help having access to most, if not all, of the patents related to a specific technology.

Accessing Data for AI

Access to data is certainly a central and complex question around AI and we invite to read through the work done

[9] https://www.wipo.int/edocs/pubdocs/en/wipo_pub_1055.pdf

by the GPAI Data Governance group[10] and especially their framework paper[11].

Please note here that we are not touching on privacy considerations which will be subject to very specific regulations.

Now, in practical terms and considering the situation today, how can you secure access to the data that you need?

- If you are working with one of your customers, this may authorize you to access its data. Such access is likely to be limited to the work you are doing and if you are planning to re-use such data or the trained model developed using its data, you should seek for some specific provisions in your agreement.
- Certain data sets are available as a commercial service and therefore the access will depend on the commercial terms (some of their data may be protected under certain copyrights and their database may be protected).
- Certain data sets are widely available and can be used, but you should read the terms of the license. For example, *Waymo* is making available data re. autonomous driving under various specific terms and limited terms that which are prohibiting any commercial use, and for example, using such data sets to develop a trained model for one of your customers or to offer some services is explicitly prohibited[12].
- Use open source data sets and, for example, the Creative Commons with their open data initiative[13], and the Linux foundation is hosting an initiative, as well and some other data sets. Like any open source software, what is essential is to understand the terms and conditions of any license.
- Certain jurisdictions are offering certain rights to use copyrighted materials for machine learning. Please refer to Chapter 3 for more details.

Create value with your IP

Having intellectual property rights is a first step, but then will come the question about how to use such IPR to achieve your business goals, and very various approaches exist. It is therefore difficult to summarize, as it may be different for patents or copyrights, and as well depending on the different components of your technologies.

For example, you may consider filing patents on your key technologies and more widely to protect your business defensively so that you can secure a cross-license if needed. It will help you to secure funding from investors.

This will not preclude you from making some of your technologies accessible through an open source model to facilitate its adoption, and even with a dual licensing model so clients can choose between an open source license or a proprietary license, or simply open sourcing some enablers (such as certain ML algorithms).

4.3. Execute

4.3.1. Create the team

You should build an organizational capability for managing IP. At first when the company is small, an officer, such as a CTO, can do all IP-related management tasks. Later, after the company grows larger, you may need to establish a department dedicated to IP.

You will also need outside counsel to assist you, especially qualified and registered patent attorneys. In any country, professional associations of lawyers or patent attorneys will have lists of their members available.

4.3.2. Optimize IP-related Costs

Managing IP is costly. You should always be conscious of the balance between the IP-related cost and its benefit in your business context.

[10] https://gpai.ai/projects/data-governance/
[11] https://gpai.ai/projects/data-governance/gpai-data-governance-work-framework-paper.pdf
[12] https://waymo.com/open/terms
[13] https://creativecommons.org/about/program-areas/open-data/

Patent filling cost

Typically, one patent costs $30,000 USD or €100,000 (in case you file the patent in three EU countries and the US) for its lifetime of 20 years[14]. This number includes the cost for filing a patent application and the annual maintenance fees, but does not include the cost of the inventor's work time for invention, preparing the necessary documents, office actions, monitoring the market for possible infringement, and lawsuits (if such events occur).

If your invention does not seem to be worth the patenting cost, here are some other ways to protect your invention:

- Keep the idea as a trade secret instead of filing a patent: The AI field is evolving quickly. If you expect your idea will become outdated soon (for example, within the next 6-12 months), keeping your idea secret is a reasonable alternative to filing a patent (see "Cost of Maintaining Trade Secret" below).
- Publish the invention: If you are not concerned that your competitor copies your idea, publishing it (e.g., as a technical paper or a web article) will prevent others to file a patent on the same idea.
- Consider PCT Application: If you plan to file your patent in multiple jurisdictions, applying for PCT (Patent Co-operation Treaty) will save significant amount of cost.

Patent Search/Clearance Cost

To avoid infringing third-party patents, you need to check whether the idea has been already patented. There are a number of commercial patent databases. If you are on a tight budget, you may use free search engines, such as FreePatentsOnline.com. Building appropriate query yourself is not easy and there are chances that you may miss critical patents in your search. Instead, you may use a professional patent search service which may cost anywhere between $100 USD and $3,000 USD per search.

Cost of Maintaining Trade Secrets

Protecting your invention as a trade secret instead of filing a patent is viable option to minimize cost. However, you should be aware of the fact that there are costs associated with maintaining trade secret, because you have to have appropriate security mechanisms, such as authentication and access control, together with periodical auditing. Also trade secrets are also much weaker, especially because protection depends on secrecy. Any other person may make it public.

Cost of Lawsuits and Insurance

Costs of enforcing intellectual property rights can be extremely different depending on the countries and on the type of rights considered, varying from several millions of USD for a patent litigation in United States, to several hundred thousand in France, or a bit more in Germany, for a patent to substantially less for copyright infringement situation.

Regarding insurance against third party claims or even against third party infringement of your IP, very limited offers exist today in the market but it is a rapidly evolving market[15]. Costs can range from a limited coverage for €50,000 a year, to a certain percentage of the amount for which you would like to be covered.

4.4. Resources

- Enterprising Ideas: a guide to Intellectual property for start-ups: https://www.wipo.int/edocs/pubdocs/en/wipo_pub_961.pdf
- How startups and SMEs should think about IP: an investor's perspective: https://www.wipo.int/wipo_magazine/en/2021/02/article_0006.html
- More on data: https://gpai.ai/projects/data-governance/gpai-data-governance-work-framework-paper.pdf
- Montreal Data License (https://www.montrealdatalicense.com/en): an easy-to-use, web-based tool for generating data license language.
- Contract Guidelines on Utilization of AI and Data a comprehensive guide for contracts between a user company

[14] The numbers may increase if another party brings opposition proceedings to prevent the grant of the patent.
[15] https://news.bloomberglaw.com/ip-law/ip-insurers-see-their-time-as-now-with-covid-19-in-background

and an AI technology supplier: https://www.meti.go.jp/press/2019/04/20190404001/20190404001-2.pdf

5. FAQ for Entrepreneurs in AI

Question: I am developing new products or services using AI technologies to improve them. Should I protect these improvements?
Answer: Yes, improving your products or services by using AI technologies can be protected through IPR especially by patents if it helps to solve new technical problems as they may be considered technical means. Such innovation may be protected by patents but as well by copyright if your innovation is delivered through software.

Question: I am developing new AI related technologies. Should I protect such technologies, and how? Or should I release them under open source?
Answer: As any technology, various forms of intellectual property can help to protect your innovation, especially patents. It is not an alternative to open source as once protected, you will have the option depending on your business model or other considerations to adopt a more proprietary approach or an open source model (or a dual licensing approach).

Question: What about the output of an AI? Can it be protected?
Answer: The answer is not straightforward here. For example, a patent office rejected an AI-generated invention patent application. More protection may be available for AI-assisted work, but again it really depends here.

Question: I need data to train my AI system. Can I use any kind of dataset available?
Answer: No, you need to check whether such a dataset is available under specific terms and conditions. This is like any software some are under open source; some others are under specific license.

Question: I am working with a client using their data to develop an AI invention to assist them in their business. Who will own what?
Answer: It is very important that you define contractually who will own what, especially the trained models, as you may be interested (and your client, too) to have your AI trained with more data coming from other clients. Obviously, your client will be concerned by the protection of their own data and access to such data by its competitors and normally, it should not be the case.

Question: Within my company we gathered very interesting non-personal data and we would like to monetize it as a business. Can I protect such data?
Answer: To summarize an extensive explanation, data is not likely to benefit from an IP protection. Therefore, what will be important is for you to define the access to such data you would like to grant through contractual mechanism.

Annex

Table 1

Table 1 - Patents			
1 - Requirements			
EU	**US**	**Canada**	**Japan**
One can either file a patent at a national patent office, or at the European Patent Office (EPO).	Inventions must be novel and non-obvious, as well as not “directed to a judicial exception” “without significantly more”. Approach to subject matter has evolved through substantial case law (notably *Diamond v Diehr*; *Alice Corp. v CLS Bank*; *Mayo v Prometheus Labs*, among others).	Inventions must be novel and non-obvious, and have a “discernible physical effect” (beyond “mere calculation”).	Inventions need to have “novelty” (meaning, objectively something new based on the date and time when the applicant filed the patent application with the Japan Patent Office), and be “advanced”. In the case of computer programs, it is sometimes disputed whether or not they “utilize the laws of nature.” Since “invention” is the creation of technical ideas that “utilize natural laws,” it is clear on whether mere abstract and artificially decided concepts fall under the category of the creation of technical ideas that "utilize natural laws.” In addition, even if the program merely adds content such as recordings and displaying data by using general computer functions in accordance with these abstract concepts and artificial arrangements. It does not fall under the category of creation of technical ideas “using natural laws” (Intellectual Property High Court, September 24, 2014).

		Patent Act	*Patent Act*
Article 52 EPC (1) European patents shall be granted for any inventions, in all fields of technology, provided that they are new, involve an inventive step, and are capable of industrial application.	**35 USC § 101** Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefore, subject to the conditions and requirements of this title.	**Section 2:** "Invention means any new and useful art, process, machine, manufacture, or composition of matter, or any new and useful improvement in any art, process, machine, manufacture, or composition of matter."	**Article 29 (1)** An inventor of an invention that is industrially applicable may be entitled to obtain a patent for the said invention, except for the following:
Article 52 EPC (2) The following in particular shall not be regarded as inventions within the meaning of paragraph 1:	Judicial exceptions: abstract ideas, laws of nature, and natural phenomena ["the basic tools of scientific and technological work", from Alice, quoting *Gottschalk v Benson*]. However, an invention is not rendered patent-ineligible simply because it involves a judicial exception.	**Section 27(8)** [What may not be patented] No patent shall be granted for any mere scientific principle or abstract theorem.	(i) inventions that were publicly known in Japan or a foreign country, prior to the filing of the patent application;
(a) discoveries, scientific theories and mathematical methods; (b) aesthetic creations; (c) schemes, rules, and methods for performing mental acts, playing games or doing business, and programs for computers; (d) presentations of information.	**Alice/Mayo test:** Step 1: Does the claimed subject matter fall within the four statutory categories in §101 (process, machine, manufacture, or composition of matter)? If no, it is patent-ineligible. If yes, proceed to Step 2A. Step 2A: Is the claim "directed to" a judicial exception? If no, claim is patent-eligible. If yes, proceed to step 2B. Step 2B: Does the claim contain an "inventive concept" sufficient to "transform" the claimed abstract idea into a patent-eligible application? If yes, claim is patent-eligible. If no, claim is patent-ineligible. For Step 2B, the claim must include "additional features" to ensure "that the [claim] is more than a drafting effort designed to monopolize the [abstract idea]." Additional features must be more than "insignificant, extra-solution activity", features described at a "high degree of generality", or application to a	"Purposive construction" is used to construe the claims and determine whether the "actual invention has physicality and solves a problem related to the manual or productive arts". All essential elements of the invention must be considered. In determining what is an "essential element", the inventor's intention must be considered (as far as that can be determined from the claims and specification). Must have physicality and a technical effect.	(ii) inventions that were publicly worked in Japan or a foreign country, prior to the filing of the patent application; or

	particular field of use. It is highly subjective and often conflated with analysis of obviousness (inventive concept does not equal inventive step).		
In order to assess the eligibility of a software, the EPO adopted the two-step approach known as the *Comvik* approach: – a technical feature; – an inventive step: the technical feature can be considered as non-obvious.		Particularly relevant cases: - *Free World Trust v Électro Santé Inc, 2000 SCC 66*, and *Camco v Whirlpool, 2000 SCC 67*: judgments adopting and setting out purposive construction. - *Amazon.com Inc v Canada (Commissioner of Patents)*, 2011 FCA 328: business methods are not unpatentable *per se*. - *Yves Choueifaty v Attorney General of Canada*, 2020 FC 837: Federal Court rejected the "problem-solution approach" to purposive construction used by the Patent Office and clarified the determination of essential elements. After Choueifaty (which was not appealed), the Patent Office has since published a Practice Notice (PN2020-04) outlining a revised approach. Among other things, they note as follows: "The mere fact that a computer is identified to be an essential element of a claimed invention for the purpose of determining the fences of the monopoly under purposive construction does not necessarily mean that the subject matter defined by the claim is patentable subject matter and outside of the prohibition under subsection 27(8) of the Patent Act. In such a case, it is necessary to consider whether the computer cooperates together with other elements of the claimed invention and thus is part of a single	(iii) inventions that were described in a distributed publication, or inventions that were made publicly available through an electric telecommunication line in Japan or a foreign country, prior to the filing of the patent application.

		actual invention and, if so, whether that actual invention has physical existence or manifests a discernible physical effect or change and relates to the manual or productive arts.”	
Specific conditions for AI or ML inventions: Specific clauses in the EPO Guidelines for Examination concerning Artificial Intelligence and Machine learning inventions have been added. (G-II, 3.3.1 – Artificial intelligence and machine learning). Artificial intelligence and machine learning have been defined in these specific clauses as, “computational models and algorithms for classification, clustering, regression, and dimensionality reduction, such as neural networks, genetic algorithms, support vector machines, k-means, kernel regression, and discriminant analysis”. As they can refer to abstract models or algorithms, they cannot be patented as such (art.52 (2) and (3) EPC). Those inventions will inevitably need to imply a technical effect (Art. 54 and 56 EPC). The EPO provides a few examples of the technical effect. For example, the use of a neural network in a heart-monitoring apparatus for the purpose of identifying irregular heartbeats makes. On the opposite, this has no technical effect on the classification of text documents, solely in respect of their textual content. Lastly, and more interestingly, the EPO specifies that if “a classification method serves a technical purpose, the steps of generating the training set and training the classifier may also	Note that arguments based on the 2019 PEG are recognized during prosecution at the USPTO but have not always been successful in US lower courts (not yet tested at the USSC).	(2) Where, prior to the filing of the patent application, a person ordinarily skilled in the art of the invention would have been able to easily make the invention based on an invention prescribed in any of the items of the preceding paragraph, a patent shall not be granted for such an invention notwithstanding the preceding paragraph.	

contribute to the technical character of the invention if they support achieving that technical purpose". Concerning the disclosure of information (art. 83 EPC), an application shall disclose the invention in a manner sufficiently clear and complete for it to be carried out by a skilled person. As an example, in the case T161/18, an AI-related invention may require the disclosure of underlying algorithms and/or corresponding training steps.			
		Article 2 (1) "Invention" in this act means the highly advanced creation of technical ideas utilizing the laws of nature.	
Table 1 - Patents			
2 - Duration of protection			
EU	**US**	**Canada**	**Japan**
Article 63 EPC (1) The term of the European patent shall be 20 years from the date of filing of the application [given the annuities are paid].	**35 USC §154 (a)(2)** Subject to the payment of fees under this title, such grant shall be for a term beginning on the date on which the patent issues and ending 20 years from the date on which the application for the patent was filed in the United States or, if the application contains a specific reference to an earlier filed application or applications under section 120, 121, 365(c), or 386(c) from the date on which the earliest such application was filed.	**Patent Act, s 44** Subject to section 46 [payment of maintenance fees], where an application for a patent is filed under this Act on or after October 1, 1989, the term limited for the duration of the patent is 20 years from the filing date.	**General Rule** **Article 67 (1)** The duration of a patent right shall expire after a period of 20 years from the filing date of the patent application.

Table 1 - Patents			
3 - Examples			
EU	**US**	**Canada**	**Japan**
Decision G 1/19 on the patentability of simulation methods, and especially on the assessment of the inventive step of computer-implemented simulations. A computer-implemented simulation of a technical system or process that is claimed as such can, for the purpose of assessing inventive step, solve a technical problem by producing a technical effect going beyond the simulation's implementation on a computer. For that assessment it is not a sufficient condition that the simulation is based, in whole or in part, on technical principles underlying the simulated system or process. This case might be applied to AI related inventions, as the same criteria might be kept for analyzing the inventive criteria of an AI-related invention. **The DABUS cases** Two patent applications have been filed, where a machine called "DABUS", which is described as "a type of connectionist artificial intelligence", is named as the inventor. The applications were refused by the EPO on the grounds that they do not meet the legal requirement that an inventor designated in the application has to be a human being, and not a machine.	In addition to the EU, the DABUS cases were also rejected in the US. In light of the "current" state of US law, the USPTO concluded that an inventor must be a "natural person". The more technical details, the better the chances of success: - *DDR Holdings v Hotels.com*, 773 F.3d 1245 (Fed. Cir. 2014): the claims addressed a technological problem "particular to the internet"; - *Biax Corp. v. NVIDIA Corp.* (Civil Action No. 09-cv-01257-PAB-MEH): patents at issue directly included substantial sections of code, technical details. Subject matter was not raised as an issue.	Landmark Graphics Corporation (Re), 2021 CACP 9 (PAB Decision, post-Choueifaty): Claims related to "the steps of a computer-implemented algorithm for improved modeling of oil, gas, and water production profiles of prospective wells and the economic returns associated with them". Also included the step of "(e) using the data from the simulation engines in a well perforation and completion process" (which was considered to be a practical application). In preliminary consideration, before release of the FC judgment in Choueifaty, considered the claims unpatentable. However, by the time of the decision, Choueifaty applied and the CIPO Practice Notice PN2020-04 had been released. Analyzing the claims as directed by PN2020-04, the PAB concluded the claims comprised patentable subject matter.	N/a

Table 1 - Patents			
4 - Remedy against infringement			
EU	**US**	**Canada**	**Japan**
Infringement and validity of patents in Europe are under the responsibility of the competence of national courts and authorities. This means that patents must be litigated separately in each country where they have effect and are infringed.	Monetary remedy, injunctive relief, and may include punitive damages. **35 USC §284** Upon finding for the claimant the court shall award the claimant damages adequate to compensate for the infringement, but in no event less than a reasonable royalty for the use made of the invention by the infringer together with interest and costs as fixed by the court. When the damages are not found by a jury, the court shall assess them. In either event the court may increase the damages up to three times the amount found or assessed. **35 USC §286** Except as otherwise provided by law, no recovery shall be had for any infringement committed more than six years prior to the filing of the complaint or counterclaim for infringement in the action. **35 USC §287** To recover for infringement of any patented article, the article must be marked with a patent notice or the infringer must have been notified and continued to infringe.	Federal Court jurisdiction. Injunctions are possible, but rare, especially when monetary award would be sufficient relief. Interlocutory injunctions are very rare. May include punitive damages. **S 55(1) of Patent Act** A person who infringes a patent is liable to the patentee and to all persons claiming under the patentee for all damage sustained by the patentee or by any such person, after the grant of the patent, by reason of the infringement. **S 55(2)** A person is liable to pay reasonable compensation to a patentee and to all persons claiming under the patentee for any damage sustained by the patentee or by any of those persons by reason of any act on the part of that person, after the specification contained in the application for the patent became open to public inspection, in English or French, under section 10 and before the grant of the patent, that would have constituted an infringement of the patent if the patent had been granted on the day the specification became open to public inspection, in English or French, under that section.	Injunctive relief, compensation, and criminal sanctions.

Table 2

Table 2 - Utility model			
1 - Requirements			
EU	**US**	**Canada**	**Japan**
There was a proposition to harmonize the utility model regulation across the European Union, but it has been abandoned.	Utility models are not available in the US. However, under the Paris Convention, foreign utility models may form the basis for a priority claim.	Petty patents are no longer available in Canada. However, under the Paris Convention, foreign utility models may form the basis for a priority claim.	In general, creation of technical ideas utilizing the laws of nature is not publicly known, and not easy to be make.
In France, the PACTE law no. 2019-486 of May 22, 2019, reformed the utility model system. The new PACTE law also added the possibility to convert a utility certificate into a patent application.	N/a	N/a	**Article 3 (1)** A creator of a device that relates to the shape or structure of an article or combination of articles and is industrially applicable may be entitled to obtain a utility model registration for said device, except when the following applies:
The utility certificate is a property title issued by the French Patent Office, which, like a patent, gives a monopoly of exploitation on an invention: - For a maximum period of 10 years, instead of 20 years for the patent; - For which no prior art search report is established during the examination procedure, unlike the patent application.	N/a	N/a	(i) the device was publicly known in Japan or a foreign country, prior to the filing of the application for a utility model registration therefore;
The new PACTE law also added the possibility to convert a utility certificate into a patent application.	N/a	N/a	(ii) the device was publicly worked in Japan or a foreign country, prior to the filing of the application for a utility model registration therefore; or
The new PACTE law also added the possibility to convert a utility certificate into a patent application.	N/a	N/a	(iii) the device was described in a distributed publication, or a device that was made publicly available through an electric telecommunication line in Japan or a foreign country, prior to the filing of the application for a utility model registration therefore.

	N/a	N/a	(2) Where, prior to the filing of the application for a utility model registration, a person ordinarily skilled in the art of the device would have been exceedingly easy to create the device based on a device prescribed in any of the items of the preceding paragraph, a utility model registration shall not be granted for such a device notwithstanding the preceding paragraph.
	N/a	N/a	**Article 2 (1)** "Device" in this Act means the creation of technical ideas utilizing the laws of nature.
	N/a	N/a	In the Utility Model Act

Table 2 - Utility model			
2 - Duration of protection			
EU	**US**	**Canada**	**Japan**
Article 63 EPC (1) The term of the European patent shall be 20 years from the date of filing of the application (given the annuities are paid).	**35 USC §154 (a)(2)** Subject to the payment of fees under this title, such grant shall be for a term beginning on the date on which the patent issues and ending 20 years from the date on which the application for the patent was filed in the United States or, if the application contains a specific reference to an earlier filed application or applications under section 120 , 121 , 365(c) , or 386(c) from the date on which the earliest such application was filed.	**Patent Act, s 44** Subject to section 46 (payment of maintenance fees), where an application for a patent is filed under this Act on or after October 1, 1989, the term limited for the duration of the patent is 20 years from the filing date.	**General Rule** **Article 67 (1)** The duration of a patent right shall expire after a period of 20 years from the filing date of the patent application.

Table 2 - Utility model			
3 - Examples			
EU	**US**	**Canada**	**Japan**
Not very common.	N/a	N/a	Rarely used.

Table 2 - Utility model			
4 - Remedy against infringement			
EU	**US**	**Canada**	**Japan**
Infringement and validity of patents in Europe are the competence of national courts and authorities. This means that patents must be litigated separately in each country where they have effect and are infringed.	Monetary remedy, injunctive relief, and may include punitive damages. **35 USC §284** Upon finding for the claimant the court shall award the claimant damages adequate to compensate for the infringement, but in no event less than a reasonable royalty for the use made of the invention by the infringer, together with interest and costs as fixed by the court. When the damages are not found by a jury, the court shall assess them. In either event the court may increase the damages up to three times the amount found or assessed. **35 USC §286** Except as otherwise provided by law, no recovery shall be had for any infringement committed more than six years prior to the filing of the complaint or counterclaim for infringement in the action. **35 USC §287** To recover for infringement of any patented article, the article must be marked with a patent notice or the infringer must have been notified and continued to infringe.	Federal Court jurisdiction. Injunctions are possible, but rare, especially when monetary award would be sufficient relief. Interlocutory injunctions are very rare. May include punitive damages. **S 55(1) of Patent Act** A person who infringes a patent is liable to the patentee and to all persons claiming under the patentee for all damage sustained by the patentee or by any such person, after the grant of the patent, by reason of the infringement. **S 55(2)** A person is liable to pay reasonable compensation to a patentee and to all persons claiming under the patentee for any damage sustained by the patentee or by any of those persons by reason of any act on the part of that person, after the specification contained in the application for the patent became open to public inspection, in English or French, under section 10 and before the grant of the patent, that would have constituted an infringement of the patent if the patent had been granted on the day the specification became open to public inspection, in English or French, under that section.	Injunctive relief, compensation (punitive damage is not allowed), and criminal sanctions.

Table 3

Table 3 - Copyright			
1 - Requirements			
EU	**US**	**Canada**	**Japan**
The EU regulatory framework is composed of 11 directives and two regulations. **General rule** To be protected by copyright, the work must: - Meet the criteria of originality - Have taken shape (excluding ideas or concepts). **Computer programs** - DIRECTIVE 2009/24/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 April 2009 on the legal protection of computer programs Computer programs, and its preparatory materials, are protected if it is original in the sense that it is the author's own intellectual creation. Computer programs are protected as literary works, but there is no clear definition given by the Directive. The *SAS Institute Inc. vs. World Programming Ltd.* case clarified that the source code and the executive code are the form of expression of a computer program and are therefore protected by copyright under the Directive. Protected under Copyright: - The preparatory material - The source-code - The object-code - The user manuals	**17 USC §101** defines "computer program" as a set of statements or instructions to be used directly or indirectly in a computer to bring about a certain result." **17 USC §201** Copyright vests initially in the author or authors. The author(s) are those who create the work and fix it in a tangible medium. **S. 306 of the Compendium of US Copyright Office Practices** "The US Copyright Office will register an original work of authorship, provided that the work was created by a human being."	**S. 2 of the Copyright Act** Definition of *literary work*: "literary work includes tables, computer programs, and compilations of literary works; (*oeuvre littéraire*)". *Computer program*: "a set of instructions or statements, expressed, fixed, embodied or stored in any manner, that is to be used directly or indirectly in a computer in order to bring about a specific result." In *Klivington Bros v Golberg* (1957) the courts held that a work must be an "original expression of thought of its originator" and not a mere copy of another work. In *CCH Canadian v Law Society of Upper Canada*, the SCC developed the Canadian conceptualization of originality as encompassing aspects of both the product (in that it cannot be a mere copy), and the process (in that it must be an "exercise of skill and judgment" by the author).	**Copyright Act Article 2 (1)(i)** "Work" means a production in which thoughts or sentiments that are creatively expressed, and which falls within the literary, academic, artistic or musical domain. NOTE: Only creative expression is protected; thoughts, feelings, ideas, and facts are not protected. What is creative expression in a program? Since the programming language system is strict due to the nature of programs, the choice of combinations of instructions is limited in order to make the computer function as economically and efficiently as possible. The Copyright Act protects the specific expression of a program, not its functions or ideas. Therefore, if the specific description of a program is almost the same regardless of who creates it due to restrictions on expression, or if it is very short or commonplace, it is considered that the individuality of the creator has not been demonstrated. On the other hand, if the entire program consisting of the expression of commands, combination of commands, and order of commands has room for other expressions, and if some individuality of the creator is expressed, creativity exists. The Intellectual Property High Court, April 27, 2016, Case No. 2014 (ne) 10059, 10088, adopted the above interpretation and decided that creativity exists.

New exceptions - The Directive 2019/790 of the European Parliament and of the Council of 17 April 2019 on copyright and related rights in the Digital Single Market. The new Directive introduces new exceptions, such as the text and data mining exceptions. The first one is an exception for the benefit of research organizations and cultural heritage institutions that carry out data mining for scientific research purposes, to which right holders cannot object. The second one is an exception or limitation to the rights of right holders for the benefit of any data mining, whatever its purpose, even commercial, provided that the right holder has not expressed his opposition, or "opt-out". Text and data mining means, "any automated analytical technique aimed at analyzing text and data in digital form in order to generate information which includes, but is not limited to patterns, trends, and correlations". Please note that is it is a directive and it has to be transposed by Member states.	Fair use is a non-exhaustive list in the US and text and data mining (TDM) has been found to be fair use in numerous circumstances. In particular, when used for other enumerated purposes (e.g., "scholarship and research"), TDM is often considered to benefit the public and to be a fair use. Commercial services may still defend TDM as fair use if the use is sufficiently transformative/satisfies the fair use analysis. For instance, *A.V. v iParadigms*, LLC (4th Cir. 2009) -- iParadigms created "TurnItIn" database which analyzes student work against other Internet content to assess likelihood of plagiarism. Considered a "highly transformative" use.	In 2019, the Parliamentary Standing Committee on Industry, Science, and Technology recommended "that the Government of Canada introduce legislation to amend the Copyright Act to facilitate the use of a work or other subject-matter for the purpose of informational analysis." (Statutory Review, June 2019, pg. 87) "Informational analysis" proposed as a ground of fair dealing similar to, but broader than, "text and data mining". The review quoted one definition as: "informational analysis [is] 'the derivation of information from data'; for example, through text and data analysis, 'and not the actual use and commercialization of that data.'" Proposed changes are not yet implemented. (The same review also recommended making the list of fair dealing purposes illustrative rather than exhaustive; again, not yet implemented.)	**New flexible copyright exceptions** Objectives: It is expected to create innovations that utilize technologies related to "*Industrie 4.0"*, such as IoT, big data, and artificial intelligence (AI). There were many exception provisions in the Japanese Copyright Law before this amendment, which specifically stipulate legal requirements. When a new use that deviates from the requirement is executed, even if the use does not substantially harm the interests of the right holder, it was pointed out that there was a risk of copyright infringement without the application of the exception clauses. In response to this situation, the industry had requested the establishment of exception provisions that can flexibly respond to the use of new copyrighted works that utilize new technologies in order to create innovation. It was decided to develop the "flexible exception provisions". An example of provisions: **Article 30-4** It is permissible to exploit a work, in any way and to the extent considered necessary, in any of the following cases, or in any other case in which it is not a person's purpose to personally enjoy or cause another person to enjoy the thoughts or sentiments expressed in that work; provided, however, that this does not apply if the action would unreasonably prejudice the interests of the copyright owner in light of the nature or purpose of the work or the circumstances of its exploitation: (i) if it is done for use in testing to develop or put into practical use technology that is connected with the

			recording of sounds or visuals of a work or other such exploitation; (ii) if it is done for use in data analysis (meaning the extraction, comparison, classification, or other statistical analysis of the constituent language, sounds, images, or other elemental data from a large number of works or a large volume of other such data; the same applies in Article 47-5, paragraph (1), item (ii)); (iii) if it is exploited in the course of computer data processing or otherwise exploited in a way that does not involve what is expressed in the work being perceived by the human senses (for works of computer programming, such exploitation excludes the execution of the work on a computer), beyond as set forth in the preceding two items. Expected Effects of these provisions: It is expected that the creation of innovation will be promoted by making it possible to perform many of the following services without the permission of the copyright holder. Permitted Services: deep learning for artificial intelligence (AI) development, software research, and analysis for ensuring cybersecurity, location search service, information analysis service, etc., as long as these are considered as those that cause no disadvantage or a slight disadvantage to the right holder. **Fair Use Doctrine** "Flexible exception provisions" are different from the fair use clause. Japan did not adopt it because: (1) Most Japanese companies have a high sense of legal compliance and resistance to litigation, and emphasize

			clarity rather than flexibility of regulations. (2) Since the understanding of copyright is not sufficiently permeated through the public, too much increasing the flexibility of the exception provisions like fair use clauses increases the possibility of promoting infringement of rights due to negligence. (3) Since there is no statutory damages compensation system in Japan, there is a problem that even if a proceeding is filed, it often results in "cost collapse". And even if general and comprehensive exception provisions such as fair use are created, the effect of promoting "fair use" of copyrighted works cannot be expected so much, but rather negative impact that "unfair use" is promoted is expected. (4) In addition, due to the division of roles between the legislature and the judiciary and the principle *nullum crimen sine lege* exception provisions such as fair use were not desirable.

Table 3 – Copyright			
2 - Duration of protection			
EU	**US**	**Canada**	**Japan**
Copyright protects IP of the creation until 70 years after the death of the author, or 70 years after the death of the last surviving author in the case of a work of joint authorship.	For works created after January 1, 1978, copyright lasts for the life of the author, plus an additional 70 years. For an anonymous work/pseudonymous work/work made-for-hire, copyright runs for 95 years from the date of publication, or for a term of 120 years from the year of the work's creation; whichever expires first.	Copyright duration protects IP for the entirety of the creator of the work's lifetime, plus 50 years from the end of the calendar year in which the creator died. Increasing to life plus 70 years for many types of work (including literary works) with CUSMA. The current "transition period" ends on December 31, 2022.	**General Rule** **Article 51** (1) The duration of copyright begins at the time the work is created. (2) Unless otherwise specified in this Section, a copyright subsists for a period of fifty years after the death of the author (or the death of the last surviving co-author, for a joint work; the same applies in paragraph (1) of next Article).

	Works created prior to 1978 are subject to the common law of each state.	**S 6, Copyright Act** The term for which copyright shall subsist shall, except as otherwise expressly provided by this Act, be the life of the author, the remainder of the calendar year in which the author dies, and a period of fifty years following the end of that calendar year. **S 7, Copyright Act** Anonymous and pseudonymous works: 6.1 (1) Except as provided in section 6.2 and in subsection (2), where the identity of the author of a work is unknown, copyright in the work shall subsist until the end of 75 years following the end of the calendar year in which the work is made. However, if the work is published before the copyright expires, the copyright continues until the earlier of the end of 75 years following the end of the calendar year in which the first publication occurs and 100 years following the end of the calendar year in which the work was made.	

Table 3 - Copyright			
3 - Examples			
EU	**US**	**Canada**	**Japan**
N/a	**Naruto v Slater (2018)** **Main takeaways:** - A monkey took pictures of himself/itself with a camera abandoned by a photographer (the "Monkey Selfies"). - The photographer included photos in a book. - The publisher, photographer, and website (which was used to make book) were sued by PETA and Dr.	**Ha Vi Doan v. Clearview AI Inc., Case No. T-713-20** (Federal Court, proposed class action) **Main takeaways:** - Primarily based on privacy grounds, but also claims copyright impacts: Clearview AI algorithms scan photos to derive biometric data. - Allegedly infringes copyright in the photos thus scanned and therefore violates moral rights of	Japan sometimes writes it in contracts to prohibit secondary use of statistical models, annotations, and tagged training datasets. However, the attribution of copyright is not always clearly stated there. It is also not clear whether these are protected as creative expression under copyright law, but contracts are often made based on copyright law concepts.

	Engelhardt (who worked with the monkey) for copyright infringement. - Court held "animals other than humans – lack statutory standing under the Copyright Act".	photographers. **Basanta v Galarie NuEdge** - Montreal artist sued for copyright infringement, as his AI bot randomly generates an image, and then compares it to a database of art to see the percentage match. - Because the database uses images online, there is a debate about whether it constitutes infringement	

Table 3 - Copyright			
4 - Remedy against infringement			
EU	**US**	**Canada**	**Japan**
Copyright infringements are within the competence of national courts. Remedies against infringement are mostly harmonized in the EU; Sanctions, injunctions, statutory damages, punitive damages, etc.	Injunctions, impounding of infringing articles, actual damages, and profits. No punitive damages *per se*. Must be registered for statutory damages; attorney's fees to be recovered. Criminal sanctions under 17 USC §506(a).	Official registration of copyright is not required in Canada. Damages and injunctions are primary remedies. The owner of the infringed work can opt to receive damages based on: the actual damages suffered; profits lost, or prescribed statutory amount. Punitive damages may be available. S, 42 of copyright act provides criminal remedies (maximum penalty fine 1m CAD or imprisonment up to 5 years or both).	Injunctive relief, compensation, and criminal sanctions.

Table 4

Table 4 - Trade secret			
1 - Requirements			
EU	**US**	**Canada**	**Japan**
The European Directive 2016/943 on the protection of undisclosed know-how and business information (trade secrets) against their unlawful acquisition, use and disclosure (known as the Trade Secrets Directive). According to Article 2 of the directive, a trade secret is any information that: - is secret in the sense that it is not, as a body or in the precise configuration and assembly of its components, generally known among or readily accessible to persons within the circles that normally deal with the kind of information in question; - has commercial value because it is secret; - has been subject to reasonable steps under the circumstances, by the person lawfully in control of the information in order to keep it secret.	18 USC Chapter 90 deals with trade secrets. **18 USC §1839** Trade secret means: - All forms and types of financial, business, scientific, technical, economic, or engineering information, including patterns, plans, compilations, program devices, formulas, designs, prototypes, methods, techniques, processes, procedures, programs, or codes, whether tangible or intangible, and whether or how stored, compiled, or memorialized physically, electronically, graphically, photographically, or in writing if: (A) the owner (person or entity) has taken reasonable measures to keep such information secret; and (B) the information derives independent economic value, actual or potential, from not being generally known to, and not being readily ascertainable through proper means by, the public. According to the USPTO, a trade secret (requires all three elements): - is information that has either actual or potential independent economic value by virtue of not being generally known, - has value to others who cannot legitimately obtain the information, and - is subject to reasonable efforts to maintain its secrecy. It also falls within jurisdiction of each state.	No legislation in Canada defines/protects trade secret. Trade secret protection outside of Quebec relies on the common law "breach of confidence" action. It is best protected by contracts. Proving breach of confidence does not require proving the information has commercial value or that positive steps were taken to keep the information secret. As affirmed in Supreme Court *case Lac Minerals Ltd. v. International Corona Resources Ltd.*, the elements of a breach of confidence action are: - the information must have a necessary quality of confidence about it; - the circumstances under which the information was imparted must give rise to an obligation of confidence; and - the defendant must have made unauthorized use of the information. (Note: no need to show independent economic value or reasonable efforts to maintain secrecy). Definition under the Criminal Code (s. 391, added for accession to CUSMA) does require independent economic value and reasonable efforts to maintain secrecy. Specifically, s 391(5): (5) For the purpose of this section, trade secret means any information that:	Trade secret is protected by the Unfair Competition Prevention Act if it meets the requirements. **Unfair Competition Prevention Act Article.2** **(6)** Trade secret is defined as technical or business information that is: - kept secret - useful for business activities - not publicly known

		(a) is not generally known in the trade or business that uses or may use that information; (b) has economic value from not being generally known; and (c) is the subject of efforts that are reasonable under the circumstances to maintain its secrecy. Common law does not apply to Quebec for civil matters. “Trade secret” is not defined in the Quebec Civil Code. However, the Code contains two articles (1472 & 1612) which relate to trade secrets. 1472: A person may free himself from his liability for injury caused to another as a result of the disclosure of a trade secret by proving that considerations of general interest prevailed over keeping the secret and, particularly, that its disclosure was justified for reasons of public health or safety. 1612: The owner of a wrongfully disclosed trade secret may claim damages related to the cost of acquiring, perfecting and using the trade secret. Lost profits “may be compensated for through payment of royalties”.	

Table 4 - Trade secret			
2 - Duration of protection			
EU	**US**	**Canada**	**Japan**
As long as it is kept secret.	As long as it is kept secret	As long as it is kept secret	As long as it fulfills the three aforementioned requirements of a trade secret.

Table 4 - Trade secret			
3 - Examples			
EU	**US**	**Canada**	**Japan**
N/a	Former Google executive (Anthony Levandowski), was criminally indicted over claims that he stole, or attempted to steal, confidential information from Google subsidiary (Waymo). Levandowski allegedly stole 14,000 sensitive self-driving car files from Waymo that served as the foundation for another company's self-driving car project. He pleaded guilty to criminal trade secret theft (and later pardoned).	Clamato juice formula and manufacturing methods (*Cadbury Schweppes Inc. v FBI Foods Ltd.*)	Any information that is useful for business activities may be protected. To be protected as a trade secret, the requirement of secrecy management (being kept secret) is important in practice. The information must be managed as a secret to the extent that those who come into contact with it can recognize that it is managed as a secret. For example, by taking measures to indicate that the information is confidential so that those who have access to the information can recognize that the information is a trade secret, and by limiting those who have access to the information (The Intellectual Property High Court, August 6, 2014, Case No. 2014 (ne), 10028). An example of concrete measures is applying a password and making it known to employees (The Intellectual Property High Court, April 27, 2016, Case No. 2014 (ne) 10059, 10088). For "usefulness" to be recognized, the specific information should be objectively useful for business activities. However, there is a case where the general definition of variables in the source code of a program is not useful (Intellectual

			Property High Court, August 21, 2019, Case No. 2018 (ne) 10092).

Table 4 - Trade secret			
4 - Remedy against infringement			
EU	**US**	**Canada**	**Japan**
Provisional and precautionary measures, damages, injunctions and/or recurring penalty payments.	Through the Economic Espionage Act (1996), it is punishable by imprisonment and/or fines. The Defend Trade Secrets Act (2016) established a private civil cause of action for the misappropriation of a trade secret. Both are federal laws (i.e., enforcement no longer state-based). Civil remedies: injunctions, ordering that the secret be protected from public exposure, ordering seizure of material, and damages.	Injunctive relief, damages, and criminal sanctions, not exceeding 5,000 CAD (maximum penalty is imprisonment not exceeding 14 years, and may also be fines (on summary conviction).	Civil measures: Injunction and/or compensation for loss or damage. Criminal measures: Imprisonment and/or penalty payments. Border measures: Import or export of products created by using trade secrets illegally.

Table 5

Table 5 - Data			
1 - Requirements			
EU	**US**	**Canada**	**Japan**
Directive 96/9/EC of the European Parliament and of the Council of the European Union of 11 March 1996 on the legal protection of databases. The Database directive establishes a double protection of databases: - A copyright protection for the structure of the database that meets the criteria of originality; - A *sui generis* protection for the content of the database, that required "the investment of considerable human, technical and financial resources while such databases can be copied or accessed at a fraction of the cost needed to design them independently". Several decisions in 2004 clarified the scope of the database *sui generis* right. It does not apply to databases that are the by-products of the main activity of an organization (i.e. IoT devices, big data, machine-generated data, etc.). NOTE: the European Commission is currently working on an update of this Directive to meet the new evolutions regarding the Single Digital Market and the free flow of non-personal data.	No *sui generis* data/database rights. Databases are generally protected by copyright law as compilations. Under the Copyright Act, a compilation is defined as "a work formed by the collection and assembling of preexisting materials or of data that are selected, coordinated, or arranged in such a way that the resulting work as a whole constitutes an original work of authorship. The term "compilation" includes collective works." Underlying data is not automatically granted protection. The Copyright Act specifically states that the copyright in a compilation extends only to the compilation itself, and not to the underlying materials or data. A compilation of mere facts may not be copyrighted. Instead, a compilation may only be copyrighted if there is a creative or original act involved, i.e. in the selection and arrangement of materials. The protection is limited only to the creative or original aspects of the compilation. In the case of *Feist Publications, Inc. v. Rural Telephone Service Company, Inc.*, the U.S. Supreme Court ruled that a compilation work such as a database must contain a minimum level of creativity in order to be protected under the Copyright Act. Uncreative collections of facts are outside of Congressional authority	In the case of *CCH Canadian Ltd. v Law Society of Upper Canada* (leading case on originality) provides that a work (such as a compilation) is original only if it results from the exercise of skill and judgment. - Skill means the use of the author's knowledge or aptitude in developing the work; - Judgment means the use of the author's capacity to discern among possible options in producing the work - Requires the exercise of non-trivial, intellectual effort May be protected as a trade secret or through privacy legislation, as in the US (i.e., as a consequence of compliance with privacy obligations). Canada also lacks a single unified privacy framework, though a new framework has been proposed.	There are no *sui generis* laws for specifically protecting databases like the data protection law. Databases or data relating to AI development are fragmentally protected by the Copyright Act and the Unfair Competition Prevention Act. A copyright protection: "database" means an aggregate of data such as articles, numerical values, or diagrams, which is systematically constructed so that such data can be searched with a computer. A database that, by reason of the selection or systematic construction of information contained therein, constitutes a creation is protected as a work. In addition, personal data may also be protected by the Act on the Protection of Personal Information. Data that meets certain requirements can be protected under the Unfair Competition Prevention Act. This act protects "shared data with limited access" apart from trade secret protection (see Table 4), in order to improve an environment for secure data utilization. Unfair Competition Prevention Act Article.2 (7) "Shared data with limited access" is defined as technical or business information that is: - accumulated to a significant extent

	under the Copyright Clause (Article I, § 8, cl. 8) of the United States Constitution, therefore no database right exists in the United States Could also be protected as a trade secret. May also be protected via privacy legislation, particularly where the data sets / databases contain personally identifiable information (i.e., unauthorized use of the data set would likely infringe the privacy rights of the data subject. Thus, when a company complies with its obligations towards users/data subjects, a *de facto* "data right" may arise. However, no single unified privacy law or framework in the US.		- managed by electronic or magnetic means - information to be provided to specific persons on a regular basis Objectives: Data is easily duplicated and provided. Unauthorized distribution can cause rapid and widespread damage. Even valuable data might not be (1) immediately subject to copyright protection, or (2) classified as a "trade secret" on the premise of sharing with others. It was difficult to stop its unauthorized distribution. Then, it was decided to protect valuable data that meets certain requirements as "shared data with limited access". Currently, wrongful acquisition, use or disclosure of such data was positioned as "unfair competition" based on the Unfair Competition Prevention Act. Concepts and Examples of "shared data with limited access": Concepts: Data that is expected to be utilized, such as creating new businesses and increasing the added value of services and products, mainly by being provided and shared by multiple parties among companies. Note: If information is kept secret, it would be protected as "trade secret" which means technical or business information useful for business activities, such as manufacturing or marketing methods, that is kept secret, and is not publicly known. Examples of "shared data with limited access": 3D high-precision map data; Ship or machine operation data; Maritime meteorological data, and consumption trend data.

Table 5 - Data			
2 - Duration of protection			
EU	**US**	**Canada**	**Japan**
Term for copyright protection is 70 years. The term of protection for the *sui generis* right is 15 years. Any qualitatively or quantitatively "substantial change, which would result in the database being considered to be a substantial new investment," can revive the fifteen-year term of protection.	Term for copyright protection is life (of a known author, post-1978), plus 70 years. Trade secrets can be protected indefinitely.	Term of copyright protection (for known author) is life of author, plus 50 years. Trade secrets can be protected indefinitely.	Term of copyright protection (for known author) is life of author, plus 70 years. "Shared data with limited access" under the Unfair Competition Prevention Act: As long as it fulfills the three aforementioned requirements of "shared data with limited access".

Table 5 - Data			
3 - Examples			
EU	**US**	**Canada**	**Japan**
N/a	Selected citations from US Presidents: The individual quotations themselves may or may not be subject to Copyright protection. However, the selection of the quotations involves enough original, creative expression that it would likely be protected by copyright.	- Phonebooks organized by headings. - Case summaries and headnotes (selecting and arranging specific elements of judicial decisions, note: CCH case). - According to the Canadian Bar Association, AI-created works might be within the meaning of original in the Copyright Act. That is, the CBA has suggested that "exercise of skill and judgment" does not necessarily preclude AI.	Data rights are unlikely to be legally disputed. This is because the parties have individually agreed on the use of the data by contracts. For example, in drafting a contract, parties insert specifications about the attribution of the rights of data and the terms of use into their contract, assuming that the database or data related to the business is protected by copyright law or Unfair Competition Prevention Act.

Table 5 - Data			
4 - Remedy against infringement			
EU	**US**	**Canada**	**Japan**
The Database Directive prohibits any extraction or re-use of all or substantial part of the contents of a database without the owner's permission. The remedies available are identical to the remedies provided by copyright law, namely damages, injunctions, etc.	Copyright and/or trade secret remedies (see above). Privacy remedies vary depending on specific state/data. The US has hundreds of different pieces of privacy legislation.	Copyright and/or trade secret remedies (see above). Privacy remedies may include fines and/or damages (usually, however, payable to the data subject rather than the data controller).	Copyright and/or trade secret remedies (see above). Protection of "shared data with limited access" under the Unfair Competition Prevention Act: Civil measures: Injunction and/or compensation for loss or damage.

Disclaimer: Each row in the table does not necessarily show the exact correspondence among the jurisdictions.

Annex II. GPAI IP Primer v1 Case Study Report

In 2021, the IP Committee of the *GPAI Innovation & Commercialization Working Group* published a short booklet called the *GPAI IP Primer* to help startup companies and SMEs that develop and use AI technologies manage their intellectual properties. In order to assess the usefulness of the *GPAI IP Primer*, the Committee conducted a series of case studies with seven companies around the world. This report explains the findings of this study.

Summary

Based on the feedback from the startup companies that we interviewed, the overall rating of the usefulness of the *GPAI IP Primer* was 8 out of the 0-10 scale (0 is useless and 10 is the most useful), indicating that the *GPAI IP Primer* is in fact **useful** for helping them to manage the challenges associated with IP in AI. There are several areas for potential improvement, such as more elaborations on the use of open source technologies and the IP of pre-trained models for transfer learning. The IP Committee intends to incorporate these findings into the future versions of the *GPAI IP Primer*.

Methodology

The purpose of these Case Studies was to evaluate the usefulness of the *GPAI IP Primer* and collect useful insights to improve its content. We elaborated a questionnaire and asked the Committee members and other GPAI representatives to nominate companies that are:

1. Developing or using (or planning to use) AI technologies (e.g., machine learning, deep learning etc.), and
2. Limited in resources for managing their IP (e.g., no dedicated IP department).

Thus, 21 companies were listed, and the IP Committee selected 13 of them, considering diversity in region, focused industry, and gender of the leader (either CEO or CTO). Seven companies among the selected 13 responded and agreed to have an interview. Among the seven companies that responded, three were in Europe, three in Asia, and one in Africa. On the gender diversity of interviewee, two were female and five were male. The interviews took place during August-September 2021.

Prior to the interview, Committee members sent the preview version of the *GPAI IP Primer* to the company, asking the designated interviewee (either CEO or CTO) to read it through. The company also was sent the questionnaire (Appendix A), to be filled-in prior to the interview.

The interviewers were volunteer Committee members. All interviews were done remotely, considering the COVID-19 situation. During the interviews, the questions considered general issues regarding IP in AI, as well as feedback on the *GPAI IP Primer*.

Major Findings

IP Protection Strategy Variation

Their IP protection strategy significantly varies. Table 1 shows the company size (the number of employees, including those who are outsourced) and the number of filed patents. There are no clear correlations between them. Some companies choose to file patents to protect their IP while other companies put a higher priority on growing faster than protecting their existing IP (or relying on other protective means such as trade secret).

Company Size (incl. outsourced)	# Patents Filed
2	>5
6	0
8	0
9	0
50	1-5
60	>5
200	0

Table 1. Company Size and the Number of Patents Filed

Use of Open Source Technologies

Multiple companies expressed concerns about the risks associated with the use of open source technologies. Many of the IT tools (including operating systems, system tools, middle-ware and frameworks, and AI-related tools) are open-sourced and the companies rely on these technologies. In addition, there is open-sourced data, which is often used in training machine learning models. Whether these open source technologies can be used for commercial purpose and in what conditions depends on the individual license terms and is complicated. Additionally, some companies asked questions on how patents (either third party patents or the company's own patents) interact with open source technologies.

Reuse of Pre-trained Models

More AI systems are using pre-trained models. Instead of training a model from scratch, one will use a model already trained by somebody else based on various data that is not available. Then, through various techniques, notably through transfer learning, one will be able to use this trained model slightly modified to address the needs at hand. The exact legal or commercial conditions under which such trained models can be used, some of them being under some proprietary license, some others being open source license. For example, *YOLO* is a pre-trained model for object recognition and it is generally available under MIT license, i.e. a very permissive license which will allow any company to use it, including for commercial purposes. The *GPT-3*, a trained model for NLP (Natural Language Processing), will be accessible through a commercial license (with an older version being available under an open source license). It will be important to cover such questions in the next revision of the *GPAI IP Primer*.

Jurisdiction Coverage

Currently, the jurisdiction comparison table in the *GPAI IP Primer* covers EU, US, Canada, and Japan only, but some respondents expressed concerns because their businesses extend beyond these countries. The IP Committee may need to add more countries/regions to the table, as well as elaborate on the global patent filing strategy (such as the use of PCT application).

Other Requests for Improving the GPAI IP Primer

- Clarify the differences between trade secret and IP for software industries;
- Illuminate on whether UI models should be considered under Copyright or Trademark;
- Extend the coverage of the GPAI *IP Primer* to the full AI system, including IT parts (e.g. data lake, data traceability, computing, production and maintenance, etc.);
- Elaborate on the cost of IP management, including those in potential violation disputes;
- Create a list of IPR protection options with typical cost associated with them (citing that it would be useful).

- Add several concrete example cases of actual AI-related IP infringement with business impacts (e.g. cost, time spent to handle the issue, and opportunity loss) would be useful
- General guidance for recommended actions corresponding to each key question listed in 4.1 (i.e., in a flowchart)

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- Startupindonesia.co (Indonesia), Cecilia Astrid (CTO)

Appendix A. Questionnaire Form

IP Primer Questionnaire

Concept name	Case study for feedback on IP Primer
IP Committee leads	Hiroshi Maruyama, Yann Dietrich
Lead Working Group	Innovation & Commercialization
Lead Centre of Expertise (CofE)	Paris

Introduction

The IP Primer is intended as a guidebook for businesses that want to develop or use AI technologies and that innovate using AI technologies. Thanks to this guidebook, businesses should be able to understand the current IP landscape and optimize their business strategy, alleviating IP-related risks in AI innovations.

Case studies are being organized to better understand how businesses are handling IP risks regarding AI-related innovations and commercialization and how the IP Primer helps them. As such, your name will appear in the published IP Primer (please notify us if you do not want this publicity).

Company

Name of the company ……

Name of CEO ……
Year of creation ……
Country ……
Number of employees of the company ..... Internal ..... Outsourced
Activity sector ……
Line of business ❑ AI product ❑ Service ❑ Licensing
AI maturity level ❑ High ❑ Medium ❑ Low
Do you use open-source AI libraries? ❑ Yes ❑ Some ❑ No

What is the source of your training data? ……
Understanding of IP issues ❑ High ❑ Medium ❑ Low
IP issues handled ❑ Internally ❑ Externally
Number of patents filed ❑ None ❑ 1-5 ❑ > 5
Your IP protection needs expected to ❑ Increase ❑ Stay same ❑ Decrease
What is your background with IP? ……
Why is IP important for your company? ……
Do you think IP issues could impair your growth? ……

Use of IP Primer

Have you read the IP Primer in its entirety? ❑ Yes ❑ No
The goal was to develop a "simple and practical guide to IP for AI practitioners". Do you think this goal has been achieved? 0 = not at all; 10 = totally: ……

Chapter 1

Overall, does the chapter give you a good overview about the different forms of intellectual property rights? ❑ Yes ❑ No
Do you have any comments or suggestions for this chapter?

……

Chapter 2

Do you agree with the outlined challenges? ❑ Yes ❑ No
- If no, why? ……

Is there anything missing? ❑ Yes ❑ No
- If yes, what? ……

Do you find the descriptions helpful in better understanding the patentability of AI based systems? ❑ Yes ❑ No

Chapter 3

Do you consider the overview of the different legislation as being relevant for your business?

❑ Yes ❑ No

Do you get better insights into the different legislation through this chapter?

❑ Yes ❑ No

Chapter 4

Do the IP Management Guidelines help you to understand the process to protecting IP?

❑ Yes ❑ No

What aspects would you like to have further details/more information on?

1. ……
2. ……
3. ……

Chapter 5

Do you have any more questions that you would like to get answered by experts?

1. ……
2. ……
3. ……

Overall, are there any topics that you missed in the IP Primer?

1. ……
2. ……
3. ……