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AI-based production of content: obstacles, threats, and opportunities

Author : Guillaume Nicolas & Manuel Martins da Silva
Supervisor(s) : Paul Belleflamme
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INTRODUCTION

By 2030, artificial intelligence(AI) is believed to add roughly 14.7 trillion dollars of value to the global economy (PricewaterhouseCoopers, 2017, para. 4). This would establish AI, by far, as one of the biggest opportunities for organizations from various natures and sectors. This technology has a real capacity of shaping the global market. But changes of such magnitude will also bring disruptions. This would in addition lead organizations to "*be confronted with choices on what to adopt, when to adopt and how to change, where complete information may not be available in time for decision making*"(Donald, 2019, p. 73). Experts, organizations, consultancy groups and regulators logically started to develop a real interest on this specific subject. For Russell & Norvig (2020) , the number of AI papers have been multiplied by 20 between 2010 and 2020. While the number of patents related to AI in 2019 is 4.5 bigger than it was in early 2000 (Zhang et al., 2021). If the lack of information about AI is general, there is an industry for which this scarcity is even more critical: the AI-based companies themselves.

For those companies, for which AI is the core business, the uncertainty on general questions related to the intellectual property (IP), disruption of markets and ethics in a broad sense remains very risky for their development and survival. In this thesis, we decided however to focus on one specific category of those AI-based companies, the organizations generating contents through AI such as AI-generated soundtracks, pictures, and videos.

First, we will start with a contextualization of our research, outlining the framework on which our research is based. We therefore draw a literature review, gathering the definitions useful to this thesis as well as the state of the art related to the subject. To situate the reader in the vast environment that is AI, we begin with a definition of the technology as a whole. We then draw up the current state of the AI after a brief historical development. Afterwards, we define the most relevant technologies in terms of content creation, respectively machine learning, artificial neural networks (ANNs) and deep learning. Then, a definition of the concept of content, as well as the industry in which it evolves, was provided. The literature review ends with the state of the art, in which we were able to identify the existing gap for companies evolving or willing to evolve in the creation of content by AI.

Secondly, we orient our research towards a practical study, analyzing two business models of companies chosen as being representative: Amper Music and Moneybrain. In addition, this

research is also qualitative, for which purpose we conducted five interviews and attended a webinar. These discussions allowed us to reinforce our ideas and suggestions throughout this work. The conduct of these meetings allowed us to realize the extent of the shadows surrounding the subject, for which the professionals of the field, themselves, sometimes lacked answers.

Then we will enter in the heart of the content of this thesis with six chapters dedicated to three major topics. The two first chapters will focus on the questions related to IP. Chapter one depicts the IP legislations regarding the authorship of the outputs of an AI Systems while the second focuses on the nature of the data used to nourish those algorithms in regard to copyright law. Chapters three tackles the question of the difference of value between AI-generated contents and human-made contents. The next chapter, chapter four, presents the debate of unfair competition attributed to AI companies with a case study of Spotify. Finally, chapter five tackles different ethical concerns on AI. Each of those chapters also presents a managerial implications section which provides concrete information and advice for AI companies producing contents and regulators. By analyzing those specific topics we try to answer our research question:

What are the obstacles, threats and opportunities for AI-based companies generating content?

Finally, our last section will be dedicated to the conclusions and limitations of our thesis. We will also provide at the end an appendices section. In the latter, you will find the transcript of the interviews led in the context of this thesis and a summary of a seminar followed on AI and law.

PART I: CONTEXT AND LITERATURE REVIEW

Chapter 1: Introduction on AI

Artificial intelligence, when considered as a whole, surrounds us today in many spheres of personal and professional life. As previously mentioned, this is evidenced by the general interest shown for the technology, expressed in literature and in the economic reality.

Before going into more detail in the development of this master's thesis, we consider it necessary to first define the term artificial intelligence that we will use throughout this work. A brief history of the evolution of the technology will then be provided to the reader in order to better situate him or her in the subject. Then, the current state of the technology will be defined. The emphasis will be particularly placed on machine learning and its subdivisions. Finally, some examples of embodiments of these concepts in technologies used for content production will be given.

1.1 Definition of AI

As a prelude to the future development of this thesis, the definition of AI is therefore essential. In this section, we will go through the different ways of defining the technology in order to identify the one we will choose as most adapted for an accurate understanding of the subject.

Many definitions of AI have emerged, the understanding of the technology and its field can therefore greatly vary (Marr, 2018). In the literature, there is hence no generally accepted definition (Bhatnagar et al., 2018; Monett & Lewis, 2018; Nilsson, 2009; OCDE, 2019; Office of Science and Technology Policy, 2016). Indeed, Russell and Stuart (2020) attest to the latent ambiguity, citing that:

> *Some have defined intelligence in terms of fidelity to human performance, while others prefer an abstract, formal definition of intelligence called rationality […]. The subject matter itself also varies: some consider intelligence to be a property of internal thought processes and reasoning, while others focus on intelligent behavior, an external characterization.* (Russell & Norvig, 2020, p. 31)

The first person to mention AI is considered to be John McCarthy in 1955 (Marr, 2018). "*He invited a group of researchers from a variety of disciplines including language simulation, neuron nets, complexity theory and more to a summer workshop called the Dartmouth Summer Research Project on Artificial Intelligence*" (Marr, 2018, para. 2). If the proposal does not give a precise definition of the technology, it refers to it as an "intelligent machine" (McCarthy, 1955). Moreover, the author adds that "*every aspect of learning or any other feature of intelligence can in principle be so precisely described that a machine can be made to simulate it*" (McCarthy, 1955, p. 1). Later in 1998, McCarthy drew up a first definition, describing AI as:

> *The science and engineering of making intelligent machines, especially intelligent computer programs. It is related to the similar task of using computers to understand human intelligence, but AI does not have to confine itself to methods that are biologically observable*. (McCarthy, 1998, p. 2)

Today, dictionaries and encyclopedias approach a definition describing the technology as "*a sub-field of computer science and how machines can imitate human intelligence (being human-like rather than becoming human)*" (Marr, 2018, para. 3). The English Oxford Living Dictionary therefore defines AI as "*the theory and development of computer systems able to perform tasks normally requiring human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages*" (Oxford University Press, 2020, para. 1). In the same sense, the Encyclopedia Britannica defines it as "*the ability of a digital computer or computer-controlled robot to perform tasks commonly associated with intelligent beings*" (Copeland, 2020, para. 1). In addition, the Merriam-Webster dictionary refers to it as "*a branch of computer science dealing with the simulation of intelligent behavior in computers*" (Merriam-Webster, n.d., para. 1).

Recently, various institutions have proposed their own definition of AI. For example, the OECD (2021, p. 7) defines an AI system as "*a machine-based system that can, for a given set of human-defined objectives, make predictions, recommendations, or decisions influencing real or virtual environments. AI systems are designed to operate with varying levels of autonomy*".

Finally, the definition that we have decided to consider for this master's thesis is provided by the European Commission. The latter states that:

> *Artificial intelligence (AI) systems are software (and possibly also hardware) systems designed by humans that, given a complex goal, act in the physical or digital dimension by perceiving their environment through data acquisition, interpreting the collected structured or unstructured data, reasoning on the knowledge, or processing the information, derived from this data and deciding the best action(s) to take to achieve the given goal. AI systems can either use symbolic rules or learn a numeric model, and they can also adapt their behaviour by analysing how the environment is affected by their previous actions. As a scientific discipline, AI includes several approaches and techniques, such as machine learning (of which deep learning and reinforcement learning are specific examples), machine reasoning (which includes planning, scheduling, knowledge representation and reasoning, search, and optimization), and robotics (which includes control, perception, sensors and actuators, as well as the integration of all other techniques into cyber -physical systems)*. (European Commission, 2019, p. 6)

1.2 History of AI

Since the emergence of the concept of AI, the technology has undergone, like its many definitions, great evolutions accompanying its democratization to the public. We provide here a brief overview of the history of AI from its inception to the present day.

As already mentioned, the birth of the term AI is largely attributed to John McCarthy, who, in his proposal related to the "Dartmouth Summer Research Project on Artificial Intelligence" in 1955, will refer for the first time to this specific expression (Haenlein & Kaplan, 2019; Office of Science and Technology Policy, 2016; Stone et al., 2016). During this event, "*the goal was to investigate ways in which machines could be made to stimulate aspects of intelligence*" (Stone et al., 2016, p. 50).

Without being designated as such, the AI concept actually appeared a few years earlier in various studies (Russell & Norvig, 2020). The works of Alan Turing, in particular his 1950 article entitled "Computing Machinery and Intelligence", was among the most influential one

on the subject (Haenlein & Kaplan, 2019; Russell & Norvig, 2020; Stone et al., 2016). In this paper, he notably described the well-known Turing test, still believed "*as a benchmark to identify intelligence of an artificial system: if a human is interacting with another human and a machine and unable to distinguish the machine from the human, then the machine is said to be intelligent*" (Haenlein & Kaplan, 2019, p. 3).

After these first advances and discoveries, the field of AI went through a phase of ups and downs for two decades, called the AI Winter. Between 1964 and 1966, ELIZA, a program allowing conversation between a human and one of the first artificial intelligences to pass the Turing test, was born. Despite this event, if many investments had been allocated to AI research until then, the Western world went through a period of criticism and skepticism about AI. Investments were therefore drastically reduced, until 1980, when the Japanese growth in the field of AI had to be countered (Haenlein & Kaplan, 2019).

Consequently, it is only towards the end of the 90s that new advances in the field were felt, notably in the application of AI to contemporary problems. The year 1997 marked the victory of Deep Blue in chess, an AI created by IBM, against the former world champion Garry Kasparov. Further advancements introduced the public to the premises of what would later become Apple Inc.'s Siri voice assistant, to IBM's Watson question-answering software that won a game show, and also to the first examples of autonomous cars in the 2000s (Office of Science and Technology Policy, 2016).

Since 2010, interest in AI has continued to grow, driven in part by three mutually reinforcing elements: "*the availability of 'big data' from sources including e-commerce, businesses, social media, science, and government; which provided raw material for dramatically 'improved machine learning approaches and algorithms'; which in turn relied on the capabilities of 'more powerful computers'*" (Office of Science and Technology Policy, 2016, p. 6).

At the same time, investments in the field have been growing more than ever lately. Many private companies are now turning to the integration of AI in a large part of their business models. Among them, Google, whose CEO Sundar Pichai described the use of machine learning (one of the many branches of AI) as increasingly important for applications such as YouTube (Office of Science and Technology Policy, 2016).

Today, interest in AI is shifting to the managerial implications in response to the issues raised by its use. In particular, the discussion is focused on how this technology will become part of

our daily lives in the future. Therefore, the main concerns today are about the need to regulate AI, both in its design and its applications (Haenlein & Kaplan, 2019).

1.3 Current states of AI

1.3.1 Narrow and general AI

Making machines as efficient, or even more efficient than humans has always been one of the challenges of artificial intelligence. The aimed objective is therefore to make AI able to handle any common cognitive process in any given context, as human intelligence is able to do (Walch, 2019a). This leads to two typologies of AI distinguished by practitioners, Narrow and General AI, also previously called respectively weak and strong AI (Walch, 2019a). "*From the perspectives of researchers, the more an AI system approaches the abilities of a human, with all the intelligence, emotion, and broad applicability of knowledge of humans, the 'stronger' that AI is*" (Walch, 2019a, para. 1).

Firstly, Narrow AI systems "*simulate human intelligence for specific tasks to produce commercially viable smart programs or machines*" (Paschen et al., 2019, p. 7). Indeed, a Narrow AI "*addresses specific application areas such as playing strategic games, language translation, self-driving vehicles, and image recognition*" (Office of Science and Technology Policy, 2016, p. 7). Therefore, this typology representing the "*state of the art has transformative qualities and will warrant a thorough assessment of the opportunities and threats for business today"* (Paschen et al., 2019, p. 2).

Secondly, General AI systems aim at developing "*machine intelligences capable of turning their hands to any task, much like a person can*" (Paschen et al., 2019, p. 7). The typology "*(sometimes called Artificial General Intelligence, or AGI) refers to a notional future AI system that exhibits apparently intelligent behavior at least as advanced as a person across the full range of cognitive tasks*" (Office of Science and Technology Policy, 2016, p. 7). Practitioners argue that such system should show "*common sense reasoning, self-awareness, and the ability of the machine to define its own purpose*" (European Commission, 2019, p. 5).

> *Attempts to reach General AI by expanding Narrow AI solutions have made little headway over many decades of research. The current consensus of the private-sector expert community […] is that General AI will not be achieved for at least decades.* (Office of Science and Technology Policy, 2016, p. 7)

Therefore, "*long-term concerns about super-intelligent General AI should have little impact on current policy*" (Office of Science and Technology Policy, 2016, p. 8).

1.3.2 Machine learning

"*Machine learning is one of the most important technical approaches to AI and the basis of many recent advances and commercial applications of AI*" (Office of Science and Technology Policy, 2016, p. 8). In machine learning, "*a computer observes some data, builds a model based on the data, and uses the model as both a hypothesis about the world and a piece of software that can solve problems*" (Russell & Norvig, 2020, p. 1201). In fact, when designing algorithms and inherant rules, humans have difficulty specifying the implicit and tacit mode of reasoning they use to solve certain complex problems (Janiesch et al., 2021; Russell & Norvig, 2020). Machine learning solves this constraint by its increasing effectiveness when placed in repeated interaction with a certain set of actions and data (Janiesch et al., 2021).

> *As such, it aims at automating the task of analytical model building to perform cognitive tasks […]. This is achieved by applying algorithms that iteratively learn from problem-specific training data, which allows computers to find hidden insights and complex patterns without explicitly being programmed.* (Janiesch et al., 2021, p. 2)

For all the reasons cited above, machine learning systems "*have been successfully applied in many areas, such as fraud detection, credit scoring, next-best offer analysis, speech and image recognition, or natural language processing (NLP)*" (Janiesch et al., 2021, p. 2).

It is also worth noting that three types of machine learning can be distinguished based on the way input data is processed. The system can firstly be related to supervised learning if it uses labeled inputs to build a function that associates the corresponding label to a new input. Secondly, it can be described as unsupervised learning if no labeling is provided with input data, allowing the system to derive patterns on its own. Thirdly, it is coined as reinforcement learning when it operates through testing and failing. Errors punishing the system and successes rewarding it, the system is in the latter case able to evaluate the final output and to designate the actions that have positively contributed to this final state (Janiesch et al., 2021; Russell & Norvig, 2020).

1.3.3 Artificial Neural Networks (ANNs)

Among the different machine learning subdivisions, ANNs are of importance because of their great adaptability to final implementations regardless of the three learning types used (Janiesch et al., 2021). "*Inspired by the principle of information processing in biological systems, ANNs consist of mathematical representations of connected processing units called artificial neurons*" (Janiesch et al., 2021, p. 3). In that sense, ANNs "*consist of a sequence of computational stages known as network layers. Each network layer performs fairly straightforward calculations and then hands the result to the next, deeper layer*" (Paschen et al., 2019, p. 4). However, "*the number of layers and neurons, among other property choices […], cannot be learned by the learning algorithm. They constitute a model's hyperparameters and must be set manually or determined by an optimization routine*" (Janiesch et al., 2021, p. 3).

1.3.4 Deep learning

Deep learning systems, also called deep neural networks, "*typically consist of more than one hidden layer, organized in deeply nested network architectures. Furthermore, they usually contain advanced neurons in contrast to simple ANNs*" (Janiesch et al., 2021, p. 3). Deep learning systems are "*particularly useful in domains with large and high-dimensional data, […] in which text, image, video, speech, and audio data needs to be processed*" (Janiesch et al., 2021, p. 4). Therefore, "*deep learning is currently the most widely used approach for applications such as visual object recognition, machine translation, speech recognition, speech synthesis, and image synthesis*" (Russell & Norvig, 2020, p. 1378).

1.4 Example of technologies used in content generation

1.4.1 Natural Language Processing (NLP)

"*Natural language processing employs computational techniques for the purpose of learning, understanding, and producing human language content*" (Hirschberg & Manning, 2015, p. 261). One of the reasons for NLP existence is in fact the need for humans to interact with computers in the form of natural communication (Russell & Norvig, 2020). Today, most of NLPs are relying on machine learning and deep learning techniques, because they offer undoubtedly several advantages against prior hand-writhed rules methods for language processing (Chopra et al., 2013).

Current improvements allows researchers to "*refine and make use of such tools in real-world applications, creating spoken dialogue systems and speech-to-speech translation engines, mining social media for information about health or finance, and identifying sentiment and emotion toward products and services*" (Hirschberg & Manning, 2015, p. 261). The increasing computing power, the emergence of big data, the refinement of machine learning techniques, and the better understanding of natural communication schemes have particularly contributed to these developments (Hirschberg & Manning, 2015).

1.4.2 Generative Adversarial Networks (GANs)

Generative Adversarial Networks (GANs), developed by Ian Goodfellow in 2014, uses machine learning so that the algorithm learns from the inputs provided to it such as artists' works (Elgammal, 2018a). As explained by Goodfellow et al. (2020), the objective of number of "*generative models, […], is to study a collection of training examples, then learn to generate more examples that come from the same probability distribution. GANs learn to do this without using an explicit representation of the density function*". GANs have thus several advantages over other algorithms notably relying on Markov chains to produce their outputs, such as less computational costs and fewer mathematical restrictions (Alqahtani et al., 2021). They therefore allow generative modeling, which implies a large amount of data for the learning model and hence makes it possible to produce results that are close to the learning data but that have never existed, which makes them original (Goodfellow, 2017).

The name Generative Adversarial Networks come from the fact that they imply two algorithms or networks, respectively called the generator and the discriminator (Goodfellow, 2017). As an example, the generator is used in visual art sector to create new images similar to the training set it has been fed (Goodfellow, 2017). The second, the discriminator, is used to analyze the generated images and to test whether they belong to a real picture distribution, meaning that they would have been produced by humans (Alqahtani et al., 2021; Rea & Schneider, 2018). A GAN therefore operates "*a Turing-like test for artworks until the generated portraits could fool this discriminator into thinking they were real, too*" (Rea & Schneider, 2018, para. 5). The music industry can also make use of GANs in the creation of content by AI, notably defining the "*nature of the assemblage of processing units (the artificial neurons) and their connections*" (Briot, 2020, p. 10).

Chapter 2: Content in the cultural industry

2.1 Introduction

In order to ensure the reader's understanding throughout the future development of this master's thesis, a description of the nature of the content term to which we refer is essential. In this section, we first discuss the definition of the term used in this work as well as its corresponding industry. We therefore link the related industry to the advent of technologies, with and beyond AI. We then end with a non-exhaustive list of organizations operating in the relevant ecosystem using AI.

2.2 Content definition

The most adapted definition of content in the scope of our master's thesis is the one of the Korean Ministry of Culture, Sports and Tourism. They refer to the term content both in their "Act on the Promotion of Content Industry" and in their "Framework Act on the Promotion of the Cultural Industry". These legislative acts are aimed at underlying the different content production areas in the aim of increasing use of technology in the field (Rim & Koh, 2014).

In these laws, content is described as "*data or information on symbols, letters, figures, colors, voice, sounds, image, and video (including combinations of these items)*" (Rim & Koh, 2014, p. 381). Furthermore, content industry is defined as "*related to the production, distribution, and use of contents that create additional economic value or to the relevant services (including combinations thereof)*" (Rim & Koh, 2014, p. 381).

In the scope of this master thesis, the term content to which we refer can be more precisely described as specific to the cultural industry. This latter industry is defined by the Korean Ministry of Culture, Sports and Tourism as:

> *Related to planning, developing, producing, manufacturing, distributing and consuming cultural products, and of related services; which include one of the following (exhibitions, fairs, sample markets and festivals targeting film, video, music, game, publication, printing, periodicals, broadcasting video, cultural heritage, cartoon, character, animation, educational entertainment, mobile cultural contents, design (excluding industrial design), advertisement, performance, artwork, crafts, contents-related service, clothing using*

> *traditional materials and techniques, formations, decorative items, artifacts and daily articles, and cultural products).* (Rim & Koh, 2014, p. 381)

More precisely, a characteristic of this defined domain will undoubtedly interest us for the continuation of this master's thesis. Indeed, a great part of related contents are falling under the expression "literary and artistic works" within the meaning of the Berne Convention and are therefore subject to protection measures, particularly in the form of copyright (World Intellectual Property Organization, 1971). This expression notably refers to:

> *Every production in the literary, scientific and artistic domain, whatever may be the mode or form of its expression, such as books […] and other writings […]; musical compositions with or without words; cinematographic works […]; works of drawing, painting, architecture […]; photographic works to which are assimilated works expressed by a process analogous to photography; works of applied art; illustrations.* (World Intellectual Property Organization, 1971, p. 4)

2.3 Content creation in the age of technologies

Nowadays, new technologies are giving new means of creation for artists and content creators in general. Among them, AI is identified as a major driver of change in the industry. It has therefore resulted in several concerns from the legal community. From this raising awareness, European programs, frameworks and legislative proposals have been developed (Science Business, 2019).

In fact, several evolutions in technology have already had an impact on the cultural content industry throughout its history. Indeed, digitalization has notably allowed greater accessibility to content creation while reducing its cost (Pilege et al., 2020; Primorac, 2005). In addition, "*the Internet is now the main distribution medium for audio, video, and written content*" (Science Business, 2019, p. 8). In general, the literature has shown that the advent of new technologies has allowed many new business models to emerge (Pilege et al., 2020).

Artificial intelligence is further disrupting the value chain of the cultural industry, especially in the creation, distribution, and communication of content. The different spheres of the industry

are therefore affected, such as those related to video, picture, music, text or even journalism (Caramiaux, 2020).

2.4 Examples of companies producing AI-generated content

In order to better expose this new paradigm developed above, we briefly present here several companies whose innovative business models are disrupting the cultural industry. Indeed, these organization are able to use AI to create new modes of content generation, distribution and communication. Two of them, Amper Music and Moneybrain, will notably be the subject of a more in-depth analysis in part II of our master's thesis.

In the field of music content creation, AIVA and Amper Music can be cited. Both rely notably on deep learning and are "*aimed at the creation of original music for commercials and documentaries. In such systems, generation is automated, with the user being restricted to a role of parametrization of the system though a set of characteristics*" (Briot, 2020, p. 2). In addition, the solution FlowComposer can be highlighted. Using machine learning techniques, this system assists the user in music creation by completing his pieces of music step by step (Briot, 2020).

Then, we can cite Obvious collective as operating in the field of painting. Indeed, the French group uses machine learning to create paintings that have notably been sold at auction (Stephensen, 2019). In particular, they have used GANs to produce classic portraits, including the famous one named "Edmond de Belamy" (Stephensen, 2019). We will further analyze this case in part III of this work. In addition, some non-profit initiatives operate in this specific area. We can notably cite NextRembrandt, a "*software system sponsored by ING and developed among others by TU Delft and Microsoft. The aim of the project was to bring the great Dutch painter back to life to create one more portrait*" (Fossa, 2017, pp. 184–185).

In term of video generation, we can highlight two companies: Moneybrain and Rosebud. Moneybrain will be depicted in detail in the descriptive analysis of the business models in part II of this thesis so we will not go here into details. Roughly, they have a solution called AIStudio which allows them to generate videos of scanned models which act and speak like the originals. While Rosebud, on his side, proposes an application which generate "tokkingheads". In other words, their AI allows to generates talking heads from face pictures and have applications in marketing, movies and digital avatars (*Tokkingheads*, 2021). We can also notably cite the company Resemble which is focused on voice cloning and speech generation. Their API allows to clone a voice in 6 languages and build a realistic AI language. Their voices are pretty realistic

and have applications in movies dubbing, video games and generally in communication and marketing (*Clone Synthetic AI Voices with Neural Text to Speech - Resemble AI*, n.d.).

A certain number of companies have also developed solutions to generate pictures thanks to AI technologies. Nvidia for example, the multinational American company, developed a tool called GauGAN which allows to create photorealistic images. The user draws rough shapes as input and assigns them a nature such as sky, plant, beach, etc., the AI then generates a photorealistic landscape as output (Nvidia Corporation, 2021). We can also cite again the company Rosebud which also proposes a solution for creating AI models for on-demand photoshoot (*Rosebud AI*, 2021).

Chapter 3: State of the art and gaps

This second section will focus on providing the information on the state-of-the art literature concerning the issues raised by our problematic. We will also present the different explorations that have already been carried on those problems related to the generation of AI content. We describe which issues have already been identified in the literature and which solutions have already been prescribed to businesses in comparison to the analysis that we provide.

3.1 AI and need for regulation.

When it comes to regulations, a certain number of actors have already expressed concerns regarding the utilization and implementation of AI systems.

3.1.1 AI and Intellectual Property

The obstacles raised in our chapter 1 and 2 of section 3, related to the intellectual property of the inputs and outputs of AI algorithm, have already been identified by some experts and organization in the literature. A rising number of conference and seminars are organized to mobilize different professions from lawyers, managers to regulators in order to confront their ideas and positions on the subjects. As an example, the WIPO, the World Intellectual Property Organization, raised awareness in several conversations about some issues provoked by the meeting of AI and intellectual property (WIPO Conversation on Intellectual Property (IP) and Artificial Intelligence (AI), 2019). Ourselves, we attended a seminar organized by the European Student Law Association on the subject of new technologies and artificial intelligence law with actors from both the law and business world. When it comes to scientific papers, Ramalho (2017) already identified a lack of regulations regarding the authorship of AI-generated content by comparing different legislation and considered different policies such as attributing the authorship to an AI. At the end she concludes that an attribution of AI-generated works to the public domain is preferred. Mauritz Kop (2019) managing partner at Artificiële Intelligentie & Recht., also provides a comparative study of EU, USA, UK regarding copyright protections of AI creations in regard to the normative human-centered view of the copyright and question the legal personhood of an AI system. His goal is to foster the debate on the possible intersections between AI systems concerns and IP rights through interdisciplinary research. Other express concerns on the necessity or not to develop a specific IP regulation regarding AI systems.

Grimmelmann (2017) for example considers that computer generated works should not be differentiated from classical works.

Those conversations and conferences highlight a high number of issues but also implicitly attest a lack of clear answer which are necessarily limited to some speakers or organizations views. Moreover, those opinions do not imply clear implications for the businesses and remain proposal of uncertain regulations. The comparison of Ramalho (2017) remains for example the opinion of an expert and her comparative study of different regulation lacks of the newly implemented regulation of the EU in the past two years. By confronting ideas of various sources through our analysis of two business models, propositions of laws and thinking of experts and speakers, we were able to provide implications for businesses on those questions of property in the middle and long term.

3.1.2 AI and Ethics

When it comes to the ethical issues raised, the Council of Europe organized a series of webinar on AI&Law with a focus on human rights and democracy. In their tenth session for example, they provided discussions between academicians, officials and policy makers on the subject of new language processing and deepfake (*AI&Law Webinar #10: "I'm Not a Robot"*, 2021). The OECD, in his report on "AI and responsible business conduct" of 2019, also cited eight concerns for the utilization of AI for human rights from the rising of fake news, monitorization of opinions from government, automation of jobs to personal data and privacy. The report focuses on a great variety of dangers and illustrates the possible misutilization of AI to amplify those phenomena that we already face today. They also highlight a growing fear of automated discrimination due to the use of biased or incomplete dataset (Organisation for Economic Co-operation and Development, 2019). The same fear is shared in a common report of the office of the president of the USA, the national science and technology council and the committee on technology of the United States. They published a complete report in 2016 to establish national goals and investments regarding AI. Among others, there is a full section which focuses on the necessity to ensure fairness and safety of AI algorithm (Executive Office of the President et al., 2016). Stankovic et al. (2017) proposed also a paper describing some economic disruptions of AI and their consequences on unemployment and on the repartition of value. They also further analyzed the bias and concerns on privacy and security brought by the development of AI from a legal perspective. Whether it is about officials, policy makers, experts of speakers, we can see that there is a general repetition on the theme of concerns when it comes to the AI.

If there is an abundant number of opinions and analysis on the possible dangers of implementation of AI and its implications on the consumers in the literature, there is however a lack of interpretation of consequences for AI-based businesses themselves. Benchmarks and consensus are lacking to have a clear evaluation of the impact of companies on those ethical questions and, therefore, the improvements possible (Zhang et al., 2021). We can notwithstanding emphasize that the OECD in his report of 2019 provides a one-page proposition of ethical principles which should be followed by AI companies. Those recommendations are however briefly illustrated in companies such as Intel and Microsoft. Those are two huge multinational companies which do not develop AI as their core business, making it hardly applicable to small and medium AI-based companies generating contents (Organisation for Economic Co-operation and Development, 2019). Therefore, a non-exhaustive list of questions raise: What would be in practice forbidden business models? Can some AI-based company fear to see their business model declare illegal tomorrow? Which initiatives can they take to satisfy those concerns? In this thesis, we focus on a comparison with two real business cases and apply the future framework of the European legislation published in late April 2021. It allows us to bring serious managerial implications to issues which have already been discuss in the literature but without interpretation for the AI-based businesses producing contents. We also provide advice on measures and strategies such as transparency and explainable AI. Those are prescribed in order to avoid retaliations at short or medium term from regulators but also the public opinion.

3.1.3 AI and Market Threats

Concerning the threats of unfair competition, some literature focused on the problem such as Donald (2019) which provided a complete analysis of the managerial implications of disruption inside organizations. He particularly wrote a chapter on artificial intelligence and provided analysis on the impact on employment market in some industries such as communication. He also provided a list of possible organizational improvements that companies should follow to be preserved from the disruption of AI mass produced assets at lower costs. When it comes to creativity, Donald questions the ability of AI to rival the human mind by assessing the speed to market and connectivity. A danger that Nugent (2018) also identified. In his papers he questioned the possibility of powerful algorithm to generate valuable contents in opposition to human creativity.

While most authors focus on the consequence of AI on the employment market, we made the choice to assess the difference of value between AI and human contents. We also address this question and its potential threats to human creativity by focusing on value perception, and the concept of process-driven art. Furthermore, we focus on the specific market of the music industry following our analysis of the business model of Amper Music. By doing so, we aim to provide a business-oriented analysis of the possible developments of some companies' behaviors which may undermine the cultural market. We take the example of Spotify and investigate the details on how the company address those questions as well as looking into the patents of some of his algorithms such as anti-plagiarism solutions.

3.2 AI and need for managerial applications.

If the AI is by far one of the most debatable and popular subject among businesses, regulators and consumers around the world (Russell & Norvig, 2020, p. 80), the literature is much more scarce when it comes to solutions and advices for companies. Especially in regard to the discussions on AI for the companies which make those changes possible: the AI based companies themselves. A constate shared by Donald (2019, p. 73) which, in relation to the development of AI, emphasizes that "*Organisations will be confronted with choices on what to adopt, when to adopt and how to change, where complete information may not be available in time for decision making".* Therefore, there is a need for companies to have access to information on AI, its regulation and potential disruption to develop appropriate strategies. And this for both the companies which evolve in the AI market or are impacted by it.

The European Commission (2021) or the United States with the The National Artificial Intelligence Research And Development Strategic Plan (2016)both recognize that promoting the development of AI businesses are key. But the literature is lacking of interpretation on the consequences of those debates for AI-based companies regarding ethics, competition, and intellectual property. It is why in this thesis we make the choice to start from the description of the business model of two companies generating AI contents and for which it is the core business. Through this analysis we could list a certain number of issues, notwithstanding the fact that some had already been identified in previous literature. First, through comparative study on the regulations put in place and proposals for regulations, we were able to provide concrete implications for companies when it comes to intellectual property of inputs and outputs of AI algorithm. Companies cannot develop correctly in an environment where uncertainty remains regarding the ownership of the content produced by their algorithm or when they can

face retaliations for the nature of the dataset used without clear indication in first place. When it comes to competition, fears and concerns of the market may obstruct the development of the algorithm and their recognition as affordable tools of creativity and personalization. Concerning the list of ethical concerns, notably listed in the report of the Organization for Economic Co-operation and Development (2019), companies should have a clear idea of forbidden business models as well as initiatives which can mitigate the fears of the market and consumers.

3.3 Already existing answers

To the needs expressed in the previous sections, a certain number of answers can however be already found through initiatives, NGO's and states regulations.

In term of regulations, some legislation already started to tackle the issues raised by the artificial intelligence on the questions of ethics, intellectual property questions and markets threats. Among other we can cite the Copyright Law of Japan (2021), the Data Governance Act (2020) of the EU, the Copyright, Designs and Patents Act 1988 (2003) for the questions of intellectual property for AI systems. We can also notably cite the general proposal of the European commission which covers the ethical and competition dimensions of AI systems (European Commission, 2021). The answers given by those regulations are however either partial and limited to a specific section such as the data for the Data Governance Act (2020) or too recent and broad to be easily interpreted by AI-based businesses generating contents. Through our analysis in the further sections of the thesis, we will focus on a comparative study of those regulations, as well as considering proposals which are likely to be implemented in the next years. This will allow companies to have clear indications of the nature of the ownership of AI-generated contents as well as the nature of data which should be preferred in the dataset of AI systems to avoid legal retaliations.

Concerning the debates on the capacity of AI systems to disrupt markets or raise ethical concerns, a certain number of organizations have already been created to provide consulting services, advices, documentations and conferences on those questions for companies. We identified two: the NGO AI together founded by Badr Boussabat that we interviewed for this thesis and the partnership for AI. AI together is an organization focusing on the benefits brought by AI to the society and has the mission to convince the general public, companies and regulators to incentivize and trust the development of AI. Among their members, they have some of the biggest actors of AI in the world such as Spotify head of intelligent automation and the global chief AI officer of IBM. They notably present a company-oriented perspective on

debates as diverse as inequalities, education, employment and propose AI as the solution for those social issues. (*Projects – AI Together*, 2021). The organization is however still very recent in May 2021 and lack from small and medium companies for which AI is the core business. The second one, partnership for AI, is a non profit organization which can be sum up in its 4 goals: developing best practices in AI-based companies, improve the understanding of the general public on AI costs and benefits, incentivize discussions between relevant stakeholders and foster the development of social AI which may benefit the whole society. The organization gather NGO's, academicians but also multinational such as Facebook, Microsoft and Open AI (*The Partnership on AI*, 2021). Again, its lack of small and medium actors for which AI is the core business, may however reduce its impact.

Chapter 4: Methodology

This section aims to provide the important decisions, methods and steps which led us in the redaction of this master's thesis. We will first depict the steps followed to define the problematic of our thesis before concentrating on the redaction of the theoretical and practical analysis. Finally, we will present our qualitative study and in which degree those findings supported our analysis.

4.1 Definition of the problematic

At the very early stage of our master's thesis, we both took the time to discuss with our promotor, Professor Paul Belleflamme, on the broad subject of our master's thesis which was at this time "Digital economy and intellectual property". In the beginning, we already knew that we wanted to address some issues of intellectual property induced by the development of Artificial Intelligence algorithms.

We decided on a common ground that our thesis would take an exploratory approach on this topic. An exploratory approach is defined by Jacquemin (2017) as an approach in which the researcher tries to characterize, describe a situation or process that have not been addressed largely in the literature so far and remains quite unknown. As the broad subject of artificial intelligence is expanding day by day and remains diverse as we can give it as many definitions as it has implications, this approach seemed appropriate.

This decision being taken, we made a hypothesis that AI systems will have significant influences on intellectual property regulations and that the compliance to those uncertain regulations by AI-based companies will bring also uncertainty to their business models. We decided to test this hypothesis by exploring AI business models and regulations regarding intellectual property on the input and output of AI systems.

Then we also analyzed potential disruption of markets and their potential threat to consumer and competition, as well as the role played by ethics in the role and adoption of those AI systems. To tackle those questions, we relied on expert papers, regulation and proposal of regulation, discussion as well as a qualitative study with five experts related to this question. We also participated on a webinar of one week organized by the European Student Law Association on the subject of new technologies and artificial intelligence law. In other words, by exploring obstacles and market threats posed by AI on a broad basis, we aimed at finding relevant managerial implications for AI-based businesses producing content or, even, regulators. This

in order to maintain the development of AI businesses while still avoiding unfair competition. It led us to the definition of our problematic:

AI-based production of content: obstacles, threats, and opportunities

4.2 Practical redaction

As a first step in our exploratory approach, we decided to dive into the world of AI-based companies producing contents by analyzing two business models of two specific companies. After a first screening which led us to consider companies such as Resemble, RosebudAI, Spotify and even Nvidia which have applications of AI systems in subjects as diverse as voice synthesizer, music and video games, we decided to focus on two specific companies: Moneybrain and Amper Music. This decision was motivated by our will to concentrate on companies for which AI is the core business, as we wanted to analyze which obstacles they face in their development. We first chosed Amper Music because the Music Industry was notably one of the most dynamic sectors in generating content through AI. Moreover, it brought us several questions in term of intellectual property such as the ownership and authorship of AI-generated songs produced by AI algorithm. It also highlighted a possible difference of value between AI-generated works and human-made works.

Then we took the decision to concentrate on the South Korean company called Moneybrain, which is famous for its platform allowing to create replications of models in order to represent an AI version of some personalities. They provide notably their solution to a TV channel, allowing the latter to broadcast an AI version of their tv presenter star but also to communicate with a personal virtual teacher on their learning application. This choice was motivated by the several ethics questions raised by the business model in term of image rights and to diversify our point of view on AI industry in a larger sense.

This first section of our thesis allowed us to structure the different sections of our paper as they were raising awareness on the different topics we planned to address. First, we raised the issue of the utilization of copyright-protected works in the dataset of AI systems. As an example, when we were analyzing the business model of Amper Music, we wondered what the possibilities for companies would be to use protected songs in their dataset and how they can also circumvent this issue. As both Moneybrain and Amper Music propose a product/service directly generated by AI, we also wonder who would own the copyright on the latter, as the systems become more and more automated, and how could the market organize. Later, when

comparing the business model of Amper Music or the current projects of AI by multinational like Spotify, it led us to consider potential issues of unfair competitions.

Finally, as we got a very deep knowledge of the problematic, two other issues were raised when analyzing the two business models. Amper Music led us to tackle the question of the comparison of value between human-made and generated artistic works while Moneybrain raised ethical questions of personality rights.

4.3 Method of analysis

To analyze the business models, we decided to apply the Business Canvas Model. As highlighted by Osterwalder & Pigneur (2010,p.11) in their book Business Model Generation, it is "*time to understand and to methodically address the challenge of business innovation*". The business Canvas Model allows in the process of development to share understandings of the business idea so that everybody understands it from the same point of view. It is therefore used ex ante by promotors of business models to convince their investors, partners, and consumers. We however decided to apply it ex post on business models idea in order to clearly understand nature, obstacles faced by the two companies we analyzed in their development. As Osterwalder & Pigneur (2010, p.15) emphasize, the business model canvas can also be used to "*manipulate business models to create new strategic alternatives*." We believe that there is no better way to identify obstacles faced by young companies in their future development than by using a model meant to be applied at early stage or for strategic redirection. This method allowed us to have a deep understanding of those companies and highlight several issues related to intellectual property, ethics, and data collection.

While gathering our data concerning the business model canvas of those companies, we had to be careful to the news as decisions and acquisition go very quickly in this sector. For example, we needed to adapt our statement when Shutterstock acquired Amper Music, as we were at the beginning of the redaction of our master's Thesis.

We decided to focus first on the issues linked to intellectual property. As we had a business-centered methodology, we then decided to extend it further to market threats following our analysis of two business models: Moneybrain and Amper Music.

Secondly, we decided to make a quantitative analysis, for which the development is detailed in section four of this chapter, as well as following a one-week seminar on the subject of legal issues raised by artificial intelligence and new technologies.

Thirdly, as you will see in the next section, we apply the concept of literature review at the early development of our thesis to gather data and keywords in order to write our thesis with a great diversity of sources and having a deep understanding of the problematic in order to tackle the theoretical section of our thesis.

4.4 Qualitative study

Through the redaction of our master's thesis we also had the possibility to have several interviews with professional and experts related to artificial intelligence, intellectual property as well as digital law experts.

Our first interview was conducted inJanuary at the time when we finished the elaboration of the two business models in order to explore more into the problematic of intellectual property and artificial intelligence through an open discussion with Adrien Lemoine, European Patent Attorney at AGC Glass Europe. This discussion helped us broaden our problematic in the field of intellectual property and bring some partial answers to open questions that we had especially regarding the authorship and ownership of AI-generated contents.

The second flow of interview took place much later during April and May 2021 and aimed to provide an expert point of view to the problematic that we raised and analyzed precisely by then. More especially, we could rely on law experts to help us analyze law statements of specific jurisdictions and their possible applications to business cases. The interviews are as followed:

Date of the interview	Name of the interviewee	Function of the interviewee	Subject of the Interview
12/01/2021	• Adrien Lemoine	• European Patent Attorney at AGC Glass Europe.	Discussion on intellectual property and artificial intelligence.
22/04/2021	• Badr Boussabat.	• President of the NGO AI TOGETHER and AI Speaker.	Obstacles and opportunities of AI-based companies & AI Together.
24/04/2021	• Alexandre Thissen. • Adrien Lemoine .	• Digital Project Leader at AGC Europe and Head of Technology at FeelInGlass. • European Patent Attorney at AGC Glass Europe.	Implementation of AI-based system in private company.
12/05/2021	• Migle Laukyte.	• Professor in cyber law and cyber rights at Pompeu Fabra University in Barcelona.	Interpretation of statements of law of copyright law in AI-based businesses.
13/05/2021	• Ana Andrijevic	• Research And Teaching Assistant at Digital Law Center of the University of Geneva.	Legal uncertainty and interpretation of statements of law related to copyright law in AI-based businesses.

PART II: DESCRIPTION OF THE BUSINESS MODELS

Chapter 1: Amper Music

Amper Music is an A.I. assisted music composition tool developed in 2014 by Sam Estes, Michael Hobe and Drew Silverstein (Leswing, 2016). "*In the early 2010s, the composers Drew Silverstein, Sam Estes, and Michael Hobe were working on music for Hollywood films like The Dark Knight when they found themselves deluged with requests for simple background music for film, TV or video games*" (Chow, 2020, para. 9).

As stock music repositories require a large amount of time to browse the relevant music, too often not so unique and leading to intellectual property hurdles, many actors of the art industry do not want to rely on them (Silverstein, 2019). It is from this observation that the trio decided to create Amper Music, for which we could summarize the value proposition as on one side proposing musicians a new tool assisting them in the creative process and on the other side allowing non-initiated to take part in a task from the one they would have been incapable due to a lack of skills (Chow, 2020).

1.1 Customer segments

Drew Silverstein, the CEO of Amper music distinguishes both functional music and art music. The first is used by creators of all gender who rely on music for its capacity to support other content or message. The second one is created by musicians or composers and valued for its creative assets and human individual or collective process underlying it (Silverstein, 2019).

1.2 Value proposition

Today, Amper Music offers two types of products. The first one, score, is an application used to quickly create AI-assisted music which will mostly be embedded in other medias such as podcasts. Their second product, the API, is aimed at becoming integrated into other business models or services by making Amper Music solutions embedded in another tool. In particular, it makes it possible to add new functionalities to existing tools and thus to bring added value to existing activities or to offer new creative possibilities and facilities to musicians and professionals in the sector (Amper Music, 2020).

Although they have no pretension to replace musicians in their creative process, Amper Music aims at developing new ways of assisting professionals in their work. Drew Silverstein illustrates this value proposition by a parallel with other key improvements already performed in other artistic fields, where computer assistance has disrupted ways of creating. As an example, the designers have replaced their pencils with design software, the typewriter became the text editor. For him, the work or the profession does not disappear when technology evolves, it is only the way we do our work that change (Silverstein, 2019).

In this view, Amper Music aims at making life easier for people, whether they use music for its function or the creative process leading to the final artwork. They mainly provide users legal ease, based on their need and particularly dependent on the license they are willing to pay according to these needs. This convenience materializes itself into A.I. assisted music creations leading to no royalty's duty or copyright licensing issues under a perpetual licensed utilization right (Amper Music, 2020).

Moreover, the benefit takes too the form of time and money-saving, as "*creative expression flourishes when the process of expression is easier and more affordable*" (Silverstein, 2019). Indeed, the software allows non-initiated people to quickly find music adapted to their needs by reducing sourcing time and money spent on artist retribution. Furthermore, the company also offers its A.P.I for anyone willing to even fully integrate the solution in another service (Amper Music, 2020).

To fit customers' needs, the Amper Music solution uses multiparameter inputs when the user starts a new request to the software. He will specify the music genres he wants as the final output, as well as the structure of the output. To do so, the user can choose between different music styles as well as "moods". Regarding structure, the user will have to specify either manually the duration of the music as well as its "peak" moment and the B.P.M. (Beats Per Minute) also called the rhythm of music, or to furnish a video as input in which the output music will be used. With the latter option, the software will then try to fit the video under the adjustments of the user. At the end of the process, the user will get the opportunity to adjust its demand and the final output to get the perfect fit music (Amper Music, 2020; Silverstein, 2019).

To support this value proposition, the software musical rendering relies on real recorded instruments by using their proprietary music library consisting of "*millions of individual samples and thousands of purpose-built instruments*" (Amper Music, 2020). This specific library builds the competitive advantage of the company regarding other A.I. assisted music

software such as AIVA (Hogan, 2019). AIVA Technologies is one of the leading AI-assisted music creation companies, co-founded by the European Union under the Horizon 2020 program (AIVA Technologies, 2021). The company has developed its own deep learning neural network and has the particularity of being registered at SACEM (the France and Luxembourg copyright agency), which allows it to put its copyright on the tracks created by its solution (Nemire, 2017).

1.3 Channels

This section concerns the channels on which the company analyzed can deliver value will be structured under the typology expressed by Osterwalder & Pigneur (2010).

The main channels used by Amper Music are the company website and the resulting Score platform. Both could be described as owned and direct channels as they allow the company to directly interact online with customers through Amper Music's own means. These interactions take the functions of evaluation, purchase, delivery, and after-sales. Notably, the platform allows users to quickly dive into Amper Music's value proposition. After account creation, they can design songs and explore Score's functionalities for free, without being able to download them. The platform is then proposing several prices under different licensing options if the users are willing to download and use the song created. We will come back to this pricing strategy in more detail in the revenue stream section. Moreover, the company's website also offers services related to the solution's API. For both the Score application and the API, the website offers access to utilization guides in the form of an FAQ section as well as API documentation for developers (Amper Music, 2020; Amper Music Score, 2021).

To raise awareness about their products and AI-assisted music creation in general, the company relies on indirect partner's channels such as social medias and press relies on specialized and mainstream newspapers such as Forbes, Musically, the Time and CBS News. Amper Music CEO Drew Silverstein also presented the company's value proposition at a conference at the TEDxROMA event which took place in 2019 (Silverstein, 2019).

1.4 Customer relationships

Whether from its Score application or its API, Amper Music does not entertain close relationships with customers. As part of direct interaction between the company and the user, we can note the creation of an account and the selection of the licensing type required by the uses the customer will perform from the AI-assisted music generated. The user is then able to

use the application Score to design his or her desired music, to download it and to use it within the limits of the agreement (Amper Music, 2020; Amper Music Score, 2021).

Based on the licensing type purchased, the user will be granted the possibility to use the output in more or less flexible ways. We can, for example, read on Amper Music's website (2020) that all licenses offer royalty-free, global and perpetuity valid distribution rights, the company also limits the form that this right of distribution can take. The company notably reserves the right to prohibit you from using the output for commercial or advertising purposes under some licensing agreements (Amper Music Terms of Service, 2020).

On the other side, based on Amper Music Term of use, the company seems to take a lot of precautions regarding legal aspects, sometimes in contradiction with their communication. First, regarding geographical concerns, Amper Music states that all legal dimensions, as well as the permissions for use granted in the form of licenses, are only applicable under the jurisdiction of the United States, so the company does not make any claims for use outside the country where Amper Music Inc. is legally established. More frighteningly, the company also reserves the right to terminate any agreement or user contract, for any reason, at any time. Indeed, this statement concerns the website as well as the permission to suspend our account, but also the content of it (Amper Music Terms of Service, 2020).

Although it is not clearly written that the company reserves a right of use or ownership of the content created on its platform, some questions may persist. Can music created by an Amper Music user really belong to him? Doesn't the company itself take advantage of the legal vagueness surrounding the AI to provide itself, in the form of an abusive license agreement, with the intellectual property of the works created thanks to the Score platform?

Indeed, some business models "*are licensing the rights of the music generated by the software even when in some cases, users may have actively contributed to the final input*" (Sturm et al., 2019, p. 9). Amper Music is the perfect example, where the user can have a real involvement in the design of the result, but in the end, depending on his willingness to pay, more or fewer rights on the music created with the AI tool.

Although the user could, theoretically, actively claim ownership of the output generated, it is unlikely that he or she would be able to prove that his or her participation in the design is sufficient to hold such a right, should ownership ever be challenged (Sturm et al., 2019).

So, what kind of implicit customer relationship does the company tend to maintain with such terms of use? By designing rights to appropriate the content generated under licensing principles, Amper Music skillfully circumvents the legal vagueness to take advantage of it in its favor. In this regard, "*it must be recalled that if a work is not considered as protected by copyright, the enforcement of the relevant clauses cannot be justified on the basis of copyright law but on the basis of contract law*" (Sturm et al., 2019, p. 9). In doing so, the company offers limited distribution rights on the content created with its AI application while retaining the possibility of breaking the relevant contract as expressed in the terms of use. Although it is unlikely that the company will ever invoke this right, which may seem abusive, for non-justified cases, this protection allows the company to keep track of the content generated by the AI application and the uses resulting from it, while also retaining the possibility of terminating the contract if the user goes beyond their definition of normal use. Moreover, it thus allows the company to protect itself both from the legal repercussions that may result from users' abusive use. Indeed, Amper Music also reserves the right to transfer any fines or fees resulting from a user's misuse of the generated content (Amper Music Terms of Service, 2020).

1.5 Revenue streams

To be profitable, the company relies, as already said, on per-song license contracts offered to users willing to use the generated output as part of personal, professional, or commercial ends. It has to be noted that prices communicated on Amper Music's website were higher than the effective prices on Score's platform. Thus, the first license beginning at 5$ offers users the right to enjoy their AI-assisted creation only for personal or scholarly ends such as using the output in a video on a personal YouTube channel, without ads or other commercial purposes. The second license offers for a price of 25$ the same kind of benefit from the first one, but here aimed at professionals and companies. While ads or promotional content are not allowed, this license notably allows distribution on a company's owned channel. The third license, at 99$, allows users to link commercial or promotional content to the music for example used in a YouTube video that will be monetized. The fourth license offer for 499$ the ability to use the AI-assisted output for online commercial purposes such as an online ad for a company. Finally, the company offers the ability to use music created with their platforms for fully commercial ends such as a tv ad. However, the price is not disclosed and is certainly dependent on the type and scope of such a request (Amper Music Score, 2021).

It appears that the company tends to approach a versioning model for its user price, while not applying entry fees such as a subscription to the platform. Different licensing offers are available for the same final product, the music created by AI, and are differentiated by their quality, the rights of use conferred on this final product.

Versioning theoretically allows appropriating some surplus by discriminating consumers with different packages at different prices and different clauses (Scarmure, 2017). When the information is imperfect, the different offers push consumers with high demand to choose an offer of inferior quality, thus allowing them to generate a larger surplus (Scarmure, 2017). To overcome this problem, a reduction in the prices of higher quality offers makes it possible to meet the incentive constraints of the categories of consumers with higher demand (Scarmure, 2017). However, by deteriorating the quality of the low-end menu, it is then possible to increase the price of the high-end offers while reaping a larger share of the surplus from consumers with high demand (Scarmure, 2017). In other terms, by offering a low-end menu with really limited rights, Amper Music is then able to offer high-end menus with really higher prices.

Moreover, by only licensing the output generated by the user, the company tends to benefit from the positive effect we could observe on free-trial offer. For Parker and Van Alstyne, "*offering free trial software include reducing customers' uncertainty about the quality and features of the product, and increasing the revenue from other complementary products*" (as cited in Cheng & Tang, 2008, p.1). By their pricing strategy, Amper Music therefore decided to charge no entry price at the account creation, enabling the user to quickly dive into the tool and to start creating music (Amper Music Zendesk, 2020).

1.6 Key resources

To support its business model, Amper Music requires different resources. As an analysis framework, we decided to follow once again the book from Osterwalder A. & Pigneur Y. (2010), where key resources materialized themselves into four categories.

First, physical resources mainly embody themselves in Amper Music's business model as cloud computation supporting algorithm calculations that enable AI-assisted music creation (Cognilytica, 2018; Sennaar, 2019). Moreover, as with every digital and IT-based business model, they require their websites and internet domains, notably ampermusic.com and score.ampermusic.com (Amper Music, 2020; Amper Music Score, 2021). Finally, consistent with their value proposition, Amper Music benefit from a repository of millions of music samples prerecorded from instruments (Amper Music, 2020; Nasdaq, 2020).

Secondly, financial resources have to be observed. Amper Music Inc. is a company registered in the United States Security and Exchange Commissions under the CIK number #0001651326 and incorporated in the state of Delaware (U.S. Securities and Exchange Commission, 2021). On November 11, 2020, Shutterstock Inc. announced the acquisition of Amper Music Inc., without terms disclosure (Nasdaq, 2020; Shutterstock Inc., 2020). Previously, Amper Music raised since its creation a total of $9 million notably by the last seed round of $4 million on March 22, 2018. This latest seed round, notably supported by capital companies such as Horizons Ventures and Two Sigma Ventures, was aimed at developing the worldwide presence of the company as well as increasing the human resources of the company (Amper Music, 2018).

Thirdly, the company relies on intellectual resources allowing the company to perform knowledge-based competitive advantages against the concurrence. Indeed, "*in the process of innovation, knowledge is an essential element and in the present competitive environment innovations help gains an advantage over other organisations*" (Urbancova, 2013, p.94). To this end, "*it [Amper Music] uses a range of AI and Machine Learning (ML) algorithms to produce music tracks that are of commercial quality*" (Cognilytica, 2018, para. 1). These intellectual resources are protected and rely on three patents notably accessible through the European Patent Office (European Patent Office, 2021a).

The last resource concerns the human capital present within the company. On its website, the company describes its teams as composed of "*composers, pianists, venue owners, live coders, saxophonists, vocalists, guitarists, and DJs*" (Amper Music, 2020). An updated list of employees seems difficult to find and is subject to changes, notably through the recent acquisition of the company by Shutterstock.

1.7 Key activities

The main activities carried out by the company are firstly the definition and optimization of their solution. As Drew Silverstein explains in an interview, the goal of Amper Music "*is to write music as well as John Williams, which then sounds like it's recorded at Abbey Road and produced by Quincy Jones. Obviously we're not there yet*" (Dredge, 2018a, para. 1). Its main aim is to make AI music undifferentiated from that performed by a man and thus to deeply understand the path of creation through which humans are passing (Dredge, 2018a; Silverstein, 2019).

In that view, and in connection with the value proposition, the company "*started by making individual recordings, one note at a time, of every instrument, playing every note of the scale, at every volume level*" (Kim, 2018, para. 15).

On the other hand, the company's main objective today is to evangelize its solution and reassure the pessimists such that "*Amper will become a foundational infrastructure in music creation, in the same way that Microsoft Word is for documents*" (Dredge, 2018a, para. 7). Moreover, it aims at developing an indispensable tool that will become an integral part of the creative process, so that every artist will use Amper music to design their creations (Dredge, 2018a; Silverstein, 2019).

1.8 Key partnerships

Following Osterwalder & Pigneur (2010), developing partnerships could be aimed at developing new assets and a portfolio of activities, notably by acquiring new customers and segments of the market as well as reducing tough competition among the market. Hence, coopetition is defined as cooperation among competitors aimed at acquiring new strengths, positions and knowledge (Gnyawali & Madhavan, 2001). The literature also refers to it as shared competition and cooperation performed by companies (Lado et al., 1997). Coopetition is furthermore described by Osterwalder & Pigneur (2010) as one of the four types of partnerships companies can be involved into.

In that view, Shutterstock announced on November 11, 2020 the acquisition of Amper Music. If complete terms of the transaction are not yet publicly announced, the acquisition involved notably the integration of particular assets from Amper into Shutterstock business. Notably, engineers and members of Amper Music company have been transferred to Shutterstock capabilities. Shutterstock is a company offering under licenses, access to royalty-free media such as music, photos, and video. As expressed by Stan Pavlovsky, the Shutterstock CEO, the main objective of this strategic partnership is to broaden the company's portfolio of customer experiences, and so to enrich its actual offer and value. On the other side, Drew Silverstein, the Amper Music CEO, talked about an operation aligned with their primary objective of enabling people to express their creative need, materialized for the company into acquiring the clientele of Shutterstock (Nasdaq, 2020; Shutterstock Inc., 2020). This coopetition has undoubtedly allowed both firms to reduce the risk induced by their competing offers, allowing them to perform their business while benefiting from respective resources.

While focusing on Shutterstock music offer, the two companies could be described as two competitors with an opposite business model and substitutable finished products before their agreement. Shutterstock music supply is divided into two offers, Shutterstock Music and PremiumBeat, which could be described as two-sided platforms. They can be both described as "*an entity that enables interactions between users so as to generate value from these interactions*" (Belleflamme, 2020). Indeed, the company allows on one side external contributors to offer royalty-free music and on the other, companies, media creators and pub agencies to benefit from original and right-free content on a licensing subscription basis (Shutterstock Inc., 2021). In this kind of platforms:

> *Users may derive positive cross-side network effects (CNEs) from the participation of members on the other side of the market, which means the larger the installed user base on one side of the platform, the more attractive the service for the opposite side's users*. (Voigt, 2015, p. 140)

Belleflamme (2020) characterize a two-sided platform as benefiting from offer expansion and cost-saving, compared to a pure pipeline model, operating with complete integration of operations in a single company. By replacing the offer side with their AI solution, Amper Music can benefit from both advantages of a two-sided platform and pipeline model, while leveraging the cross-side network effect described above. Indeed, their AI solution developed, the technology agent could be characterized as operating as an independent third-party, while allowing Amper Music company to perform what Belleflamme (2020) describes as laying the first egg strategy. Such proceed avoids notably Chicken and Egg problems, allowing to:

> *Attract end-customers more easily by providing yourself the service or goods that they wish to consume. They will indeed feel reassured to find what they are looking for, without having to second-guess whether participants on the other side of the market will also jump on board or not*. (Belleflamme, 2020)

As part of other partnership strategies, Amper Music developed its API aimed at allowing businesses to fully incorporate Amper Music's AI solution into their applications or programs (Amper Music, 2020). In the past, their API notably allowed the company to perform a partnership with QQ Music, the Chinese leader in music streaming service and owned by the

Tencent Music Entertainment Group (Amper Music, 2019). Indeed, "*majority of IT decision-makers view application programming interfaces, or APIs, as essential ingredients in improved customers experiences, expanded partner engagement, accelerated innovation, and other demands of today's business environment*" (Rohan, 2021, para. 2).

Being embedded into other companies' softwares is without a doubt the aim of Amper Music. As part of their evangelization and democratization plan for AI music, being notably integrated right into systems such as videogames or pedagogical programs has always been a strategic goal for Drew Silverstein (Dredge, 2018b). The API development for IT-based business models undoubtedly furnishes benefits. Among them, we can firstly quote bigger income, as APIs leverage partnerships and thus market share by increasing end-users' acquisition and sales volume. Secondly, APIs allow greater flexibility and faster market penetration as they can easily be replicated into a partner's or third party's business model (Rohan, 2021).

1.9 Cost structure

Underlying the profitability of its business model, the cost structure of Amper Music is tackled in this last section. After having defined key resources, partnerships and activities, we define under the typology of Osterwalder & Pigneur (2010), that Amper Music's cost structure falls between the cost-driven and value-driven business model definition. Indeed, cost-driven business models are motivated by greater automation of procedures and thus cheaper value proposition for the company (Osterwalder & Pigneur, 2010). In that sense, the Machine Learning and Artificial Intelligence designed by the company allow to reduce costs by developing automation through the independent user's interface and replicability of the solution through their API, as explicated above. On the other side, value-driven business models are aimed at delivering more value, less focused on cost reduction (Osterwalder & Pigneur, 2010). This goal is also achieved by the company through high degrees of personalization on the Score solution described in the value proposition section.

The main costs endorsed by the company can be defined under the typology of Osterwalder & Pigneur (2010) as variable costs. Indeed, as approached in the key resources section, "*Amper Music is a cloud-based Artificial Intelligence (AI) music composer*" (Cognilytica, 2018, para. 1). Such proceeding "*allows potential entrants to save in the fixed costs associated with hardware/software adoption and with general ICT investment, and turns part of this capital expenditure into operative expenditure, that is in variable costs*" (Etro, 2011, p. 7).

In addition, the marginal cost of an additional user must be considered, as it is not null. Indeed, relying on cloud computing also allows "*turning some of the fixed costs in marginal costs of production*" (Etro, 2011, p. 1).

Whether these fixed costs of the company are not publicly available, we can deduct that they may be mainly induced by staff's salaries, workplaces costs and website-related costs. Moreover, the intellectual capital owned by the company, respectively trademarks and patents induce fixed costs. Indeed, patents involve annual renewal fees depending on the laws induced by the legal area covered by the patent application (European Patent Office, 2021b; United States Patent and Trademark Office, 2021).

Chapter 2: MoneyBrain

Moneybrain is a Korean firm specialized in developing AI Models which act and speak like their original model. In an interview at the United Nations agency for information and communication technologies, their chief financial officer RJ Choi explained what Moneybrain consists in: *" The simple answer to [what is money brain] is: Money refers to financial institutions and Brain for artificial Intelligence"*(RJ Choi, 2017). In the same interview he explains that the goal of Moneybrain is to provide business with solution which reduce their costs and increase their revenue through artificial intelligence. They started in 2016 by focusing on creating an AI chatbox and then ,based on this technology and their learnings, they progressively moved to a conversational AI with human expressions (RJ Choi, 2019).

In November 2020, they hit the headline when their technology was used by the Korean TV channel MBN to create an AI version of their TV star presenter Kim Joo-ha (MBN News, 2020). This was made possible thanks to a tool developed by Moneybrain and called "AI studio" which allows firms to generate videos of the presenter where an artificial intelligence reads scripts and acts like the presenter herself (MoneyBrain, 2020b).

But further than this, Moneybrain made of AI technology his core business and is also active on the educational market with an AI based application called "AI Speak now" which aims at teaching English to Korean Native with a disruptive "freetalking" option to discuss and communicate in real time with an AI (AI Speak Now Website, 2021).

In the following section the business model canvas of Moneybrain will be analysed in details.

2.1 Customer segments

Ai Studio:

Currently, the company segments its offer regarding the 3 companies who joined a collaboration program by adapting the firm package to their needs. As so MBN benefits from a realistic AI copy of his news presenter superstar and Rainus, a customer personal advisor. But in a close future, Moneybrain tends to a diversified business model with applications as different as an AI tutor for educational purposes, AI Kiosk solution for stores, and an AI promotional video synthesizer. There will be an AI solution for each of those different markets (MoneyBrain Website, 2021). As the needs between those firms group are totally different, we can consider that Moneybrain tends to a diversified business model (Osterwalder & Pigneur, 2010).

With a basic plan of $ 3.000 a month, it seems unlikely that they will target individual customers. However, any user registering on their website has currently a free, but very limited, access to the platform with the perspective to nourish the AI and test the tools of the platform. Indeed, there are clear messages popping up on the message explaining that the free beta will end and that charging will start on December 31st 2020 (AI Studios, 2021). For this reason, we made the choice that individual consumers will not be considered as a customer segment in this analysis. But their role in beta testing will though be analysed in the customer relationship section.

AI Speak Now:

Concerning AI Speak Now, the company focuses exclusively on individual users with a software embedded in a tablet in order to teach English to native Koreans. They segmented their offer into two customer segments with basic common features: Adults and children (AI Speak Now Website, 2021). If the basic need is relatively the same by teaching English to the users with an AI teacher able to communicate and answer questions, some functionalities as well as the level of the courses differ. The business model of this value proposition is therefore segmented, following the theory of Osterwalder A. & Pigneur Y. (2010).

2.2 Value proposition

The value proposition of Moneybrain can be divided into two main released services: AI Studio and AI Speak Now. In the past Moneybrain also developed other solutions such as an English conversation chatbox and a voice synthesis app (RJ Choi, 2019). But as none of those value propositions had a much more limited impact, we made the choice to focus on AI Studio and AI Speak now.

In this section, we will be describing each of those values propositions of the Moneybrain firm in details. The first one, Aistudios, consists on a software where users can generate videos of some models developed by the Company. With AI Speak Now, Moneybrain focuses the consumers directly by providing English Classes through AI Professors which discuss and teach the users. Moneybrain also broadcast a list of other use cases which they consider to develop in the future such as AI Kiosk, AI Shopping and AI Tutor. In the following section, each of those value propositions will be described.

AIStudios:

The first one that we will consider is “AI Studio”, it consists of a software generating videos of defined models as output based on a speech script as input. Currently however, the complete

version of the software is only available to some companies with whom Moneybrain has negotiated. The “company package” allows firms to use the platform as much as they want without any limits of characters and they even have the option to add a personalized model to their library (MoneyBrain Website, 2021). It was the option chosen by the Korean TV Channel MBN. More than being a robotic reproduction of a voice, the AI produces here realistic and original videos as it can be seen on their website. The AI reproduces not only the voice and face of the announcer but also her language tics, body posture and hands movements with accuracy (MBN News, 2020). This technology allows to reduce the costs of producing videos as the AI can be mobilised 24 hours a day, 7 days a week regardless of the availability and wage of the model.(RJ Choi, 2017). For Moneybrain, AI studio is also a risk reducer as it will allow them to rely on a tv presenter 24 hours a day in case of emergency (MoneyBrain, 2020b). It should also enable the production to be much more flexible and independent of their presenters as any script can be read and act by the model.

However, so far, the service is still considered in “Beta” and the betatesters can only access some limited features until December 31st. After creating an account and agreeing to the terms of use of the company, the user has the possibility to choose for the template content that he wants to create. Three tools are available: AI Human, Text/Image and Powerpoint. We tested those tools for the purpose of this work. The first one allows to create a video footage of maximum 500 characters in either English or Korean using one of the 8 models available in the beta (AI Studio Beta 2020). But they also plan to develop other languages: in early 2021 they released a first video of an AI Model able to use Chinese with native pronunciations and tones (Moneybrain LinkedIn, 2021). The second tool is slightly the same with the difference that we can choose the picture in the background of the video. Finally the third tool takes a powerpoint file as input and adds an artificial intelligence presenter at the bottom right of the screen who is able to read the content of the slides(AI Studios Beta, 2021).

Among the models available, 6 are male models: Bret, Adam and Jacob (English Teachers), Gisung (an actor),Sam Hammington (an entertainer) and Danny (a model). While there are two female models: Semi Lee (An Announcer) and Vida (a model). Then, for some of the models, the user has the possibility to choose between different clothing styles from the navy suit to ivory sweate, pink dress... Before generating any content, the user has to agree to their terms of use and receives a warning of consequences misuse of the technology for fake news and false declarations (AI Studio beta, 2021).

AI Speak Now:

AI Speak Now consists of a software implemented on tablets to help native Koreans learn English. Its added value resides in the capacity of its AI to directly communicate with the user and, therefore, enhance its English skills through communication. But the device, which is also sold in a package with the tablet, promises also to work on the writing, listening and speaking skills. Trough the photo tool of the tablet, users have access to a word recognition tool. By showing a pen to the camera, the AI will tell the user how to pronounce this object in English. They have two versions of the software: one for kids and one for adults (AI Speak Now Website, 2021).

Both of the two versions have their own specificities. The kid version has a rewarding system where the children get a sticker for each lesson learned, stickers which they can then exchange to get access to presents in the app such as air pods, mobile gifts, drones… (AI Speak Now Website, 2021).

In the adult version, they argue that a report system is implemented to highlight the vulnerable chapters of the learner and a memory cycle so that they check their understanding of previous words learned regularly. They also focus on business English courses and proposes interviews with the AI teacher inside the app. They even have a section where they learn how to seduce in English and have a real-time seducing exercise with the AI on the tablet. If they succeed they receive a tourist guide with the AI in New-York City (AI Speak Now Website, 2020). For the purpose of this paper, we created an account on this platform. Once logged in, the user has the possibility to access the "speaking room" where he can access English courses, wordbook and the free talking experience with AI models. Then the user has to pay for a subscription to win the access (AI Speak Now Speaking room, 2021).

With this value proposition, Moneybrain bet that its service is more complete than alternatives on the market as it allows its users to have a private teacher 24 hours a day and 7 days a week. As a comparison, Duolingo, one of the world leader in language teaching app, has a functionality of voice recognition to check the pronunciations of words and some speaking exercices but none of their functionality allows a user to communicate with a native every time the user needs it (Duolingo Website, 2021).

Other future developments:

Moneybrain also disclosed a list of other markets which they believe their technology may be useful such as an AI kiosk receptionist, an AI tutor and an AI shopping adviser.

With the AIKiosk solution, they believe they can provide grocery stores and resellers with an AI receptionist programmed to help the customers of the latter businesses to pay without any physical touch on the screen. With speech recognition and deeplearning methods, the AI receptionist will be able to advise the customers and answer his questions (Moneybrain Website, 2021). Existing solutions on the market such as the self-ordering kiosk and even the contactless ordering of the American firm GRUBBRR required so far a physical interaction of the customer such as screen touching or QR code scanning (GRUBBRR Website, 2021). This value proposition differs from current value proposition as it does not require physical contacts and allows vocal communication with the AI (Moneybrain Website, 2021).

They also plan to develop a synthesizer of promotion videos for a variety of products with AI Shopping. Allowing their customers to enhance and optimize their marketing campaigns on social medias (Moneybrain Website, 2021).

Last but not least, they also consider to extend their AI Speak Now product to all educational contents by proposing AI professors ready to teach, discuss and evaluate on various subjects such as mathematics. An example is provided on their Facebook page with an interactive course of introduction on mathematics. After greeting with the AI professor, the student has the possibility to ask questions directly to the AI by voice and the latter understands and answers the question. There is also a category providing statistics on the student such as his progress and rates of correct answers. The AI is also programmed to be enthusiastic and motivate the student (Moneybrain Facebook).

2.3 Channels

AI Studio:

The main channel of Moneybrain for their AI Studio service is the website of "https://aistudios.com/" where interested companies have the possibility to choose between three different subscriptions. It is also on their platform that companies have access to their AIStudios account and can start producing videos. However, as the service is still in beta, it is currently used to collect beta-testers and giving them access to the limited beta. A chat is also

implemented on their website where customers can directly be put in touch with Moneybrain's Aistudios team (AI Studios Website, 2021) .

When it comes to the attraction of potential customer, Moneybrain is very active on both Facebook and Linkedin with roughly a video every two weeks althought they do not have more than 290 subscribers. But their main channel of marketing campain are through international and national fairs, partnerships and initiatives in order to make their AI technology more user-friendly and acceptable to the eye of the public. As an example of initiatives, they put in place the AI deepfake recognition contest with the artificial intelligence laboratory of Seoul University (DSAIL) in which contestants compete to find ways to recognise deepfakes. On this subject, the CFO of Moneybrain, Seyoung Jang, insisted that "*modulated image detection technology is needed to prevent abuse or side effects that may occur"* (translation from Korean) (MoneyBrain, 2020e) which shows the determination of Moneybrain to prevent its public image from the deepfake pandora box. They are also involved in the "AI Voucher Project", an initiative hold by the Korea National IT Promotion industry which promotes the utilization of AI in small and medium firms and proposes to use vouchers to implement those IT technologies in their business model (MoneyBrain, 2020d). Finally they also participate in the DT4D project (Disruptive technology for development) organised by the world bank, which aims at finding disruptive solutions for societies issues such as Covid-19. The project also develops the infrastructures of tomorrow's global economy (Moneybrain Facebook, 2020;*Global Innovative Growth Forum 2020*, 2021). As ethical questions are more and more raised by medias regarding artificial intelligence used in video synthesis (Walch, 2019b), Moneybrain tries to prevent its image from this frightening movement by taking part in initiatives. For example they were the sponsors of a "Deep Fake Video Detection Contest" in collaboration with Seoul National University (Song, 2020). They are also very present on international IT fairs such as the CES (Consumer Electronic Show) 2021 online show, the K-Global Start up contest (Korean Start-up contests for overseas development), the K-Service Digital 2020 (fair to connect korean companies with IT firms globally) and the AI expo 2020 (Moneybrain Facebook, 2020).

AI Speak Now:

To deliver the AI Speak Now application, Moneybrain relies on the official website https://www.speaknow.ai/ where users sign up to have access to the different lessons and the free talking service with ai models after purchasing a program. Whether it is on their tablet,

phone or computer, customers have access to the service directly from the website (AI Speak Now Speaking room, 2021).

In term of marketing campaigns, AI Speak Now relies a lot on their website where different promotions show up when the user log in. We notice by our visit on the website that the price tends to be different depending on when we log in. There is even a countdown of the number of offers available of that price but it seems to be reset everyday (AI Speak Now Website, 2021)They also have a Facebook and Instagram page where they used to post regularly until November 2020 (Speaknow Facebook, 2021) (speaknow_english Instagram, 2021).

2.4 Customer selationships

AiStudios:

The strategy used by the company for its AIStudios solution is double. On the first side they organised an open beta for individuals to test their tool and train their AI with individual consumers who do not represent their targeted segment. While; at the same time, they developed partnership with big firms to test the market with their firm package. This firm package consists in a all-in solution. Firms benefit from independent server and a model creation as well as unlimited uses and number of broadcasts (Moneybrain Website 2021). Beta-users can not be considered as customer segment as they will disappear with the official launch of the platform.

As explained earlier, they only provide their AIStudios technology to 3 korean firms right now: the above-mentioned TV Channel MBN, LG Hellovision and Rainus. (MoneyBrain Website, 2020). With MBN, the goal was to provide an AI news presenter which copies the gestures, face expressions and speech habits of their tv star Kim Joo-ha and which can be deploy at any time, any moment ready to read a script through the AI Studio Platform (Moneybrain Website, 2020). The second collaboration is made with Rainus, an electronic price displayer in stores. For them they will develop an AI device implemented in store in order to provide information on products to the clients and answer their different questions (MoneyBrain, 2020). Finally, with LG Vision, the project is pretty similar to the one with MBN as they developed an AI version of the announcer of the private TV Channel of the Korean Conglomerate (MoneyBrain, 2020c). Through those partnerships it is likely to believe that Moneybrain has dedicative personal assistance due to the importance of those partnerships for Moneybrain which also represent the only kind of customers they have right now for their product AIStudios. As explained by Osterwalder A. & Pigneur Y. (2010, p.39) key partnerships in a buyer-supplier relationship allows to "*optimize the allocation of resources and activities*". By doing this

partnership, Moneybrain develops a technology which has clear implications in the business model of those companies and can therefore guide the development of AIStudios. For Rainus, LG and MBN, it allows them to have a on-shape solution which may at the end lead to a reduced cost of production through outsourcing.

For beta-users however, the free-trial is only accessible until December 31st 2020 in his beta version (AI Studio Website, 2020). For this specific segment of beta-users, the communication is mainly done through self-service with a FAQ section where they also provide tutorials on how to use their tools. If really needed, they provide an email address and a live chat which allows personal assistance (AI Studio website, 2020).

Through their terms of use of the betatesters, Moneybrain also tries to establish implicit relationships. They make the customer fully responsible for the content regardless of the technology provided by the company and, foremost, forbid the user to modify the video in anyway. The terms of use of the beta also prevent the user from broadcasting the generated content on tv and cinema. By doing so Moneybrain remains the only owner of the technology and the only intermediary to develop partnerships with their technology. They also consider that by *"using the platform, the beta users give a worldwide, non-exclusive, royalty-free, perpetual, sublicensable and transferable license to use, copy, distribute, transmit, display, and perform such Content".* (Ai Studio terms of use 2020, p.9). As they are not public, we do not have any information regarding the terms of use regarding the three partnerships with MBN, Rainus and LG. But we can observe that the MBN TV channel is freely broadcasting their AI version of Kim Joo-ha (MBN News, 2020). It is likely to believe that the terms of user for the partnerships consider commercial uses of the given platform.

<u>Ai Speak Now:</u>

With AI Speak Now, the targeted customers are the individual consumers themselves and their customer relationships are organised with a mix of self-service and personal assistance.

Through FAQ and didactics implemented on the website, we can see that they try to provide the tools and explanations so that their customers can find the answer themselves. If needed, the customer can also choose to contact the company directly through an inquiry form available in the service center category. They can also choose to use the live chat and contact directly an employee of Moneybrain (Ai Speak Now website, 2021).

AISpeaknow uses also a gamification strategy through their scholarship program. Deterding & al. (2011, p.9) defines "gamification" as *"the use of design elements characteristic for game in non-game contexts"* , in other words using game appearance with some specific underlying intentions. Indeed, in their speaking room category of their website, they state that if a customer buys a one year pass or a lifetime pass and completes a certain mission in a row, you get a certain amount of money. They even state that if you complete a mission everyday for 365 days, you will get a 100% refund on the pass. However they make it clear that this program may be terminated without notice or if the dedicated budget is spent (AI Speak Now Website, 2021).

2.5 Revenue streams

In term of revenue streams, Moneybrain established a subscription as an usage fee for both their applications AiStudios and AISpeak Now. For AIStudios however, the pricing strategy tends, after a certain point, to a two-part tariff with a subscription fee at entry and a per-usage fee after three minutes of video contents (Scarmure, 2017).

AIStudios:

With AIStudios, there are three prices available going from a basic version at $ 3.000 a month to a premium one at $ 5.500 and a company package at $ 10.000 a month. First there is the basic version which allows the creation of up to 100 AI projects which can be distributed online. The customer has, however, only access to one model and has to pay an additional price of $3 after three minutes. The premium version updates the limit to 200 AI Video projects and can be distributed online but also in tv broadcasting. All models become available with this version but the company has also to pay an additional price of $3 after 3 minutes. Finally, with the enterprise package, there is an unlimited number of AI projects for both online and broadcasting purposes. This package provides an independent server to the customer and allows him to add one model of his choice to the application (AIStudios Website, 2020). However, the proposition is still in beta and there is no possibility to order a package on their website right now. As for the beta, the author of the video remains the owner of the content created through the platform but , as explained in the terms of use, the user gives a royalty-free license to Moneybrain to use the generated content (AIStudios Terms of use 2020). They do not provide information on the terms of use for the final product.

Revenue streams for AIStudios are there constituted of a subscription and a per-use price after a certain length of the video. First, we will concentrate on the subscription model. As identified

by Krämer A. and Kalka R. (2017) subscription model has the advantage to retain customers on a contractual level and target the regular users needing a price security which are the case of the customers of AIStudios such as Rainus, LG and MBN. They need a regular ongoing prestation. Moneybrain offers three different versions of their AIStudio platform which differ in size an price. The more we pay, the more videos and models we can use. It is therefore a vertical differentiation. This differentiation is used when the firm knows the general distribution of consumer valuations, not individually (Bhargava & Choudhary, 2001). By differentiating vertically their customers between those three versions, they try to catch all the different profiles of companies which could be interested by their profile.

Also, we can not consider any free-trial effect with the beta as it is very different in his purpose and content. More than being limited on time with the 31st December for all users, it does not focus the companies themselves with very limited tools and a big copyright on the videos which prevent any commercial uses.

By combining a subscription fee and a cost by minute, AIStudios controls the flow of videos generated through their servers for the two first versions. As underlined by Cachon G. P. (2011), per-use pricing methods can be the solution to a problem of congestion. Charging an additional price of $3/ minute after three minutes contributes to regulate the utilization of Moneybrain servers. If we use again the tariffication at marginal cost (Scarmure 2017), we can understand that they charge an additional price as the exploitation of Moneybrain Servers for long videos lead to a bigger cost which has to be cover by this per-use price at a certain level. The absence of this per-use cost for the company package can be explained by the attribution of server in this package which is covered by the overall subscription price. The question of the congestion is crucial for Moneybrain as their technology requires powerful computations to analyze a script and generate the AI videos. In their term of use, they even insist that they can not be taken as responsible in case of shut down due to congestion which shows that they take the problem very seriously (AIStudios Terms of use 2020).

AI Speak Now:

For AISpeakNow, the AI Free talking solution is on a simple subscription basis. In exchange of a monthly or yearly price, the users can enjoy the services of the application. Still they differentiate an offer for adult and one for kid. They also propose packages with Ipad7 and/or Samsung Galaxy Tab Advanced2. For adults they charge 358.800 wons ($ 325) for the twelve months interest free solution on the 18-01-2021 or 29.900 wons ($ 27) a month. This price is

indicated with a reduction but has remained since December 2020, the official price is 749.000 wons ($ 681). For the package with the Ipad 7 and the yearly subscription, it is a fix price of 1.499.000 wons ($ 1364) with the reduction and 3.500.000 wons ($ 3185) for the full price. Finally, the tablet scholarship package cost 119.900 wons a month or 1.438.800 wons ($ 1308) (2.740.000/$ 2 493 without reduction) with a Samsung galaxy tab advanced 2. (AI Speak Now website, 2021). We believe that they do not need any per use price as this application does not generate AI content in opposition to AI Studios. The AI has always been generated in advance by Moneybrain with his/her facial expressions, vocabulary and voice recognition system. The utilization of their server is therefore much limited and they do not face a congestion issue as for AIStudios.

2.6 Key resources

In this section we will focus on the most important assets required by the company Moneybrain in order to deliver their value propositions to their customer. As AI Speak Now and Ai Studio are based on the same technologies, there will be no distinctions in the explanation of this section. Also we made the choice to follow the typology of Osterwalder A. & Pigneur Y. for this sections, the assets will be divided into four categories: physical, intellectual, human and financial resources (Osterwalder A. & Pigneur Y. 2010).

First, we will start with Intellectual resources as they are the key elements in the business model of Moneybrain and also they key resources analysed in this paper. As an observation, we can notice that since their creation in 2016, more than sixty patents have been published according to the European Patent Office (EPO, 2021). As they started small with more basic services such as chatbots before moving to three dimensions modelling and voice synthesis, they could develop several methods and technologies internally (RJ Choi 2019). As example of their patent, we can notice that they developed an interactive agent system monitoring several messengers and a method which improves the speech recognition based on the context of a conversation. (EPO, 2021). When it comes to the pure development of their technology, an interview on TechInvestment website of Moneybrain's Financial Chief Officer RJ Choi specifies that they started by exploring already-existing deeplearning technologies such as the "generative adversial networks" which is known for generating realistic pictures (Creswell et al., 2018), the "2D face alignment" which allows face recognition through a projection of a 3d model (Liu et al., 2016) and "Pix2Pix" which allows image-to-image translation, in other word it can generate pictures based on handmade drawing for examples (Isola et al., 2018). Then Moneybrain

developed themselves their own three dimensions face reconstruction technology with two dimensions plans as an input and “Semi-casual Convolutional Neural Network” which is one of the most preferred technology of deeplearning using mathematical linear operations between matrixes (Albawi et al., 2017). They also used “vid2vid” which stands for “video to video synthesis”, in other words it converts a semantic video to a photorealistic one (Wang et al., 2019). Based on those technologies, Moneybrain was able to develop their AI Studio and AI Speak Now tools.

To enhance the probability of success of the technology inside the targeted segments, they also rely on partnerships with selected firms in which they implement and test their technologies. So far the three firms which signed a partnership with Moneybrain are LG. Hello Vision, MBN and Rainus which are described in the previous section (MoneyBrain website 2020). For the development of their AI Speak Now application, they also argue on the website of AI Speak now that they were helped by a bunch of Korean and International Universities (New York, Toronto, Seoul) for the planification and development. This help is however neither quantified or explained in details (AI Speak Now website, 2021).

In term of financial resources, the company could rely on several government contests and aids. RJ Choi announced in 2019 that they could rely on three R&D fundings of the government for 20 billions wons (15.000.000 €) (RJ Choi 2019). In 2020 they also won one million dollars thanks to her first place at the Korean National IT Industry Promotion Agency for the K-Global Start up company and they are currently involved in a program to boost and support their overseas development. The agency will support, among others, their implantation in the Silicon Valley (MoneyBrain, 2020a).

Concerning Human resources, it is also one of the most crucial resources for Moneybrain as they are knowledge-intensive. The number of patents filed is one of the proof (European Patent Office, 2021). RJ Choi argued in an interview in 2019 that they all come from different background and nationalities. He also underlined in that interview the role played by Eric Seyoung Jang, the CEO and founder of Moneybrain who is, for him, an AI expert who also founded three other AI companies (RJ Choi 2019).

As a company furnishing dematerialized contents, Moneybrain has a limited number of physical resources. The main one is their office in Seoul in Gangnam-gu in Seoul (Moneybrain Website 2021).

2.7 Key activities

The main activities of Moneybrain consist in development of the technologies needed for their value proposition. Since their creation in 2016, Moneybrain has been active in the development of chatbot services, voice synthesis and conversational AI (RJ Choi 2019). Based on those technologies, Moneybrain was able to develop complete value propositions with Ai studio and Ai Speak now. A video posted on their Facebook page provides for example the big steps of the AI technology used by Moneybrain for AI studio. The AI is an actual person, called a model, and they first have to collect data of the voice and images of him/her. To do so, they film the actual model to read a script of 11.000 sentences and use the footages to nourish the deeplearning algorithm. Then they train the model, with both audio and video files, during hours (MoneyBrain Facebook Page 2021).

In their strategy, the beta that they organized on the AIStudios Website take a very important place. In the 2003 PDMA new products development's best practices study, betatesting was identified as one of the main tool used by firm to analyze the market potential and the trends of adoption by the users (Griffin et al., 1997). But, if we take the example of the GPT-3 beta of open AI, it was also one way to prevent abuses of their AI ool (LaGrandeur, 2020). The participation to the beta requires the participants to sign up an account on their website to win the access to the platform. There are an FAQ and live chat to exchange to contact the company but there are no form or question provided to contact the company itself. But, by doing so, Moneybrain can collect informations and data on the way their users act with their application. Moneybrain has also a very active communication based on participation to events and presence on social medias as explained in the channel section. They also constantly develop their models for both AISpeakNow and AIStudios as a model is sometimes used on both platform like the English Teachers models called Bret, Adam and Jacob and the entertainer Sam Hammington.

2.8 Key partnerships

Through the analysis made on Moneybrain, we identified four key partners. Two of them concern the AI Studio solution: the customer-partners (MBN, LG, Rainus) for the AIStudios solutions and the betatesters. Through the establishment of customer-partner relationships with LG, MBN and Rainus, Moneybrain can adapt their technology to the reality of their future customers as explained in the customer relationship section. Through beta-testing, we also saw that they can test their functionalities on a larger scale and prevent abuses.

They also insist on their website that their other value proposition, AISpeak Now, is followed and supported by a panel of international universities such as New York Universities and Seoul University for example (AISpeak Now Website, 2020). But there is no information available on the form and content of this collaboration.

The last partner that we identified is the government of the Republic of South Korea which financed several times the company (RJ Choi 2019) and also advised and supported their exportation as part of their win in the K-Global Start up contest (MoneyBrain, 2020a).

2.9 Cost structure

This section focuses on the most important cost of AIStudio and AISpeak Now. Using the typology of Osterwalder A. & Pigneur Y. (2010)., we can consider that Moneybrain is between cost-driven business models and the value-driven business models. As an example we can notice that the AIStudio value proposition is divided into three different profiles in order to maximize the revenue streams but also minimize the cost structure by reducing the cloud computing price as explained further. Moreover, Moneybrain can be considered as value-driven as they propose constant ameliorations and new models to their customers, therefore having a high degree of personalization.

One of the main cost endured by Moneybrain is Cloud Computing that they provide to their customers. In 2009, Vaquero et al. (2009 , p.51) define it as a *"large pool of easily usable and accessible virtualized resource such as hardware, development platforms and/or services"* Indeed each video generated by the platfor AIStudio uses calculation capabilities of Moneybrain servers to provide the service of AI videos rendering. To fix this cost, they divide their value proposition into three profiles: the two first one lead to an additional price of 1$ by minutes after three minutes of rendering for each video generated. The third profile, the company package, furnishes an independent server to the company which is compensated by an higher price of 10.000 $. This price is more than two times of the second package. (AI Studio Website, 2021). By doing so, they compensate the enormous demand for cloud computing that their technology requires. For AI SpeakNow however, this cost is reduced as the AI in the application teaches the customer based on an internal database of preenregistered models which does not changed in function of the customer. In term of fixed cost, the largest one is the Research & Development as Moneybrain constituently evolved from AI chatbox to an AI Voice generator and finally to an AI Video generator (RJ Choi 2019). They grew from nothing and had to acquire knowledge and technologies in order to provide their current value proposition.

PART III: ANALYSIS

Chapter 1: Challenges of authorship for AI-generated works

1.1 Introduction

In 1984, the book "The Policeman's Beard Is Half Constructed" was the first literary work entirely wrote by a computer code called Racter. This lead quickly to some copyright issues, especially with the library cataloguers who were hesitating between considering Racter as the author or the team that implemented the code. They finally decided to attribute the authorship to the author of the code and considering Racter as a title access point (Carlyle, 2015). The problem was also already identified in 1992 by Professor Sam Ricketson who raised conscience about the necessity to redefine the authorship in the "People or Machines: The Berne Convention and the Changing Concept of Authorship" and avoid a limitation of the debate to the commercial value and use of the authorship. For Professor Ricketson, if the human intervention is limited to request the generation of the AI-based content (such as a music, painting …), the authorship cannot be attributed to a human following the Berne convention (Ginsburg, 2018). However the Berne convention also stands that an author has to be a natural person (González Otero & Quintais, 2018). Lately, as identified by the IRIS, the evolution of IP laws to adapt to the creativity and innovation of AI-based systems has becoming a redundant theme (Burri et al., 2021).

If we take the case of Amper Music, the user can choose the music gender and mood as well as the structure of the track such as peak moments, duration and beats per minute. (Amper Music, 2020). Are those parameters not sufficient to consider the user as the real author of the music? Our analysis however pointed out that Amper music was licensing the rights of the music produced by their software. This tendence, already pointed out by Sturm et al. (2019), is questionable in term of user's rights as express in our "customer relationship" section of the BMC. It also raises questions in term of organization of the market. In this section, we will focus on the current legislation concerning the authorship for AI-generated contents from a legal point of view and see the consequences for AI-based companies of such choices. To structure the different obstacles faced by companies in this context, we will use the typology and the questions created by the World Intellectual Property Organization in his meeting of the

13th December 2019 (*WIPO Conversation on Intellectual Property (IP) and Artificial Intelligence (AI)*, 2019).

This convention pointed out three important questions related to the authorship of AI that will be tackled in this section as they have clear implications for AI-based companies producing contents such as Amper Music:

- *"Could an authorship be attributed to an AI, therefore a machine, or a human is always required?*

- *Can we attribute a copyright to AI-generated works? Should we give a legal personality to the AI-based application in a way that this personality could be governed and sold like a corporation?*

- *Should a separate sui generis system of protection be envisaged for original literary and artistic works autonomously generated by ai? "* (WIPO Conversation on Intellectual Property (IP) and Artificial Intelligence (AI), 2019, p.5).

1.2 Attribution of the Authorship: human or machine

Nowadays this question is foremost ethical as Ginsburg & Budiardjo (2019, p.1) highlight, even the current most advanced technology of AI are not more than *"faithful agents of the humans who design or use them*". In the IRIS report on AI in the audio-visual industry, Burri et al., (2021), emphasized that the question of authorship for a machine is intimately linked to the question of legal personality for an AI system as only a legal personality can be granted the right of authorship. However, this question remains crucial for AI-based companies as incredible evolutions have been seen in the past few years in sector as diverse as the music industry and journalism. We could see this tendency in the first section of this thesis with companies like Amper Music and Moneybrain. It is why we still decided to tackle those question separately as advised by the WIPO report. In this section we will analyse first two countries which already implemented a legislation and, in a second time, analyse which directions are taken by the USA and Europe.

In two countries, legislators took the lead and designed laws that must be understood closely by companies: The United Kingdom, and in smaller circumstances Japan. Those are the only countries which developed a specific regulation regarding copyright of AI-generated contents (Kop, 2019). Already implemented in 2003 with a change in the copyright, design and patents bill, the UK legislation considers the author of a computer-generated work a "*person by whom the arrangements necessary for the creation of the work are undertake*n" in the specific case of literary, artistic, musical or dramatic work (Copyright, Designs and Patents Act 1988 9(3), 2003). By this new legislation, the UK decided that a human is the author of a work generated by the AI. However this new interpretation still leads to some issues as the creator of the original work, the AI, is not the author. (Intellectual Property Office of the UK, 2021). In Japan, a new amendment was made in 2003, the "2018 Amendment to the Copyright Act" to remove a certain number of obstacles to the development of AI. For example the use of copyrights works in the database of an artificial intelligence (European Alliance for Research Excellence, 2018). This amendment permits an extended use of copyright protected works as a learning data set, for an AI system for example (Okumura, 2019). However the current legislation still considers creative musical, artistic and literary works as "*in which thoughts or sentiments are expressed in a creative way*" (Copyright Research and Information Center, 2021,para. 1). Japan announced however an upcoming amendment which will protect AI works by recognising the ownership to the company developing the AI system (Segawa, 2016).

In the United States an alternative to the attribution of the ownership for the AI-application is to consider the AI-generated contents as "works made for hire" where the AI system would be the employee (González Otero & Quintais, 2018). In the US law it is defined as a work made by an employee in the context of his job or commissioned for use in a collective work as a supplementary asset. In his simple form it is assimilated to the pictures, maps, diagrams which for example constitute a supplementary work of a publication (*17 U.S. Code § 101 - Definitions*, n.d.). But no clear legislation regarding AI-generated assets have been decided so far.

In Europe, the legislation also remains uncertain, but some decisions have already been taken regarding some aspects of the authorship. In 2020, the European parliament concluded that when the AI is used as an assisting tool in the process of creation, the current legislation remains applicable. In other sense, the author using the tool remains the keeper of the copyrights. They however emphasized that the IP legislation of AI-based creations constitute a complete new issues for which new legislations will have to be adopted (*Report on Intellectual Property Rights for the Development of Artificial Intelligence Technologies*, 2020).

But as specify by Kop (2019) those regulations may also have critical consequences for companies by creating an environment where the company producing the AI will takes the whole market. Professor Lionel Bently of the faculty of Law of the University of Cambridge, cited by González Otero & Quintais (2018) shared the same view on this subject. He wondered if AI would not disrupt the copyright content market with low-cost and highly produced works. This fear of the legislator may induce obstacles in the future for ai-based businesses. Interrogated on this fear, Boussabat B. highlights that people should not fear those new businesses. For him, creating a new way of doing artistic works open a new door of creations and opportunities for data scientists to create new arts. In some ways it will democratize those markets and rethink our market in term of inclusion of stakeholders (B. Boussabat, personal communication, 22 April 2021). Among regulators however this view is less shared and their fears for the market and the user may lead to more complications for AI-based businesses producing contents.

Among the countries which established a legislation, they made the decision to follow the Bern convention and therefore require a human author for the computer-generated works. For Ginsburg, (2018)cited by the IRIS, this convention defends an anthropocentric definition of copyright and excludes any recognition for authorship for a machine (Burri et al., 2021). Following our analysis, there is a clear tendency that most countries will follow the example of the UK and establish a legislation regarding the copyright of computer-generated works. But this research provides some information on the most probable regulations which will be adopted. The European parliament for example, hope that a harmonised framework inside the European union would become a "*a legislative benchmark at international level"*(*Report on Intellectual Property Rights for the Development of Artificial Intelligence Technologies statement F* , 2020).

1.3 Legal Personality for an AI Application

In practice, what could be the consequences of governing and selling an AI application like a corporation thanks to legal personality? Turner (2019, p.175), quoting (Bryson et al. (2017), emphasizes that legal personality is "*is a technical label for a bundle of rights and responsibilities*" which can be use as a tool to discriminate rights and obligations among entities and find a solution to our extra-legal claims. Coming back to the basic definition of a corporation in the old *Trustees of Dartmouth College v. Woodward case,* he emphasizes that a corporation allows immortality and individualism in opposition to natural people (Turner,

2019). In other words, granting a legal personality to an AI will allow to define its rights, responsibilities as well as selling and governing it as a different entity.

In his article Turner (2019) precise further three main reasons to grant legal personality to an AI. It will fill the responsibility gap, but also foster innovation and developments. Giving the legal personality to an AI would consist in "*a valuable firewall between existing legal persons and the harm which AI could cause*". He also argues that the problem of authorship for AI-generated output addressed in the previous section would be solved. (Turner, 2019, p.187).

The European legislation, in his current state, does not consider the AI as a legal entity which legally leads to a context in which ai-generated contents are not protected by copyright laws (González Otero & Quintais, 2018). Boussabat B. in our interview, agree so far that a legal personality for AI is not a goal. For him, the responsibility should be shared among the players involved in the development. A legal personality would give incentives to data scientists to be less careful on the data provided while the quality of data is one of the most important input in AI (B. Boussabat, personal communication, 22 April 2021). A position shared by the European parliament who took a note in 2020 that "*it would not be appropriate to seek to impart legal personality to AI technology*" pointing out negative consequences of such a decision regarding the negative incentives for human developers (*Report on Intellectual Property Rights for the Development of Artificial Intelligence Technologies*, 2020, statement 14).

When it comes to the responsibility gap, it is clear that the current legislation of the EU does not allow to cover the contractual responsibility in case of accident provoked by an autonomous AI for example. For the European parliament, the current legislation is sufficient to impute the responsibility to the fabricant, user, operator or owner of the AI (Burri et al., 2021). This was also emphasized in our interview with Lemoine A. In the case of industries such as buildings or planes, the use of an AI-software to design part of a whole of a project should not prevent the responsibilities to be owned by a physical person as a mistake in the design could lead to severe legal consequences (A. Lemoine, personal communication, 11 January 2021). Especially in the engineering field, the introduction of artificial intelligence in shape design and optimization may lead to question the responsibility in case of malfunction. If the outdoor appearance is nowadays out of scope, those AI iterates different possibilities of building design for example (Khan & Awan, 2018). A mistake in the generation of those design may lead to injuries, death for their occupants and will need to face legal responsibilities. Existing commercial applications are Altair's OptiStruct, solidThinking's Inspire. It is however

generally mathematical formulas optimizing *" layout of material distribution within a predefined space"* (Khan & Awan, 2018, p.1). In other words it is mainly use as tools for the engineering companies which take the responsibility of the final product.

Other, however, presents arguments in favour of an attribution of legal responsibility for AI. A resolution of the European Parliament in 2017 emphasized that ordinary rules on responsibility are not sufficient to clarify if a machine can be considered as responsible for some of its acts or non-acts. While still conserving that attributing the responsibility to a machine is not applicable right now, the resolution recognises a need to create a legal personality for highly developed and autonomous robot (Règles de Droit Civil Sur La Robotique, 2017; Burri et al., 2021). This suggestion however remains vague as the term to recognise a robot "highly autonomous" can be questionable. Ones may ask in the context of our thesis if an AI producing aircraft designs will be considered as sufficiently autonomous or if this definition is limited to robot with human aspect like Sophia. The latter being the robot with human appearance and AI software which was recognised as citizen of Saudi Arabia (*Saudi Arabia Becomes First Country to Make a Robot into a Citizen*, 2017).

But as Burri et al., (2021) conclude, the legal personality of the AI is nowadays excluded from the legal framework and this situation has few chance to change in a near future as long as a no breakthrough innovation such as self-awareness happen. The European parliament even took the decision in a resolution in 2017 in to focus on the repartition of responsibilities and obligations among the actors of the AI system (user, owner, designer …) and use contract law to close the legal gaps (Burri et al., 2021).

1.4 New protection system for autonomously generated works

This section aims to tackle the third question raised by the WIPO at their convention: should a new protection system be considered for all AI-generated works ? As highlighted by Kop (2019, p.7) , *"works solely made by code are not protected",* in other words copyright does not exist right now in European and US legislation for automated AI works. If he highlights that this question is nowadays out of scope, a new system of protection can be considered. Others consider that the use of traditional copyright protection for machine generated works are not appropriate as copyrights promote the creativity and inventiveness of artists as a purpose. As AI do not have any sense of creativity, works created by machine should not benefit from a system designed to protect human-created works (Intellectual Property Office of the UK, 2021).

On this question, the United Kingdom reflection group at the International Association for protection of intellectual property is, however, in favour of a new system of protection for AI-based works which could " *be protected by a new right, lasting for 25 years, which recognises the investment AI developers make in this technology*" (Intellectual Property Office of the UK, 2021, para. 58)**.** They first define a "sui generis right" as a legislative tool to protect assets which are not protected by the traditional forms of intellectual property such as copyright, patent and trade secrets and differ in a way that they do not require creativity or originality to be applicable but rather rewards the investment made by the owner of the AI system.

In this form a sui generis system of protection for AI-generated output may be the answer for the authorship. Some however argue that "*patenting of software inventions would stifle independent creation*" even if "*anti-trust protections might be considered to balance the threat*" (Intellectual Property Owners Association & Artificial Intelligence and Emerging Technologies Committee, 2020, p. 14).

For Ginsburg (2018) however, a new protection system may not especially be necessary as sufficient incentives already exist to protect artistic and literary works made by AI. For her, the presence of patents, copyrights protection for the algorithms and software higher in the chain as well as a "sui generis" protection of the database consulted by the AI may already be sufficient to ensure a continuous progress in the development of AI and giving an exclusive-rights to the AI-generated works may be counterproductive. The Intellectual property office of the UK also adds that, even if the development of a trained AI model requires considerable investment, it is ambiguous to know if a misappropriation of the AI system and its output could really undermine the investment made by the company. (Intellectual Property Owners Association & Artificial Intelligence and Emerging Technologies Committee, 2020)

1.5 Possible evolutions of the IP regulations regarding AI-generated works

In the previous section we tackled the 3 question of the WIPO independently and explored what the existing regulations regarding the output of an autonomous AI algorithm in the artistic, literary, or dramatic works are. We even tackled broader possible outcomes such as the design of new airplane structures. We saw that the question of the authorship of AI-generated works has already some specific rules in the United Kingdom and Japan which grant the authorship to the owner of the AI algorithm. Consultations and discussions of other legislative areas such as the European Union and the United States also seem to go in that direction. However, the

question of the legal personality, even though it is closely related to the problem of the attribution of authorship to a machine, remains not answered by any legislation so far.

In this context, there is a clear tendency for countries to grant the rights of the AI-generated output for the companies. Some also consider a new protection system for the autonomously generated works but legislative initiatives lack in this area as we say in section 3 “New protection system for autonomously generated works:”.

In future developments, legislation seem to consider the basis essence of the copyright as an incentive to produce and invest in AI by companies. Even though this incentive has little meaning in the reproduction of the work itself as an AI will not seek protection or financial retribution for its generated content, the question is critical when we consider that those outputs remunerate the efforts and investments of the companies developing the AI (Intellectual Property Office of the UK, 2021). But companies should also consider that some experts remain opposed to such protective regulations for companies. Further than the fear of Professor Lionel Bently, Professor Sam Ricketson of the Law School of Melbourne, cited by Ginsburg (2018), is opposed to a commercial utilization of the copyright. For him copyright has two main roles: providing a natural right of his author for the use of his personal creativity and incentivizing the author to invest and use its creativity to publish his work for the whole society. The commercial argument may fall into the second right but should not be considered as the sole objective.

1.6 Managerial implication for AI-based business producing contents

The relative juridic uncertainty that we established in this section related to the authorship of AI-generated content is a problematic matter for AI-based business as their business models rely on the supposition that they own the copyright on the works produced by their AI-applications. New regulations or modifications must be carefully followed regarding this matter. As we tried to go through in this section, it is more likely but still uncertain that the EU will follow the path proposed by the UK. In the US, if the idea of “work made for hire” could satisfy the companies, its context is still not very clear. As highlighted by Boussabat B. in our interview, *“if we see the evolution of AI trend and the evolution of law, we saw such a disconnected rhythm. And actually, the evolution of the rhythm of artificial intelligence is way higher than the evolution of the law rhythm. And actually, this gap will create some issues in the near future.”*(B. Boussabat, personal communication, 22 April 2021,para. 33).

If the European parliament was relying on the contract rights to close the gap relative to responsibility and obligations around a partially autonomous ai system (Burri et al., 2021), companies have relied on the same legal basis to protect their rights on the outputs generated by their AI systems. Indeed, if we look more closely on the "License User Agreement" of some companies generating contents by artificial intelligence, we notice that they appropriate the ownership of the AI-generated music by making an agreement with their end-users prior to utilization. We can notably cite the case of Amper music with the Amper Music Terms of Service (2020). As we saw previously, they allow the company to benefit from a royalty-free, global and perpetuity distribution right on the music produced by its algorithm as well as the right to suspend any agreement with their end users. This utilization of the contract law allows to bypass the lack of regulation in the domain of AI-generated output in the United-States, the region of regulation for Amper Music. AIVA, a Luxemburgish company also generating music by Artificial intelligence, go further by differentiating their customers by their desire-or-not to acquire the full copyright on the generated music. Their free and standard plan (€ 11 , roughly $ 13) grant the copyright to the company while the pro plan (€ 33, $40) grant the copyright to the end user (AIVA Technologies, 2021). Regarding the authorship in itself, we therefore consider that companies using the contract law seem to have sufficient protection on short term and should not worry as the evolution of the legislation. Indeed, it seems to go in their sense as proven by the copyright and patent act of the UK or by the discussion of the European Parliament.

When it comes to the question of the legal personality for their relatively autonomous AI algorithms, companies should not worry as this path is nowadays mainly considered as non-realistic by the researchers that we saw in the purpose of this analysis. The only institution who considered to implement this legal personality was the European Parliament in a note of 2017 which was stating conditions far from being applied so far.

Chapter 2: Uncertainties and opportunities regarding the utilization of protected-works in dataset

2.1 Introduction

In a context where AI systems already hinder some intellectual property rights, such as copyrights, it is necessary to see what the current regulations and their consequences on the development for AI-based business are. Especially, in the music industry, a case happened with the project Jukebox of OpenAI in which they nourished their algorithm with 1.2 million copyright protected songs and their lyrics. Based on this dataset, their AI is now able to generate new singles where singers perform unseen lyrics or rerender previous singles (*Jukebox*, 2020). Knowing that, we may wonder which datasets are used in AI systems developed by private companies such as Amper Music that we analyzed or even companies such as Spotify in the music industry. For Moneybrain, the question is also relevant for their AI models: on which personalities were they train? In their meeting of the 13th December 2019, the World Intellectual Property Organization (p.7) raised several questions on this subject regarding the dataset used by the AI algorithms. Among others questions, they emphasized on 1) the necessity or not to *"create new rights in relation to data or IP rights, unfair competition laws and similar protection regimes […] sufficient to protect data ?"as* well as the nature of the data protected in case of the elaboration of a new system. And 2) "*Should the use of the data subsisting in copyright works without authorization for machine learning constitute an infringement of copyright?".* Those questions already raise two important challenges for companies on which we will focus on this section: the possibility of new regulations regarding the dataset used by AI algorithms as well as the fear to see data used in a broad way in order to disrupt the market or, in some cases, consumer rights (WIPO Conversation on Intellectual Property (IP) and Artificial Intelligence (AI), 2019).

In this chapter we will provide information considering the legislative uncertainty around the data used by ai-based companies in order to generate AI-based literary, artistic works. We will provide the example of countries where decisions have already been made regarding the use of copyright data as input by AI algorithm such as Japan and the United States. We will also provide the general view of the legislators in countries where it is still undecided. More largely, we will provide information regarding the tendency or not for jurisdictions to promote the release of data and how they intent to ease the access to this data in order to support the development of AI-based business.

Finally, our goal will be to propose managerial implications based on what we learned for AI-based business regarding the nature of the data they should use to nourish their algorithm.

2.2 Legislative context for utilization of data as an input for AI Algorithm

In a consultation updated in March 2021, the intellectual property office of the UK proposes a clear description of the use of data by companies to nourish AI algorithms. We can simplify the nature of protection of data in three different natures: the protected data, the licensed data and the unprotected data. An AI algorithm benefits from free utilization of data in two specific case. First when the data are no longer under the protection of a copyright law such as literary/artistic works of old artists like Shakespeare. Secondly, in the case of a company is licensing some data to another. In other cases, it is more likely that the data used are protected by a copyright (Intellectual Property Office of the UK, 2021). Moreover, legislators in the UK and Europe for example, also recognize a right and copyright in databases themselves. If they were first implemented to protect the work of encyclopedias, the legislation is nowadays used to protect works of gathering information when substantial investments have been provided. The utilization of those databases in the case of AI nourishment are also protected when "*a substantial investment has been made in obtaining, verifying or presenting their contents*" (Intellectual Property Office of the UK, 2021, para. 17).

2.2.1 United-Kingdom

The general opinion back in 1987 in the British Parliament when the copyright and patent bill was designed, the first in the world to address this problem, was that information stored in a database are still owned by their rightful owners despite the ease of the access to that information. They took the example of royalties paid to the author of a book and considered the author of a database as rightful to receive payment for the access of his database (*Copyright, Designs And Patents Bill Hl - Thursday 12 November 1987 - Hansard - UK Parliament*, 2003).

Companies are therefore restricted to use only licensed or non-copyright data to nourish their algorithms and are required to pay to access some databases. But ones may raise concerns on the possibility by legislators to verify the respect of this law as no one could really know which data were used in the process of nourishing an AI algorithm based on the sole outputs. Companies can also protect themselves easily on not publishing the dataset by considering it as a trade secret and even raises the concern that dataset in inputs should be protected. However, the Max plank institute emphasize that offering such a sui generis protection for dynamic

database would lead to anti-competitive effects and that a period of 15 years is too long in a market where dynamism is key (Drexl et al., 2021). Like the WIPO, we may wonder on the necessity or not to prevent the use of copyright data to nourish AI algorithm. In discussions in the British parliament in 1987; some already raised the fact that copyright material can be used without prior approbation in some specific case where it is "*reasonable to do so and where economic interest of the copyright owner are not damaged*" (*Copyright, Designs And Patents Bill Hl - Thursday 12 November 1987 - Hansard - UK Parliament*, 2003, para. 10). If the exception was focusing on education and excluded the pure use of businesses, some may wonder if the new case of AI does not change the deal. In 2014, the UK government adds the "Text and data mining exception" in order to precise the legal framework in a context of expansion of artificial intelligence and machine learning. This exception withdraw the obstacles related to the use of protected works in text and data mining for non commercial use, typically researchers and academicians (Viscount Younger of Leckie & Intellectual Property Office, 2014).

Much recently the UK government for example, cited by the intellectual property office of the UK, expressed in 2017 that they would recommend new regulations for text and data mining through new copyright laws in order to tackle the raised concerns of the industry. Indeed the AI industry believes that allowing the use of copyright material would support and increase the adoption of AI Technology (Intellectual Property Office of the UK, 2021). In their review conducted by Hall & Pesenti (2017), they emphasize that UK should ease the access to data on a broad basis. They highlight that this access to data should be sustainable and affordable. They mean that no costly legal actions should prevent a company from using those data, especially in the case of small start-ups. Easing the access to data is necessary as an anti-trust measure to prevent the monopoly of AI from large companies having a large access to data like Facebook and Google (Hall & Pesenti, 2017).

2.2.2 Europe

In Europe, a report on intellectual property rights for the development of artificial intelligence technologies in 2015 highlighted that AI technologies may become a threat to IP rights as they make " *the traceability of IPRs and their application to AI-generated output difficult*" (*Report on Intellectual Property Rights for the Development of Artificial Intelligence Technologies*, section D, 2020). This report further emphasized on the necessity to strengthen the digital sovereignty of the EU, its protection against patent abuse while ensuring the competitiveness

of the European innovation in the field of AI. (*Report on Intellectual Property Rights for the Development of Artificial Intelligence Technologies*, 2020) A complex and ambitious project for the EU. In 2020 with the data governance act of 2020, the EU emphasizes the need to develop the accessibility to data with two specific means: increasing the data sharing and fostering the trust in the data. Those two objectives were fulfilled by making public data available and fostering data sharing among businesses in exchange of *"remuneration in any form"* while maintaining the legislative context of the GDPR when it comes to personal data (Data Governance Act, 2020, para. 3). This second goal can be resume under the name "data altruism". An impact assessment through a large survey of economic, academic and consumer stakeholders was made for the purpose of this act and we will depict the conclusions here. When it comes to the release of public data, a low intervention of institution is preferred, individual institutions will provide the possibility of reutilization of data such as personal data while ensuring the respect of privacy, confidentiality, and data protection. This reutilization will however be conditioned to some criteria such as the non-exclusivity which may harm the competition. A solution where a "one-stop shop mechanism" intervein to sell the request to access data is preferred. When it comes to data altruism, after discussions with European commission, the survey revealed that the prefer option so far is a system where a company has the possibility to be registered as "Data Altruism Organisation recognised in the EU" with no obligation to release all data while ensuring trust for the data released (Data Governance Act, 2020, para. 28). By data altruism, the EU commission considers an institution or individual releasing data for the common good by easing its collection and transaction. This new system of regulation is expected to make the economic value of data sharing grow from 3.87% of GDP to 3.92/3.95 % of GDP (Data Governance Act, 2020). Such an initiative will definitely benefit the AI industry with more available and trustful data in both public and private sectors. The Max Plank institute in his report of 2021 also proposes another solution by fostering the development of data pooling, in other words the generation of larger database gathering the content of smaller database to ease the access to data and limit transaction costs. They however also draws some limitations to this solution which could limit the incentive to invest in the quality of those datasets (Drexl et al., 2021).

When it comes to intellectual property rights, however, the EU parliament however precise in the data and governance act, that AI should not harm third party IP rights in anyway and may be applicable only if they respect the current legislation and international treaties. This statement may however indicate that utilization of protected data as input stay forbidden under

the laws of the EU. They also aim to safeguard some key non-personal data (such as trade secret) form being jeopardize by limiting their diffusion to third countries respecting the principle of confidentiality and data protection. Providers of data should also strictly comply to protect critical data likely to harm competition between business such as future price, production costs… When it comes to data of specific importance such as personal health data, new sectorial regulation should be provided (Data Governance Act, 2020). In a note of October 2020, they however recognize that:

> *"that the lawful use of copyrighted works and other subject matter and associated data, including pre-existing content, high-quality datasets and metadata, needs to be assessed in the light of the existing rules on limitations and exceptions to copyright protection, such as the text and data mining exception"* (*Report on Intellectual Property Rights for the Development of Artificial Intelligence Technologies*, 2020, statement 18)

By this statement, the European Parliament also takes notes that if the current IP legislation restrains the use of protected works in dataset, new regulations and rules may need to be design in the future to address the necessity or not to maintain this protection in the context of development of AI to not hinder the possibility of development of European AI industries.

2.2.3 Japan

In Japan, the regulation is very clear since the update of the copyright law of Japan in 2018, the adaptation of the law now plans that a business can create a learning dataset composed of third party protected works and benefit from transferring this dataset to other customers. The new regulation allows the utilization of any artistic, literary work in any way as long as they do not copy the *"ideas or emotions*" (Okumura, 2019, para. 3) underlying in the dedicated work (Okumura, 2019). This new regulation eases the access to data but also its utilization by reconsidering IP rights of some protected works. In their article of 201, Okumura (2019, para. 8) seems to believe that this new regulation will stop Japan from being considered as the "*Machine Learning Paradise*". But when comparing to western regulations, it seems much more flexible as it is the only country allowing use of protected work in the dataset. A position shared by Ana Andrijevic in our interview (A. Andrijevic, personal communication, 13 May

2021). This new regulation also allows the creation of business models building and transferring dataset of protected work.

Indeed, if we look more closely in the copyright law of Japan, we find that in the article 30-4 that it is *"permissible to exploit a work in any way"* (Copyright Law of Japan article 30-4, 2021) in three specific cases. First in the case of development of a technology linked to recorded sounds or visual works. Secondly in the specific case of data analysis which they describe precisely as *"extraction, comparison, classification, or other statistical analysis of the constituent language, sounds, im-ages, or other elemental data from a large number of works or a large volume of other such data"* (Copyright Law of Japan article 30-4, 2021).

In the third specific case, the copyright law of Japan also makes the distinction with computer data processing itself where no expression of the protected work is visible by the human mind. The law also extends more generally to any case that does not involve the expressions of feelings underlying in one's work and in cases that does not harm the interest of the rightful copyright owner in any unreasonable way (Copyright Law of Japan article 30-4, 2021).

Finally, at the opposite of individual works, Japan regulation however still recognizes a copyright for a database as a whole and forbids the utilization of a database without approbation or licensing from its rightful owner (Okumura, 2019).

2.2.4 United-States

When it comes to the use of protected works in the dataset training an algorithm, the notion of "fair use" in the U.S. law needs to be considered. This doctrine, under US law, allows the use of unlicensed copyright-protected works in some specific case such as comments, criticism or for educational purposes. If the U.S. Copyright office considers that nonprofit purpose is more likely to be considered as fair, they insist that it does not prevent a commercial use to be fair (U.S. Copyright Office, 2021). Kublik, an employee of a machine learning operations platform called Valohai, tackles the question in a comparative study between EU and US law in a blog of his company in 2019. His conclusion was that US law has a more flexible basis for the use of copyright protected work without having any specific legislation designed to address the question of the use of protected work in dataset of algorithm. For him, as long as the use of the copy of the protected work is used in a different manner that its original function and does not replace it, it is legal under US Law (Kublik, 2019). As an example, we can cite a previous case with the "Author's Guild VS Google" which focuses on the legal dispute on the utilization of copyright protected books to nourish an algorithm for the search tool of Google books. In 2013,

the judge Chin considered that " *Google Books provides significant public benefits. It advances the progress of the arts and sciences, while maintaining respectful consideration for the rights of authors and other creative individuals*," (*Opinion Granting Summary Judgment of Fair Use*, 2013, p.26). The U.S. seems more flexible than EU regulation for the use of copyright protected works for algorithm. Ana Andrijevic emphasized in our interview that, without being a law per se, the fair use doctrine allows the utilization of copyright-protected work in the dataset of some AI systems of private companies in some cases which have to be addressed case-by-case (A. Andrijevic, personal communication, 13 May 2021).

When it comes to the access of data, the United States also pushes for a broader access to ensure the development of the artificial intelligence industry. In 2016, the National Artificial Intelligence research and strategic plan already highlighted that " *integrity and availability of AI training and testing datasets is crucial to ensuring scientifically reliable results*"(*The National Artificial Intelligence Research And Development Strategic Plan*, 2016, *p.30*). They also insist on the necessity to share data among actors, such as the IMPACT program of the Department of Homeland security which focus on sharing data on a purpose of cyber security.

To ease the access to data and the development of AI algorithm, the report focus on promoting open-source shared libraries and toolkits. Among other they cite Weka toolkit (interface or Java API providing built-in tools for standard machine learning tasks), Mallet (machine learning applications to text such as document classification) and OpenNLP (tasks for natural language processing). They also highlight the importance played by programming language such as Octave and Python in easing the barriers to develop AI as well as gathering data. Finally, they emphasize the role played by online machine learning service proposing tasks on a cloud basis. The report also advises a strategy of standardizing the distribution of semantic information and ontologies in open source formats to ease the distribution and access to data (*The National Artificial Intelligence Research And Development Strategic Plan*, 2016).

2.3 Need for structured data as input

When the data are broad and made largely accessible as we saw in the previous sections with initiatives of the European Parliament in the Data Governance act or by the American national artificial intelligence research and development strategic plan, a new problem may arise regarding the structuration of those data. In their report made for the British Government, Hall & Pesenti (2017) highlight that most AI systems are integrated inside companies digital functions. Not only there are AI start-ups or well-developed companies using their resources

and algorithm to provide a service, but most AI are embedded in companies for which AI is not their core business. Through internal development or call-to-markets to AI-based companies, they get their own AI systems. For example, we can quote the example of AI chatbots handling automatic customers calls. This chatbot tool is being used by many companies for which AI is not the core business and they call to a third party provider of AI solutions. However, the integration of those AI systems and the way they use the data of the company is really difficult to assess from an outside point of view (Hall & Pesenti, 2017). In the National artificial intelligence research and development, the United States highlighted the rising problem of big data with the increasing numbers of unstructured or semi-structured data. The nature of those data imply to clean, integrate, transform or even reduce data for them to make sense as a dataset for artificial intelligence (*The National Artificial Intelligence Research And Development Strategic Plan*, 2016). For companies for which AI is not the core business, this issue has never been so important.

In an interview with Alexandre Thissen, Digital Project Leader at AGC Europe and Head of Technology at FeelInGlass (by AGC) we had an opportunity to see how critical the structuration of data is for companies for which AI is not the core business. As a multinational specialized in developing, designing and confectioning glass (in sectors as diverse as buildings, automotive), the link between AI and AGC is not obvious at first. On this question, Adrien Lemoine highlighted that their company plan to use AI as a tool in the future through internal development in order to minimize for example the trash-outs in glass architecture or to optimize the automotive glasses. But Alexandre emphasizes that the first goal is to structure the data as a key foundation element. An internal prospect highlighted that a lack of structured data will lead to an impossibility to nourish any AI algorithm in a proper way. Due to a lack of digital technologies appropriation by their employees, most of the data is still stored in excel files which need to be cleaned, organized and structured before further utilization inside Algorithm (A. Thissen & A. Lemoine, personal communication, 24 April 2021).

This example highlights the lack of structuration of data for a multinational beneficiating from a strong R & D department. We can therefore assume that smaller companies which may be in need to call from external companies to develop AI solutions may also face the same issues. This would therefore also consists as an obstacles for AI-based companies producing contents as they could not properly propose their service to businesses for which the dataset is not structured and therefore applicable. This is not only true for classic AI companies but also for

those generating contents through AI as the data used as inputs to nourish their algorithm should be structure upwards to allow AI companies to propose their service downwards.

2.4 Data quantification in AI output

Taking into consideration the possibility that AI copyright-protected works may be used by AI systems of private companies, we may wonder if there is any possibility to retribute the owners of the copyright on an automated basis by quantifying its use in an AI system. In our interview, Migle Laukyte, professor of cyber law in Barcelona, believes that it would be a good way to use the blockchain to manage the copyright. If we take the example of AI-produced music by Amper Music or Spotify, any kind of download or use of a song would mean that a small payment will be made to the owner of the copyright. In this way, she believes that algorithm programmer will be allowed to use copyright-protected songs on their side and copyright owners will still get their due (M. Laukyte, personal communication, 12 May 2021). This idea is shared by Bodó et al. (2018) in their article of September 2018 where they consider that Blockchain technology can gather a record of copyright-protected works and their ownership through decentralized public records and compensate the use of their work by an automatic transaction through smart contracts. Using for example cryptocurrencies, micropayments could be made by a certain number of users for a certain number of use of a particular work (Bodó et al., 2018). In the context of AI, we can imagine that micropayments would be made every time a music is used in the data set of an AI system producing AI songs for example. However, it may be very hard to map the smart contracts made by individual and some users may use the fair use doctrine in the US for example. The system may also have to comply with the regulation in firsthand, slowing down the process or even leading to legislative retaliations in case where smart contract go beyond copyright law. They also highlight however that the goal of the use of Blockchain technology would not be to prevent the use of copyright-protected work but organize the market (Bodó et al., 2018)

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An opportunity which is already considered by a company such as Spotify. As Ipshita Sen indicated by in his article on the blog outsideinsight, Spotify acquired the company Mediachain Labs, a blockchain technology actor. They explain this acquisition by their desire tackle the issue of fair payment and retribution for the owners of the songs in the music industry (Sen, 2018). We may however wonder if they could not also apply this technology in their AI division in order to retribute the use of copyright-protected songs to nourish their AI algorithm in the case where they are using their vast database of protected songs.

2.5 Managerial Implications concerning the utilization of copyright-protected works as inputs for AI systems

In the previous section we presented roughly the different regulations of four jurisdictions regarding the use of copyright-protected works in the dataset of an AI system: The United-Kingdom, the European Union, the United-States and Japan. Among those four jurisdictions, Japan has the most AI friendly environment as most experts consider that the new copyright law of Japan allows the utilization of copyright-protected works as long as the ideas or expressions of the original works are not copied. The United-States and their fair use doctrine opens the door of utilization of copyright protected works for business purpose under certain conditions without making it recurrent. EU and UK regulations however seem to be more reluctant to go beyond the text and data mining exceptions. In all those countries however we can observe a general tendency to protect and support the development of AI-based companies and this, through an ease access to data which may hinder the copyright regulations and favor their use by companies at short term.

If the tendency of most of those countries are to go for a deregulation of the use of certain datasets, excluding personal data, it is not to forget that companies should be particularly aware of the necessity to use data which are either unprotected or for which they paid a license. As the Max Plank institute emphasizes in his report of 2021, the quality of a dataset is however intrinsically related to the diversity of the origin of the data. However, buying the license for every data or dataset implemented in an AI system would be too costly nor encumbered (Drexl et al., 2021). It is however necessary for companies to prevent the use of copyright-protected works if they do not want to face legal retaliations as highlighted by Ana Andrijevic in our interview (A. Andrijevic, personal communication, 13 May 2021).

In this context some companies have been proceeding with another method using characteristics of the works and not the work per se in order to maintain the quality and diversity of the dataset used as inputs while still avoiding legal retaliations. As Ana Andrijevic (2021) told us in our interview, some companies generate datas based on the copyright-protected works and then use the characteristics of the works as inputs for their AI systems. By doing so you erase the original data and you will not have the possibility to go back to the original data. By doing so companies use the original work for a very short amount of time and cannot be held responsible for using copyright-protected work. We found an example of this method called “Model invariant set cloning” in the company Spotify for which we discuss in particular the patent related to this

process in chapter 4. If this method has several advantages for AI-based companies, it is also questionable on several ethical points and may also lead to unfair competition as well as limitation of incentives for creators of contents as we will see in chapter 4.

More generally we can wonder on the capacity for the owners of copyright-protected works such as song artists in the case of Spotify or Amper Music to prove the utilization of their work in AI system. If a system of data quantification as expressed in the previous section will not be elaborated, it remains very complex to define if a work has been used as input in an AI system. Some may also wonder if legal retaliations would be possible when they cannot be considered as “derivative works”. In other words when the output ends up being very different from the original work. Especially in the case of AI systems where the dataset used as input is huge, it may be very complex for copyright-owners to know if any of their works have been used. If we look at existing AI companies, we may raise even the example of GPT 3 which, even though the algorithm in itself is open-source, secretly keep his dataset making the algorithm useless in itself but also preventing any analysis on the content from the outside (*OpenAI API*, n.d.). Indeed a major part of the value of an AI algorithm resides in the data used in input.

Finally, a major implication for AI-based business will be the need to raise awareness among companies about the need to structure their data in order to create AI-friendly environment where applications of AI solutions would be largely possible. Mistakes or disorganizations may lead to delay and restraint the possibilities of those companies as well as limit the possibilities of development and expansions of AI-based companies generating contents.

Chapter 3: Value comparison between human-generated and AI-generated content

3.1 Introduction

For some, AI could represent a threat to the cultural industry market. With the democratization of the use of AI for content creation, notably embodied by our two analyzed business models, many concerns and debates have arisen in recent years. While AI-based creation of content may be considered technically interesting, it nonetheless raises the question of its value when compared to the human creative process. Moreover, other analysts are questioning more broadly the future organization of the market in light of this disruption in the perception of value. For example, "*some have suggested that AI's ability to create thousands of new, unique images at the touch of a button is a threat to the principle of scarcity that gives art some of its value*" (Nugent, 2018, para. 12).

In this chapter, we first attest to the existence of the debate concerning the creation of content with the help of AI and we put forward the example of the artistic field through a case study. We then argue that this debate could be mitigated by considering AI as conceptual art for artistic content, and thus as a process. This vision leads more broadly to consider the value of AI in its ability to be a tool in content creation. Then, we attest the manifestations of this value for users in our empirical examples of business models, following the framework of customer value creation of Smith & Colgate (2007). In addition, we present some arguments mitigating the threat identified in this chapter. We finally bring implications for the manager in terms of value brought to the user.

3.2 The Portrait of Edmond de Belamy case

The auction in 2018 of the portrait of "Edmond de Belamy", a painting created by artificial intelligence, was an opportunity to expose the capabilities of technology to the general public. They concern the capacity of the technology to produce artistic pieces that are aesthetically pleasing and that attract the curiosity of the initiated at the very least (Rea & Schneider, 2018). While the creation of AI-generated artworks was not new at the time, the advent of technology to produce a piece that was by some depicted as artistic and marketable, raised the question about the perception of the value of an algorithmically created artistic piece (Rea & Schneider, 2018).

Indeed, artists have been using AI for half a century, as notably attest the works of Harold Cohen and Lillian Schwartz, two pioneers in the field (Mazzone & Elgammal, 2019). However, the artwork of "Edmond de Belamy" auctioned by the society Christie's New York has been sold for $432.500 after premium, instead of the firstly valued range of $7.000 to $10.000 (Christie's, 2018; Elgammal, 2019; Kinsella, 2018).

Two factors could explain this phenomenon. Firstly, the team behind the auction piece, a French art group called Obvious, used technology that is fairly new to the field (Rea & Schneider, 2018). Previously, most of the people involved into AI-assisted artwork had notably to specify parameters and rules to the algorithm in order to retrieve a pertinent output (Elgammal, 2018a). On the contrary, the technology used by Obvious, called GANs, allows new artwork creation by making the algorithm learn form relevant dataset. To create the portrait, the Obvious team trained the GAN with "*more than 15,000 portraits created between the 14th and 20th centuries*" (Rea & Schneider, 2018, para. 5). GANs technology has already been more deeply described in the chapter one of the first part of this thesis.

The second reason, belongs to the perception shift regarding AI-generated content, notably driven by medias. This shift has been primary orchestrated by an article in the online review of Christie's, which then set the tone for various medias' communications, falsely depicting the piece as the first portrait made by AI, without human intervention (Elgammal, 2018b). As stated above, this portrait is of course not the first of its kind. In addition, such work still requires undoubtedly the intervention of a human. Indeed, the human choose "*a collection of images to feed the algorithm (pre-curation); in the case of Edmond de Belamy, this was a set of traditional art portraits. […]. Finally, the artist heavily sifts through many output images to curate a final collection (post-curation)*" (Elgammal, 2018b, para. 7). Moreover, a wave of criticism on this subject has raised the visibility to the general public even further. Most of criticism came from professionals of the AI sector such as A. Elgammal, suggesting that the Obvious works were irrelevant, as GANs technology as already been used in the field since half a decade (Cohn, 2018). R. Barrat, a young AI artist, confirmed that Obvious nor have created or coded the algorithm used to generate the final artwork, but instead, have used an already existing public model (Kinsella, 2018; Rea & Schneider, 2018). In addition, the aforementioned dataset, with which the model was trained, was also retrieved from an open source, called "Wikiart" (Nugent, 2018). The auction made by Christie's therefore raised the question of the appropriation by the authors of a freely accessible process to create a so-called original artwork (Cohn, 2018). This originality characteristic is also questioned by actors in the AI community, describing the works

created by GANs technology as derivative and not original (Cohn, 2018). The biggest difference with Obvious' artwork and all other pieces created previously, is that the team decided to commercialize it, earning them a reputation of marketers rather than creators, among art and AI professionals (Rea & Schneider, 2018).

3.3 AI as a process-driven conceptual art

The Edmond de Belamy case raised the frustration of many people, from both the art and the technical communities. As explained above, many questions arose regarding the legitimacy on the one hand of the Obvious group to market a content emanating from a publicly available model and on the other of the strict artistic dimension of such a content. These questions have given rise to a new way of perceiving the use of AI in the art world, due to their unprecedented public scope. In this regards, Waelder (2020) notably quotes "*the current use of artificial neural networks to create art, where the focus is placed on the technology itself rather than on the content that the artwork intends to communicate*".

Indeed, this paradigm shift may be part of the answer to the recent debate about the use of AI in the arts. In this approach, "*the art is not in the outcome or final image, the art is in the process, as a form of Conceptual art*" (Elgammal, 2018b, para. 11). Richard Lloyd, head of Christie's, notably supported his choice to auction Obvious work by the inherent process of the artwork. Indeed, he pointed "*limited human intervention in their creative process, evinced by the fact that the collective chose to credit the artwork to the algorithm rather than themselves*" (Rea & Schneider, 2018, para. 10). If we could argue the relative originality of such piece, viewing AI-generated content as a whole process instead of a final output could mitigate part of the debate around legitimacy of AI in the field of art.

We support this view of the creative process by drawing parallel between AI-generated content and Conceptual Art. In the latter:

> *The act of the creation of the art work is located in the mind of the artist […]. Thus, the making of an art object becomes simply optional. […]. We believe this is at the heart of the usefulness of the comparison with conceptual art: The idea or concept is untethered from nature, being primarily located in the synapses of the brain and secondly disassociated from the dictates of the material world. Most AI systems use some form of a neural network, which is modelled on the neural complexity of the human brain.*

> *Therefore, AI and conceptual art coincide in locating the art act in the system network of the brain, rather than in the physical output. The physical act of an artist, either applying paint or carving marble, becomes optional. This removes the necessity of a human body (the artist) to make things and allows us to imagine that there could be more than one kind of artist, including other than human.* (Mazzone & Elgammal, 2019, p. 7)

Indeed, "*in Conceptual Art the idea or concept is the most important aspect of the work.... all planning and decisions are made beforehand and execution is a perfunctory affair. The idea is the machine that makes the art*" (Lewitt, 1967, para. 2). Following this definition, "*by building from the foundations of early Conceptual Art we can produce algorithmically generated works of art*" (Happersett, 2003, p. 547). Indeed, Elgammal (2019) describe AI-produced pieces as a "*creative process, one that involves an artist and a machine collaborating to explore new visual forms in revolutionary ways*". This paradigm shift is increasingly interesting when it focuses on how artificial intelligence can improve the artist's expression, by understanding the inherent workings of the model and thus being able to make it do what we want it to do and not just a derivation of the training set (Waelder, 2020). For example, the "*artist Anna Ridler took stills from a 1929 film […]. She made ink drawings from the still frames and fed them into a generative model, which produced a series of new images that she then arranged into a short film*" (Elgammal, 2019, para. 20). The latter has been particularly interested into integrating artificial intelligence into her creative process by considering how it could be used, rather than just as a service (Waelder, 2020).

3.4 AI as a tool

We extend this last conception, emanating from the arts and more particularly from the painting fields to the other dimensions of the cultural industry affected by this disrpution. "*At present, much of the debate about any use of AI, including art, is colored by a grand misconception of the technology*" (Rea & Schneider, 2018, para. 12). However, AI in its broad sense, is undoubtedly going to change number of markets and the way human create and work. A study carried by Frey & Osborne (2013) notably estimates that 47 percent of the workforce of the US could be considered as high risk when talking about their propensity to be automated in one way or another. Actually, great part of the literature is more realistic, notably pointing that

expectations currently exceed technical capabilities when it comes to artificial intelligence (Rea & Schneider, 2018). Indeed, "*there are computational limits to how intelligent a system can become and strong AI is still just a fantasy for developers. The capabilities of today's AI […] almost all rely on ML techniques to achieve them*" (Picard, 2019, para. 6).

In its current state, the advantage of artificial intelligence for a company or an artist lies in its ability to become a tool. When talking about art, if "*it may be discussed whether or not the computer is capable of creativity and if it will replace the artist, it is obvious that, at this moment, it can save artists a lot of work*" (Waelder, 2020, para. 15). In addition, one Obvious' team member, himself, depicts artificial intelligence as being in its early stage, with limited public understanding just as photography was in the 19th century, but also as a technology that will quickly gain recognition and become a tool for artists (Nugent, 2018; Rea, 2018). Furthermore, just as photography has taken away the work of the miniature portrait artist, AI could disrupt some occupations by automating tasks that were previously manual (D. Lee, 2019). This will nonetheless raise expectations for value and quality, as previous technical evolutions have done (D. Lee, 2019).

3.5 Empiric example of value accorded to AI

In recent years, we have seen the emergence of different business models based on AI. These, when based on the production of content related to art (music, painting, etc.) or even more broadly to the cultural industry, fuel the debate on the value of AI-generated content. Among the empirical examples, we find the two companies whose business models have been studied in part II, Amper Music and Moneybrain. Indeed, Amper Music raises the question about value comparisons of music content. Moreover, while the solutions offered by Moneybrain are purely audio-visual, they do raise the question of the value of interacting with a human representation embodied by an AI compared to that of a real human.

Through its products, Amper Music does not want to replace human artists with algorithms. Their objective is to create a tool that can be used by artists themselves as well as by professionals from other fields and individuals (Silverstein, 2019). This approach is in line with that of Waelder (2020), in the capacity of the AI to save time for the professional. For Drew Silverstein, the use of Amper Music notably allows film artists to save time and money, as they no longer have to resort to expensive and in-demand composers (Silverstein, 2019). Moreover, they aim at making life easier in terms of copyright for professionals and people willing to embed music in other media such as podcasts (Amper Music, 2020). Finally, with its per-song

licensing formulas, Amper Music is able to meet different demands based on different user needs (Amper Music, 2020). In the same way, Moneybrain allows companies and individuals to reduce cost and uncertainty because it its solution have fewer time and financial constraints than a human (RJ Choi, 2017). Following the framework of Smith & Colgate (2007), these components relate to economic value elements such as product cost, search cost, learning cost, time, and risk. Indeed, Smith and Nagle (as cited in Rintamäki et al., 2007, p. 627) define economic value as "*product's objective monetary worth to a customer adjusted for the availability of competitive substitute products*".

In addition, Sheth et al. (as cited in Rintamäki et al., 2007, p. 627) describe functional value as the "*perceived utility derived from an alternative's capacity for functional, utilitarian, or physical performance*". The elements linked with functional value are, among others, aesthetics, customization, flexibility, appropriate performances as well as outcomes, and efficiency (J. B. Smith & Colgate, 2007). In the case of Amper Music, these manifest in the many customizable features of their Score application when the user comes to create music (Amper Music, 2020; Silverstein, 2019). Also, customization options offered to the customer through Moneybrain's AI Studio solution allows to choose between models and voices (AI Studio Beta 2020). In addition, the Amper Music's API offers functional value to the professional willing to integrate their solution into their ecosystem (Amper Music, 2020). Moreover, their library of millions of individual samples of real musical instruments increases the quality of the solution offered (Amper Music, 2020). For Moneybrain, the latest value element embodies itself in the ability to reproduce the personality traits of a real person in the way they express themselves, taking AI Studio beyond simple voice synthesis (RJ Choi, 2017)(Amper Music, 2020).

Moreover, Amper Music also try to bring customer emotional value. In particular, they aim to develop the tool as organically as possible so that it reaches a true musician in the emotion and melody achieved (Musically, 2018; Silverstein, 2019). Moneybrain, through its business model, tries to add to the functional purpose of AI the emotional dimension that we can find in our interactions between human beings. Whether through AI Speak Now or AI Studio, the company tries to mimic the human in what it transmits when it communicates, thus adding a more natural and emotional layer to the simple technical solution. By giving the customer the opportunity to participate in the creation process through the Score application's settings, Amper Music also wants to enhance the emotional appeal of the customer. Moneybrain also bring this emotional appeal by offering rewards to its users, through notably success earned in AI Speak Now. This emotional value is described by Sheth et al. (as cited in Rintamäki et al., 2007, p. 628) as the

"*perceived utility derived from an alternative's capacity to arouse feelings or affective states*". It drives value elements such as sensory emotion, enjoyment, novelty, curiosity, and trust (J. B. Smith & Colgate, 2007).

Finally, the most debatable part surrounding value creation concerns symbolic value. Rintamäki et al. (2007) describe "*the symbolic value of a product or customer experience […] as positive consumption meanings that are attached to self and/or communicated to others*". This value carries elements such as status, esteem, and social meaning (J. B. Smith & Colgate, 2007). The symbolic value of AI is hard to estimate as it is sometimes judged as destructive of it. Indeed, whether it is Amper Music or Moneybrain and despite the words of their supporters, these solutions will inevitably lead to changes in the market as well as the replacement of certain occupations and jobs. Using these solutions will therefore contribute to what may today be negatively connoted in the eyes of the public or even in their personal esteem.

3.6 Legal uncertainty and value perception as a stumbling block

The market threats related to the value of AI-generated content in the cultural industry imply that it could challenge two fundamental elements to the value given more specifically to artistic content. It implies according to Pogue (2018, para. 6) "*a world where effort and scarcity are no longer part of the definition of art*". From this threat is born as we have seen a debate surrounding the creative character of AI. Notably, Kelly (2019, para. 48) argues that *"creativity is one of the defining features of human beings*" while Vincent (as cited in Stephensen, 2019, p. 5) claims that "*creativity isn't just for humans*". As explain, while AI is likely to create value in the cultural industry when perceived as a tool, it is currently unlikely to be positioned in itself as an equivalent to the fruit of human labor and creativity in the near future. Indeed, several economic and philosophical elements reduce the risk above-mentioned.

First, content generated by AI and by a human being are not considered legally similar. In this regard, B. Boussabat and A. Lemoine do not believe in the outcome and creation of a legal personality for AI that would grant it the same legal considerations as a human (B. Boussabat, personal communication, 22 April 2021; A. Lemoine, personal communication, 11 January 2021). This fact, as well as the resulting legal vagueness described in chapter 1 and 2 of this second part, attest to the difference in judgment between the value of a human creation and that of an AI, particularly in legal terms.

Secondly, we argued above that seeing AI as a tool was currently the most realistic way to describe its value. Furthermore, we claim here that seeing AI as a tool hinders the debate around its ability to be creative on its own. An article from MIT Technology notably state that:

> *Artificial-intelligence algorithms are more like musical instruments than they are like people. […]. Just like previous tools of the music industry—from recording devices to synthesizers to samplers and loopers—new AI tools work by stimulating and channeling the creative abilities of the human artist (and reflect the limitations of those abilities).* (Kelly, 2019, para. 26)

his latter point of view relative to the music environment, when coupled with the vision developed above where AI was compared to the advent of other tools such as the camera, implies that AI is perceived as a tool assisting the artist in his creative process, rather than destroying it. This new tool, in particular, increases the quality and democratization of art (B. Boussabat, personal communication, 22 April 2021; Lee, 2019; Silverstein, 2019).

Finally, it is hard to imagine that the value of human creativity will be diminished by the prospects offered by AI. Thus, both should not be opposed, but rather observed in parallel as they could coexist. If human creativity and the perception we have of it will surely have to evolve, it is not likely to disappear. This reality is already observable in the music industry, where AI-generated songs are present on platforms like Spotify or Youtube. However, these songs do not attract the same success as real artists. This can be explained by the fact that beyond the aesthetic aspect of the music, the listener does not find the authenticity that he can find in a human being. Indeed, the image of an artist and what he or she embodies is difficult to replicate by an AI. Secondly, listeners as well as music artists have turned more and more towards the experience rather than the simple output for several years. This phenomenon was born on one hand from the difficulty for artists to get paid properly via streaming platforms and on the other hand from the change of perception of music by its listeners. Here again, the musical experience is hardly achievable by an AI, and it is therefore difficult to imagine that the public will greatly value a simple piece of music created by an AI that is not embodied by the emotions of an artist they will one day see on stage (B. Boussabat, personal communication, 22 April 2021).

3.7 Managerial implications in terms of value creation and solution design

In the course of this chapter, different implications for the manager of a company building its business model on AI-generated content have been drawn.

First, the developer of an AI-based solution must focus on its design as a tool. As it stands, these solutions are currently neither technically nor legally capable of operating on their own. Seeing the solution as a tool complementary to human activity, and developing it as such will allow the company to mitigate the debate surrounding the value of the content created by its help. This perspective is perfectly materialized by the artist Anna Ridler, in her way of giving meaning to the use of AI. On the side of our analyzed business models, Amper Music has also demonstrated how to orient its communication towards this conception. This position also allows for the easiest transition for the end user, avoiding any major disruption that would limit the commercial scope of such business models.

As noted by B. Boussabat, too much disruption by the solution will leed in low public adoption and evangelization (B. Boussabat, personal communication, 22 April 2021). Therefore, the democratization of AI as a tool in the cultural industry will open up this sometimes closed environment to many people, including the uninitiated (B. Boussabat, personal communication, 22 April 2021). Therefore, it will allow the creation of value for the whole society.

Secondly, the analysis of the value attributed to AI under the prisms of Smith & Colgate (2007), has allowed us to identify the salient points of the creation of value of this solution in the relevant industry. Hence, AI perceived as a tool by the creator, will have to be a source of time savings and therefore of money. For that, it will be able to focus on the reduction of costs and risks normally induced by human activity. At the functional level, it will have to focus on the user's ability to personalize his customer experience in order to adapt it to his needs. In addition, the solution will have to try to reproduce as faithfully as possible the fruit of human labor, in order to ensure the most natural transition possible between human-generated and AI-generated assets. In emotional terms, the solution will have to build its apeal by letting the user interact with the solution, so that he feels involved in the output. Finally, in terms of symbolic value, the task will be for the developer to minimize the impact of the solution on its community, especially in terms of ethics.

Chapter 4: Disruption of markets by AI and unfair competition: The Spotify case

4.1 Introduction

If, as we have seen, AI can be used as a tool for value creation, it can become a source of threats when in the hands of large companies. In this chapter, we study the ability of large companies to use AI to disrupt the market, or to engage in unfair competition with their competitors. More specifically, we will take the case of Spotify, which is currently developing its AI-based solutions to perhaps drastically change the music business ecosystem. We will then discuss the general risks for the market, as well as the mitigating factors. Finally, we will draw up the managerial and regulatory implications that these possible threats raise.

4.2 How Spotify aims at disrupting the music market

For several years now, the company's strategy has turned to new technologies and the search for the revolution in the music industry. Indeed, Spotify announced on July 12, 2017 "*the opening of a new Creator Technology Research Lab in Paris led by professor and musician François Pachet*" (Spotify for Artists, 2017). F. Pachet, "*has dedicated his whole life to researching music. He has been active in research since 1992, including in projects supported by the European Commission, like the Lrn2Cre8 project*" (European Commission, 2018, para. 2). The French scientist is now focusing his research on the use of AI as a tool for artists, which he had already started at the Sony Computer Science Laboratory by developing a program called Flow Machines used to produce AI-assisted music (Pachet, 2021; Solomon, 2019).

In his speeches, the director of the Creator Technology Research Lab has always defended AI as a tool at the service of the creator that will never replace him in his creative process, but rather will accompany him (Solomon, 2019; Spotify for Artists, 2017). Through his words, the latter supports our vision outlined in the previous chapter. When asked about the dangers of AI, F. Pachet quotes, "*AI will never replace a musician. On the other hand, it creates opportunities and will democratize access to music. AI is a tool for composers. They continue to make artistic choices. It reminds me of the arrival of digital synthesizers in the years that prefigured the end of pianists according to some*" (as cited in Giraudet, 2019, para. 4) [Own translation from French].

Although these words seem fair in form, some worry that the mission and objectives of the latter and his team are broader and may impact the music market (Marr, 2017; A. Smith, 2020). Notably, two patents relying on AI published in 2020 in the name of F. Pachet, among others,

attest to Spotify's ambitions and its strategy towards AI. The latest one, entitled "Plagiarism risk detector and interface", has been patented as "*a method which uses artificial intelligence to detect plagiarism in music, able to detect a 'similarity value' between songs*" (A. Smith, 2020, para. 1). Indeed, the patent EP3742433A1 describes that:

> *Methods, systems and computer program products are provided for testing a lead sheet for plagiarism. A test lead sheet having a plurality of passages is received at a plagiarism detector. A set of annotations describing a level of plagiarism of a plurality of elements (e.g., chord sequence, subsequences, melodic fragments (i.e., notes), rhythm, harmony, etc.) of the test lead sheet in relation to preexisting lead sheets are generated and output via an output device. (Pachet & Roy, 2020b, para. 1)*

The technology mentioned above echoes another patent published a few months earlier in 2020. Named "System and method for non-plagiaristic model-invariant training set cloning for content generation" it is focused on "*creating content using an AI model. Instead of training the model directly on existing content, however, it would clone the existing content and train its model on this cloned content if it passes the plagiarism interface unscathed*" (Fergus, 2020, para. 5). In technical terms, the patent EP3620991A1 states that:

> *Training set for use during content generation is generated by applying a first machine learning process P1 to a first finite sequence s wherein s has a length Ls, to generate a first statistical model M(s). The first statistical model M(s) is sampled using a first sampling process G to generate a second finite sequence t wherein t has a length Lt. A second machine learning process P2 is applied to the second finite sequence t to generate a second statistical model M(t), wherein no substring of the second finite sequence t of length d is identical to a substring of the first finite sequence s, wherein d is a predetermined number of elements in a sequence*. (Pachet & Roy, 2020a, para. 1)

4.3 Threats posed by the anti-plagiarism solution

At first glance, the technology illustrated in the patent "Plagiarism risk detector and interface" may seem to create value for the artist himself. This would be in line with Spotify's publicly

announced strategy, aimed at assisting the artist in his creative process (Spotify for Artists, 2017). Indeed, we see in this strategy the possibility for artists to protect themselves from problems or legal proceedings in terms of copyright infringement. Notably, Fergus (2020, para. 2) attests that the solution brings a "*process for analyzing lead sheets which are essentially Cliff's Notes for a song's melody, chord structure, and sometimes lyrics. Artists or publishers could theoretically use this technology to determine whether a song could be the target of a copyright lawsuit*". Moreover, the AI could detect precisely which part of the song in statistically too close from an already existing piece, which Spotify believes would even increase the overall originality of a song (A. Smith, 2020). The patent, notably state that:

> *When executed manually, plagiarism detection is usually performed by experts and lawyers. Manual detection of music plagiarism requires substantial effort, skill and excellent memory, and is generally known to be impractical. Software-assisted detection for text plagiarism on the other hand allows vast collections of documents to be compared to each other, making successful plagiarism detection much more likely.* (Pachet & Roy, 2020b, para. 5)

The creation of this solution would thus fill the gap by the vagueness generated by human interpretation, as well as to propose an intuitive solution for the user, which could even be integrated into their software.

However, we question the real use of this solution for the benefit of artists, especially given the company's history of dealing with them. This is evidenced by a letter to Prime Minister Boris Johnson signed by 156 artists, including Paul McCartney, Kate Bush and Chris Martin, attesting to the way Spotify unfairly compensates its artists (Beaumont-Thomas, 2021). Although the music industry in general benefits from streaming, few of these benefits trickle down to the artist himself, which is even more difficult for a small artist to take (Elshan et al., 2021). Masuch (as cited in Sisario, 2013, para. 14) even argues that through this model "*no artist will be able to survive to be professionals except those who have a significant live business, and that's very few*".

We therefore suggest that Spotify's real intention could be quite different. Indeed, according to Howard (as cited in Gershgorn, 2020, para. 8) "*this becomes a tool to either protect themselves from litigation or generate more works that they don't have to pay royalties for*". This statement

echoes the possibility for the company to develop its own music generated by AI, a point we will discuss in more detail in the next section. By this statement, we can deduce that Spotify could in this case firstly use this solution to proactively protect itself from accusations of plagiarism in case of a lawsuit (A. Smith, 2020). Second, when directly integrated into their AI-generated music generation solution, it would provide the same algorithm with metrics that would allow it to know when a piece of music is statistically far enough from existing material that it can be published without threat of copyright infringement. If the anti-plagiarism solution is developed and materialized in the future, there is a risk that the opportunity offered to artists will be transformed into a data collection tool for Spotify (Gershgorn, 2020). The lead sheets thus provided to the solution, if retained by Spotify, would then allow them to feed their own AI-based music generation solution (Gershgorn, 2020).

Beyond these issues, Spotify's use of this anti-plagiarism solution would pose other specific problems for artists and the Market. In particular, it remains unclear how such a solution would take sampling into account. In the latter, "*an artist incorporates elements of an original recording in a new song*" (Spotify for Artists, 2019, para. 4). This activity may indeed be allowed under certain agreements or contracts with the original artist concerned (Spotify for Artists, 2019). For example, "*sounds that have been copied and repeated extensively in songs from wide-ranging genres. The 'Amen Break,' a six-second drum sample from Winstons [...] has appeared in over 2000 tracks*" (A. Smith, 2020, para. 7). This problem is not without reminding the case of the ContentID solution developped by Youtube, allowing to detect automatically the copyright infrigements on the content published on its platform (Gershgorn, 2020). This solution, applied for some years, "*has repeatedly shown to be flawed. In 2018, a 10-hour long video of white noise resulted in five copyright infringements against it*" (A. Smith, 2020, para. 18). If the two solutions differ in terms of technique, it shows however the limits of the contribution of AI to the fight against the appropriation of other people's work.

4.4 Threats posed by the AI-based music creation solution

The hiring of F. Pachet signs for Spotify the materialization of its appeal to the possibilities of linking AI to the music industry (Marr, 2017). The company's strategy has sometimes seemed to evolve towards a better consideration of artists and their work, notably with the creation of the Spotify for Artists branch, allowing artists to access a set of user data received by the company (Marr, 2017). However, at this stage, it is difficult to imagine that Spotify's development of AI-based music generation solutions is solely focused on creating value for

these same artists. Indeed, the objective could be for Spotify to take advantage over the market and the music created by real artists.

At this stage, it has to be noted how history has already shown how Spotify has been able to wisely use AI in its broad field. The company can first define itself as "*a data-driven company*" (Marr, 2017, para. 2). This data is then used to offer users personalization and enhance their customer experience (Hodgson, 2021). In particular, the main asset for Spotify is the recommendation system (Hurtado et al., 2019). For this purpose, the company uses algorithms relying on NLP, audio analysis and collaborative filtering (Johnson & Newett, 2015). The first one is used to analyse text, while the second is used to analyse notably music patterns and the last one used to analyse behaviour of users (Hodgson, 2021). All of them materialized themselves in personalized playlists and recommendations based on moods and preferences (Hodgson, 2021; Johnson & Newett, 2015).

As expressed earlier, the company is often criticized for not compensating its artists in sufficient ways (Beaumont-Thomas, 2021; Elshan et al., 2021, p. 1). We fear that Spotify's ability to create its own content through AI will exacerbate this problem, allowing it to simply offer personalized content that does not require artist compensation. We can draw a parallel here with another situation that has affected the company's reputation in the past. At the same time that F. Pachet joined the Spotify team, the company was accused of using "fake artists" to fill certain playlists (Fergus, 2020; Ingham, 2016, 2017). Amongst others, 50 artists were considered suspicious given their direct access to important playlists for the company, while they had no other activity on the internet and no other songs in their respective discography (Ingham, 2019). These "fake artists" were mainly creating music without lyrics for mood playlists (Fergus, 2020). Most of them were "*signed to Epidemic Sound, a Swedish 'production music' house*" (Ingham, 2019, para. 4). It is now known that compared to other record companies, Spotify paid through special agreements "*a lower royalty rate for these songs than it does for tracks from 'real artists' vying for the same playlist spots*" (Ingham, 2019, para. 4). Although behind these fake artists, real composers were working for Epidemic Sound, they were only paid for the creation of the song, without any future royalties on the published music from Epidemic Sound, as they recovered all the rights (Deahl & Singleton, 2017; Ingham, 2019).

Through the ease of creation that AI could bring now, the company would be able to expand its way of using AI and to replicate the above model, but by producing music directly in its name. Better than reducing the amount of royalties paid, this solution would allow them to pay none.

Thanks to their two patents filed under the name of F. Pachet, we see here the ability for Spotify to develop a solution allowing them to create music directly responding to the tastes of customers, using all their potential in terms of data. This solution would consist in the production of music created with the help of artificial intelligence notably for mood music playlists. As already mentioned above, these playlists are mainly composed of music without words, intended to correspond to an emotion, or a time of day. These were already targeted by the company during the "fake artists" scandal and represent for example almost 3,500,000 followers for the playlist "Deep Focus", more than 6,000,000 for "Peacefull Piano" and more than 1,500,000 followers for "Happy Beats" (*Spotify App*, 2021). This non-exhaustive list shows the financial interest that the company could see in providing AI-generated music adapted to the users, therefore satisfying them while allowing Spotify to pay less royalties. Indeed, Petridis (2017, para. 8) comments that the arrival of F. Pachet attests that the "*future may well involve music made not by fake artists, but untouched by human hands*". However, in the same way that Amper Music does not aspire to produce the new Mozart, the musical capacity of such creations may be questionable given the technical advancement of AI today in terms of music making. However, Petridis (2017, para.5) notes that these musics are "*just supposed to float unobtrusively around the room, the musical equivalent of a scented candle*". This element thus attests to the effective feasibility of such an AI utility for Spotify. In addition, Spotify could also use their know-how in terms of music recommendation linked to users' data to eventually offer them fully personalized AI-created music in addition to these formatted mood playlists.

Beyond the financial and technical interest, there is the question of how Spotify could feed such an algorithm. For this, a link with the first patent described above, "Plagiarism risk detector and interface" is emerging. The artists who would use this solution would indeed provide the company with lead sheets of their songs as input. These lead sheets could then be used to feed an AI-based solution to produce music. Gershgorn (2020, para.18), attests notably that this patent reminds "*the fine print in any free tool offered by a company that traffics in machine learning*". Oftentimes, the data users provide can be more valuable than the tool itself. The use of copyrighted works as input dataset to an AI-based solution could hinder Spotify or any other company as explained earlier in chapter 2 of this part of the thesis. The patent described in this section is precisely aimed at this purpose. In it, Pachet and Roy cite that:

> *Typical systems require building databases of existing works […]. These databases can be problematic, however, as copyright owners (typically, music publishers) may prevent*

> *their construction, manipulation, use or distribution. While the general concept of using existing works as a training set is compelling, these restrictions make their use neither desirable nor feasible. Consequently, content generating AI systems remain too limited and potentially prohibited. A technical problem associated with such systems involves generating training sets that are not subject to such restrictions.* (Pachet & Roy, 2020a, para. 6)

The process described in the patent allows to generate a training set with an invariant and non-plagiaristic model which is then used to feed the algorithm used to create music (Pachet & Roy, 2020a). This technique, already highlighted by A. Andrijevic during our interview, allows the company to use original data that is legally untraceable in the piece finally created and thus to circumvent the problems related to the use of copyright-protected works (A. Andrijevic, personal communication, 13 May 2021).

4.5 Managerial and regulator implications on disruption and threats caused by the case

If materialized by Spotify, the system developed above through the filing of the two patents would cause several disruptions to the market. Depending on the trajectory these different solutions take, they could have a detrimental effect on relevant community. It raises therefore several implication for a company basing its business model on AI generated music and the pertinent regulator.

First, the development of an AI tool that assesses the level of plagiarism in a piece of music raises several ethical and pragmatic issues. Indeed, if used proactively by an artist, it could limit his creativity. Inspiration is an integral part of the creative process and is often difficult to quantify. An artist using Spotify's patented solution could unfortunately direct his or her creation according to the information received by this algorithm. As a result, the artist may no longer be looking for the most musical and artistic piece, but the most polished piece that is less likely to be called plagiaristic. Integrated into the structure of Spotify or any other company, this solution also poses ethical problems in terms of the use of the data collected. Of great value for the company, it could therefore be used for commercial purposes by feeding another AI solution. For the regulator, it would be interesting to analyze this possibility from the point of view of data protection and the use of protected content. Among other things, the imposition of

transparency on the final use of the collected pieces could limit the deviant and harmful uses of this type of application. For the artist, the recourse to such a solution requires his wise use of it. In particular, we doubt the existence of an artistic added value of this solution, but we rather attest to its destructive value.

If future developments democratize this solution, it could eventually be used in a legal process by artists or the company itself. In the state of the art section of the related patent, human interpretation is questioned when it comes to judging whether a piece is plagiaristic or not (Pachet & Roy, 2020b). If a stakeholder in the music world should one day use this solution as a defense or attack on a plagiarism issue, several problems would arise. Accusations of plagiarism are already very common in the music industry and are seen by some as an issue in the sector (Bouvier, 2020). If used for the wrong purposes, the developed solution could increase this phenomenon of numerous accusations in the aim of getting a piece of other artists' pie. For the regulator, we therefore doubt its legal legitimacy and the added value of such a solution to human interpretation. Indeed, since plagiarism is difficult to quantify, this solution would require the definition of a threshold of inspiration that would make the work plagiaristic in the event of its use in a lawsuit.

Secondly, the new patented solution to produce AI-based music based on a non-plagiarized dataset would create its own set of problems for society. Because of the ease of AI-based music generation already highlighted throughout this brief, Spotify's model, as well as any similar company operating with a music generation AI algorithm, poses a threat to the market. Indeed, these solutions create the danger of seeing a mass of AI-generated music appear on the market to the detriment of real artists. In the case of Spotify, this would primarily concern artists creating background music for the playlists described above. In the case of Amper Music, the company whose business model has been described, this would primarily concern artists producing music for other art sectors such as cinema, video games or even entertainment in the form of podcasts. If, as explained, the communication strategy of these two companies tries to reassure the market, the democratization of their model will inevitably lead to great changes in the music industry.

If the difficulties linked to the exploitation of protected pieces could slow down a company like Amper Music, the development of the solution patented by Spotify lifts this barrier. Indeed, as stated in its business model, Amper Music has its own dataset that it claims to have built by its internal teams. The activities required to build such a dataset can easily be perceived as cost

and time inefficient. The process specified in the Spotify patent could be used by a company like Amper Music. It could either pay royalties to Spotify to use its solution or develop its own technical solution. This would allow it to generate a large non-plagiarized dataset to feed its algorithm and make it more efficient as well as its whole business model.

The use of such a process, however, raises concerns in terms of ethics. In particular, it seems normal to question the appropriation of protected pieces without the agreement of the concerned artists. If legally and technically this approach remains currently possible, it could eventually harm the market. In particular, the possibility to see one's work used for commercial purposes without any financial reward would not encourage artists to produce content. Furthermore, the disconcerting ease of producing content, with the barriers removed, would lead to unfair competition. AI-based companies could over-supply the market with these works, eventually masking the work of real artists. Moreover, these same works could limit the creation of other artists if they were granted copyright protection. A. Andrijevic attests this risk while however underlining that the affixing of a copyright on these works implies the designation of a human being as author. These costly and time-consuming steps would thus make the development of this strategy on a large scale difficult (A. Andrijevic, personal communication, 13 May 2021). Recently, a lawyer named D. Riehl and a coder named N. Rubin, used an algorithm to register 63 billion melodies. They then placed them under a Creative Commons Zero protection "*which means that these melodies are similar to works that have fallen into the public domain and that musicians unknowingly composing melodies that resemble them will not run the risk of being sued for plagiarism*" (Bouvier, 2020, para. 7) [Own translation from French]. If this event does not a priori pose a problem for other artists, it nevertheless attests to the future potential of AI to shake up the current copyright system. For D. Riehl (as cited in Bouvier, 2020, para. 5), "*the copyright system no longer works and must be updated*" [Own translation from French]. For the regulator, this observation effectively raises the need to redefine the copyright system in depth, taking into account the threats and problems developed above. Moreover, the prohibition of the use of non-plagiarized cloning algorithms to circumvent the current legislation is also to be considered.

Chapter 5: The challenge of ethics for AI-based Solutions

5.1 Introduction

This section aims to tackle a non-exhaustive list of ethical issues which may be raised by the development of AI systems such as Amper Music and Moneybrain. The previous section in Chapter 4 already highlighted the danger of unfair competition, others already raised awareness about the danger of raising inequalities through biased algorithm. The capacity of Moneybrain to copy real models into a digital AI version of themselves raise similar fears that the famous deepfakes as well as posing serious questions of Image Rights. In this context, the European Union took the lead to provide a list of forbidden and high-risk applications. We will first realize a description of this regulation and then apply it to the case of Moneybrain and Amper Music and see if obstacles can be noticed for the development of those companies. As the literature is already broad on this subject so we will not go into details in the development of those issues, our goal being to highlight obstacles that may rise for AI-based companies. Then we will focus on the new paradigm of explainable AI which provides tools to improve transparency of AI systems, increasing users adoption and convincing policy makers.

5.2 A new framework for Ethical AI systems:

The new "proposal for a regulation of the European commission laying down harmonized rules on artificial intelligence" proposes a good indication of which AI applications are more likely to be forbidden on short and middle term. As an answer to a demand of the European Parliament to propose legislative answers on the subject, this text aims to propose new legislative rules to harness opportunities and development for the AI technology. At the same time it provides a safe environment of development of the technology, and this following ethical principles. This new framework aims to promote the protections of the interest of the society, with health, safety and human rights objectives among others. As examples of human rights, they cite the right to non-discrimination, data protection and privacy, consumer protections, rights of child among other hobby horses of EU regulations towards AI (European Commission, 2021).

More precisely the new regulation will forbid "*Ai systems […] with the intention to materially distort the behaviour of a person and in a manner that causes or is likely to cause harm to that or another person*" (European Commission, 2021, p.21). This statement however excludes the case where external factors not controlled by the algorithm will cause the distortion in the behaviour. Secondly, it will also ban AI systems which will be used to establish a social score

of individuals as this may lead to discrimination and bias the results (European Commission, 2021). This statement echoes the actual case we can see in China with the social credit system. The system is defined by Lee (2019) as social control tool through continuous surveillance of smartphones applications and platforms which gather data on citizens of specific industries and grant cash advances or ease the access to vital services for example. Those services being dependent of an individual score based on 30 criteria such as activities on internet and traffic offenses.

Finally, AI systems used for biometric identification will be banned for their infringements of the data privacy regulations. Exceptions are made in three specific case: victims research, threats to physical safety and prosecution of criminal offenses of more than three years in the concerned member state. This would however only be allowed under the express authorization of a judicial body and in a limited time period and space.

The new framework also highlights a category of high-risks products which will be subject to attentions and defines the conditions to allow their utilization. In this category we can find AI systems having a direct consequence on health and safety of human-being such as autonomous robots or diagnostic systems in the health service sectors. But also AI systems part of products falling under a law of harmonization such as toys, protective equipment. The list is quite elaborated (European Commission, 2021).

Further they also consider AI Systems as risky when they have a tendency to induce discrimination. For examples, the AI systems related to the education and employment decisions which may be used in institutions or companies in order to make decisions to pick a specific individual are also considered as high risk. This because there is a risk of discriminations and a lack of appreciation of impact on people's relations and lives. Algorithms which may restraint the access of "public services and benefits" will be also particularly screened by the regulator such as an algorithm determining the access of a person to an insurance or credit based on his previous record and financial outcomes (European Commission, 2021). To tackle this issue, they enacted a list of "transparency obligations for certain AI systems" in the article 52 which leads to the necessity to inform when people are in interactions were an AI or under the screening of a biometric system unless we are in the three conditions above mentioned.

One specific statement, the number three, focuses on the issue raised by "deep fakes" and aims to prevent misinformation or reputations damages by forcing the users of AI systems to

indicate that the generated audio, image or video consists on a manipulated version of people, organization, objects (European Commission, 2021)…

5.3 Application of the framework to actual business-cases

If we apply the EU regulation to the business case of Amper Music and Spotify, we can see quickly that there may be some obstacles raised for those two businesses which may fall under an interdiction or be considered as high risk under the EU Regulation.

First, considering Moneybrain, its AIStudio value proposition raises question in term of personal data rights and privacy as the AI reproduction of the model does not only speak and look like the model but acts like the model. As raised by Ana Andrijevic there is a critical question of personality rights in the business model of Moneybrain. Any reproduction of a real person will have to come with the consent of the latter which may lead to a redefinition of employee contracts in the case of the TV presenter of Moneybrain for example (A. Andrijevic, personal communication, 13 May 2021).

Further We may also wonders on the nature of the data used to train the algorithm in first place. Employees, customers, it is likely to believe that contracts should have been signed in first place to allow this screening of the models. Otherwise the proposition would be in total opposition to the principle of image right. By screening a real person, Moneybrain may also infringe the new regulation of the EU which prevents any biometrical use for identification. If here the purpose is not the identification, the company navigates here on a very close environment where she will have to fulfill both data privacy, biometrical data and image rights.

Then its AISpeakNow value proposition can fall under the high-risk category regarding educational and vocational training as they implemented an evaluation system which may be further applied to evaluate the access of one's user to a specific program and therefore lead to discrimination. As we saw in the first section of this thesis, AISpeakNow aims to go further than the only English courses by opening their technology to all educational contents. Not only they plan to teach and discuss the course but also evaluates the student and create statistics of the student's achievement and grades (Moneybrain Facebook).

5.4 Towards a new paradigm: explainable AI

One element of an answer to the problems outlined above could lie in AI described as explainable. The concept of explainable AI brings together different points of interest in AI, including transparency (Hagras, 2018). Transparency, an essential element of explainability,

"*was a traditional first step to protection of rights in human-based institutions and by analogy it is ported to algorithmic concerns such as unfairness and discrimination*" (Dosilovic et al., 2018, p. 2). Indeed, this concept was born out of concerns created by the more traditional AI "black-box" model, ensuring little transparency and interpretability for both the user and sometimes its creator (Hagras, 2018). Thus, "*the lack of interpretability or 'auditability' of AI and machine learning methods could become a macro-level risk. Similarly, a widespread use of opaque models may result in unintended consequences*" (Financial Stability Board, 2017, p. 2). Moreover, the European Commission (2021, p. 30) attests that "*to address the opacity that may make certain AI systems incomprehensible to or too complex for natural persons, a certain degree of transparency should be required for high-risk AI systems*".

Transparency, directly related to explanation, is defined as "*an information exchange between a subject and an object, where the subject receives information about the performance of a system or organization the object is responsible for*" (Woudstra, 2020, para. 3). Applied to AI, it incorporates "*an auditable record including all factors and associations related with a given prediction*" (Hagras, 2018, pp. 29–30). With this definition expanded, "*explanation techniques provide valuable information about the learned representations and the decision-making of an AI system*" (Samek & Müller, 2019, p. 5). Unfortunately, this transparency also creates a trade-off between the performance of the solution and its ability to be explainable (Hagras, 2018). In addition to extra computational and design costs, the growing and performing technology also implies less understanding of it (Hagras, 2018).

Further than increasing the company's ability to know its solution, explainable AI also bring many values for stakeholders. For the user, the ability to understand the AI solution and the results obtained is an important element in terms of adoption of this same solution (Wind et al., 2019). It therefore facilitates the adoption of the solution and reduces fears induced by its nature. Indeed, "*explanations help to build trust in a relationship between humans, and should therefore also be part of human-machine interactions*" (Samek & Müller, 2019, p. 4). For these purposes, AI cannot only be understandable by the expert in the field, it must provide in a user-friendly and intuitive way information to all types of stakeholders involved (Hagras, 2018). In addition, the company's communication must be focused on this same need for transparency and understanding in order to reduce the friction created by the user's reluctance to change (Wind et al., 2019). To this same end, the trialability of the solution participates in the fact that "*concerns are reduced and understanding of the technology is enhanced*" (Wind et al., 2019, p. 4).

Finally, the legal requirements for transparency have greatly increased in recent years. Notably, "*the EU's General Data Protection Regulation (GDPR) has even added the right to explanation to the policy in Articles 13, 14 and 22, highlighting the importance of human-understandable interpretations derived from machine decisions*" (Samek & Müller, 2019, p. 5). While it is not yet clear how this right might be applied and its scope to different types of AI, it does attest to the general interest in it.

5.5 Managerial implication for good governance and ethics

Given the growing ethical concerns for AI, we bring here some guidelines for the organization wishing to base its solution on AI. These concern the use of products or services described as high-risk above. Also, the need for transparency all across the value chain of the organization is underlined. We will use examples from other companies to support these recommendations.

First, companies willing to base their business models on high-risk products or services should be extremely aware of the limits of utilization of technologies as they could become illegal in some markets such as the EU or even used in an unproper manner to serve autocratic policies. Then to reduce the risks related to bias, discrimination, and other ethical issues, we advise companies to take inspiration from the new explainable AI model. This model allows the understanding of the algorithm and its choices in order to proactively and reactively avoid any unethical events. For the user, the ability to understand the model and its outputs increases adoption and eliminates the fears that may stand between the user and the new solutions. Conversely, too much disruption would slow down the adoption of the technology (B. Boussabat, personal communication, 22 April 2021). In this same objective, the trialability of the model is important and allows the user to take the step towards the solution more easily. The latter embodiement can for example take the form of a demo version of the solution.

As the concept of explainable AI implies a non-negligible additional cost, different solutions are available to companies concerned with the ethical development of their solution. For example, various companies have launched the development of solutions allowing in-depth analysis of AI solutions, and thus opening the black-box of players in the field wishing to focus on the concept of explainable AI. Therefore, Google's Explainable AI consists of "*Tools and frameworks to understand and interpret your machine learning models*" (Google, n.d., para. 1). Similarly, Deloitte's Glass Box describes itself as "*a toolkit to create transparency in Artificial Intelligence*" (Deloitte, 2021, p. 12).

This ethical dimension is in our opinion very important, we therefore suggest to companies active in the AI field to extend this notion of transparency and explanation to all spheres of business model. In particular explainable AI should not stop at the description of the process leading to the solution, but also at the other tasks of the company encompassing the solution. Thus, the transparency should also focus on the composition of the dataset as well as on the use of the various user data (A. Lemoine, personal communication, 11 January 2021). In this way, the governance dimension of the company is improved (Deloitte, 2021). RepTrak, an institute specialized in corporate reputation indeed describe Governance dimension as "*company's ethical behavior, transparency, and fairness. Companies must be strong in this area if they want to consistently earn a license-to-operate by stakeholders, particularly regulators and policy-makers*" (RepTrak, 2019, para. 14). Therefore, a competitive advantage will be created for the company because it will proactively protect itself from legal problems and at the same time increase the trust of all stakeholders (Deloitte, 2021).

At this stage, these different statements can be compared to the way of operating of the company Amper Music, whose business model has been analyzed. When compared to our recommendations, it appears that Amper Music first uses a free trial version to raise the awareness and accessibility of its solution. Indeed, the Score application allows to create music for free, preferring to monetize the licenses afterwards. Moreover, its communication is largely focused on transparency and good governance of the company. However, these principles are not applied to the whole business model. In particular, the composition of the dataset remains unclear, even though the company assures that it has been created in its entirety. Moreover, the way in which the music created by the users is then used remains unclear. Thus, it is impossible to know if Amper Music then uses the music to re-train its solution. Even when a license is acquired by the user, the terms described in the business model leave unclear the real ownership of the music created. Amper Music is therefore an example of a company that needs to increase its transparency in order to improve its governance.

In conclusion, transparency can be a source of value for the AI-based company producing contents, as ethics are important in this field. Its business model should therefore be inspired by the concept of explainable AI, and even further, the company should apply its values to the entire value chain in order to satisfy stakeholders in terms of good governance. However, it should be noted that these approaches remain costly and that trade-offs between performance and ethics will arise for the company. Moreover, complete transparency is not always desirable nor applicable (A. Lemoine, personal communication, 11 January 2021).

CONCLUSION

In this master's thesis, the literature review as well as the methodology based on the description of two business models allowed us to compile essential information for the further development. Hence, we brought an analysis based on the questions and challenges arising from this background. Through this analysis, we were able to bring different implications for the manager and the regulator. These have a valuable and direct relevance to the different actors of AI-based content creation.

The analysis of the two companies allowed us to outline the obstacles to the creation of a business model in the environment in which these companies operate. For the reader, it also represents two practical examples, allowing an in-depth understanding of the pattern followed by these organizations. In particular, it allowed us to understand how Amper Music circumvents the law and legal barriers through contract law. We were also struck by the way Moneybrain could substitute the value we get from our interactions with humans. In general, this description allowed us to raise many questions building the analysis representing the heart of our work.

In this latter analysis, we started by looking at the challenges produced by AI generated content in terms of authorship. The legal uncertainty surrounding the issue was striking and led us to centralize legal pieces and projects that provide a framework for the professional. While waiting for a fixed regulation, we suggest contract law to companies wishing to evolve in the field of AI generated content on a stable legal basis.

The analysis then continued on the identification of the problems raised by the nature of the datasets used by the AIs. It soon became apparent that the use of copyrighted materials leads to a legal hurdle. Moreover, the severity of this hurdle is highly dependent on the geographical jurisdiction of the company facing it. The use of data set cloning algorithms, which output can then be fed to AI, seems to be an economically interesting solution. The wise reader will however question the ethical scope of this solution. This part also identified the need for companies to structure their data in order to avoid future costs.

Mixing philosophical, economic, and technical analysis, a comparison of values between human assets and those created by artificial intelligence was then established. It appeared a divisive subject, on which few experts agree. When strictly compared, the value of AI-created assets may indeed seem lower. However, when the technology is perceived as a tool for the professional or the user, the ambiguity of this value judgment is lessened. AI is thus mainly a

value carrier for the person using it as a tool. This vision brought by this chapter may have implications for regulators, who systematically seek to oppose human creativity to that of AI.

We then questioned the possible disruption created by AI, as well as its capacity to destroy value for other market players. By analyzing the case of Spotify, we identified how this company wishing to launch itself in content creation could take advantage of the music market. The two patents recently filed by the company may indeed raise important ethical and pragmatic concerns. However, this topic seems to have only slightly raised the interest of the legal community. On the other side, we believe that a clear redefinition of the legal framework surrounding AI is needed. Many laws are outdated, and the integration of these issues is urgent in order to guarantee the balance of the markets.

Finally, we have fully focused on the ethical dimension related to AI-based solutions. Indeed, basing one's business model on this technology leads to great challenges in terms of good governance for the organization. The identification of the new paradigm of explainable AI seems to bring the necessary transparency to organizations. However, the company concerned about its ethical impact should apply all the principles related to transparency to its entire value chain, beyond the simple technological solution.

We hope that our findings and recommendations will benefit actors concerned by our research question. The integration of AI in this sphere of society can bring great value. However, this is conditional to the whole community possessing the decision-making power agreeing to integrate it in a socially, economically, and ethically sustainable way. Given the often conflicting interests of the actors, we hope for a favorable outcome to the AI-induced disruption, which the integrity of the parties and time will decide.

LIMITATIONS

Following the development of this master's thesis, several limitations can be identified. These are to be taken into account in the reading and understanding of this work and deserve further research.

First, the managerial implications drawn up throughout the practical analysis are only directly addressed to companies basing a major part of their business model on artificial intelligence. Specifically, these recommendations are addressed to companies using artificial intelligence for content creation purposes, as identified in our literature review. This definition is inherently limiting in the scope of the conclusions drawn to all AI actors. Indeed, companies using AI as a dominant part of their business model, but for a different purpose than content creation, are not directly targeted by our recommendations. In particular, we refer here to companies providing services based on AI, such as financial analysis or decision making. In addition, companies using AI as a tool are not directly affected by our implications. Thus, organizations using this technology for purposes such as optimization or operations management may see limited application of the findings. Future research to confirm or refute the portability of our research to a broader spectrum of the AI sector is recommended. In particular, the findings in terms of authorship, AI dataset feeding, value, disruption and good governance should be evaluated against any organization wishing to use AI in a thoughtful and responsible manner.

The second limitation concerns the design of the two business models as well as their scope in an ex-post construction. Indeed, we have chosen two companies to illustrate two non-exhaustive examples of companies using artificial intelligence for content creation. During the description of these examples, a major problem in terms of information gathering was encountered. Indeed, we were only able to retrieve secondary data on the two companies. As the latter refused or did not respond to our requests for interviews, we were left with no other choice than to use information from the literature, conferences, as well as Internet sources. It was therefore very difficult to collect reliable information about internal processes in companies. As a result, the technical description of the technology used by the two companies, as well as the way in which the datasets are established, remains superficial and incomplete. In addition, it should be noted that these companies were subjectively chosen as representative of two different segments of AI content creation. Other segments such as visual content creation (e.g. paintings and graphic design) remain unexplored. Future researches should therefore take into account the limitations of business models when applied to ex-post business description. If such

researches embodied those models again, it should objectively integrate the most representative companies from all segments concerned by the research question. If possible, they should include interviews with representatives of these companies in order to gain more in-depth information. This comprehensive consideration of business models will allow for comparability of results between different segments, certainly raising some inconsistencies in terms of application of the recommendations.

Third, our analysis in terms of IP remains limited in time. Indeed, the implications drawn up in this section are highly conditional to the regulations in force and to the draft laws on the horizon. If a general guideline has been constructed and has direct implications for the companies concerned by our research question, the reader must however remain cautious about the possible evolution of the legal framework on which conclusions are based. The field of AI is a subject that raises many questions in the legal community, as evidenced by the seminar organized by ELSA International. Consequently, various developments are to be expected in the next few years, which may affect the implications built up. These evolutions will remain largely linked to the evolution of the technology itself, for example in the capacity to get closer to general AI systems. Future researches should therefore consider the progressive modifications of the legal framework, in order to provide readers with up-to-date information that guarantees its scope.

Finally, the last limitation concerns the ethical scope of our research. It is true that several implications in terms of good governance have been raised along this master's thesis. These are notably required for a better public understanding of AI in order to improve the general trust in the technology. However, this work also provides examples of companies circumventing current regulations by exploiting the legal uncertainty left until now. While these elements are useful for understanding the problem and for substantiating certain economically profitable implications, they do not guarantee the integrity of the organization. Therefore, these elements, especially the one related to the use of protected data to feed algorithms, must be observed with a critical eye by the reader. As exposed in this work, AI can be both a creator of value, as well as a destroyer of it, if it implies too brutal abrupt disruptions of our societies. Future researches should therefore take into account a wider range of market threats than those addressed so far, especially focusing more on solutions that ethically and responsibly integrate artificial intelligence into our society.

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APPENDICES:

Appendix 1: List of Abbreviations

AI	Artificial Intelligence
ANNs	Artificial Neural Networks
GANs	Generative Adversarial Networks
GDPR	General Data Protection Regulation
IP	Intellectual Property
NLP	New Language Processing

Appendix 2: Transcript of interview number one: Adrien Lemoine

This interview took place on Teams on the 12th January 2021.

a) Presentation and position of the interviewee

Manuel: We can start with a brief presentation of your position and your activities? Can you describe your academic and professional background?

Adrien: Yes I am an industrial engineer in material sciences and chemistry, my master's thesis was made with a Belgian company regarding the carbon fiber composite. Then I started at AGC in 2009 and AGC paid me to follow a third academic level. I made a study in IP Law and now I am an European patent attorney. My current position is European patent attorney.

Manuel: In which activities, key competencies does the position of European patent attorney consist in?

Adrien: You need a technical background, the law is quite clear: to become European patent attorney you need a scientific background: lawyers for example can not become a European patent attorney or he needs to make scientific studies. Scientific is very large because, depending of the country, you can become a biologist, chemist, engineer … a lot of scientific background can be consider. It is very large you need degree in science. I think you need at least 60% of the courses being scientific. Concerning the key activities, you need to know the specific IP laws. European and local ones but because I am in an international companies: I need to know some notions in us, Japanese laws… the countries were AGC is active.

Guillaume: Concerning the position of patent attorney, can you be more precise?

Adrien: Globally speaking, the main role is to defend existing patent inventions and also to create new patents. I do not use specific term but drafting, writing down new pattern applications, defending patents applications to become granted patent. In my position, I also have a strategical role, I can discuss with businesses and see where we need to protect the invention, the technology and see where are the competitors. The last part of the job is to be sure that one product can be put on the market. The specific term is FTO: the freedom to operate. You have a product or a method and you want to sell for example your product,

my job is to read patent about this technology and to see if similar patents from competitors exist. I also look at the product of competition too to be sure they are not in our portfolio.

Manuel: Can we have a brief presentation of your company AGC company?

Adrien: AGC is an international company, the main activity in Europe are flat glass but in the world we have 3 main domain: chemistry, display and glass. But In Europe 95% of revenue are coming from glass. Glass is not in the sense of drinking glasses but consists in a totally different technology. In comparison with the glass used for drinking glass, flat glass are used for windshields of automotive. Inside flat glass we have three main domains: automotive, booling and solars.Inside the buildings, we have the windows and decorative glasses (furtnitures, mirrors, painted glasses, doors…). For automotive it is mainly windshields, so it is the windows of trains, planes … but also central console and dashboards which can be made of glass. In term of employees, we have more than 50.000 people in the world.

b) Artificial Intelligence and Intellectual Property

Guillaume: Using your expertise, can you give us a brief, but nevertheless complete, definition of Artificial Intelligence?

Adrien: It is a Very large questions .I used to have a definition I considered complete but I do not remember, I can give it to you after this meeting. But I will say the AI is the capability of a trained system to give a new answer from a new situation. I insist on the term training, systems (as it is a computer) and capable to give solutions on new situations based on what he learns. But I prefer the term “train” more than “learning”. I also add that it is trained based on statistics. For me it is a problem to use trained but I need to talk with experts about that.

But I also do not understand why they do not give role to AI, there are a lot of AI for calculating. If you give to an ai simple calculation like 2+5 he will never give 7 but 6.99999 or 7.00001 as it is statistics but I do not understand why basic rules can not be given to an AI. It is a real value. That’s an other subject.

Guillaume: Do you think that there is a legal definition of AI in terms of IP?

Adrien: Yes there are definitions of the European commission for AI from the EPO (European patent office). I do not know them but I am pretty sure they all go in the same sense. And you do you have a definition on AI.

Guillaume: Currently not as we are in an exploratory approach of AI, we take information from different source as, from what we understood, it was not very clear to what extends we can consider AI as it is still expanding.

Adrien: That is maybe one of the biggest part. AI is a mystic word in which you can put a lot of notions. I will give you a document with some definitions and depending on the person you are talking to, you have different definitions. It is an umbrella term with a lot of notions. One will talk about one notion, another with an other notion, maybe not directly linked but inside the first one... In my point of view, it is difficult to address this questions directrly. But for me the most important terms are "Train systems capable to give new answers".

Manuel: Based on that complexity to define AI, what are the main challenges and concerns imply in term of IP that you can identify ?

Adrien: Yes There are plenty of issues.

First because national laws are not the same. When I talk about national I consider Europe as one, but IP laws are totally different between Asian countries, Europe, US.. Depending on the country where we are, we will have different kind of issues. As a reminder, to have a patent you need a technical solution to a technical solution. Decorative stuff can not be patented: you can not patent a red car for example, the colour red can not be patented as esthetical. But if the red has specific attraction or reflection of some light: this specific color can be translated in term of composition and specific characteristics. Then ,this colour because it solves an heating problem for example it could then be patented. So you need technical problem and solution: which can be therefore patented. If I focus in Europe, the main problem for AI in IP is that in Europe they never defined what is an invention. At the opposite they defined what is not an invention. They made a list of what can not be considered as an invention. One of those forbidden inventions are softwares. AI is at the boarder of this: it could be not patentable because it is not an invention or it could be patented but we need to find a technical problem which can be solved by it. Sometimes the examiner will say, it is not an invention because it is inside the exception list or he will say it is an invention but not patentable because not inventive. It is not inventive as it is made by a computer… It is a tricky way to patent AI and IT in general.

The second problem with AI is that an invention must be done by a physical person. This physical person can be represented by an organization or a physical person. But AI is not a physical person, they do not have any juridic values. This could be a problem but for the

moment it is easy to solve it: people say I am the inventor and use the computer to help me. But when it will be autonomous it could be an issue.

c) Digital Economy and IP:

Guillaume: Definitely and it lead us to our next question as it is one issue that we pointed. What is your opinion on the property rights granted for works made by artificial intelligence? Should we give the property rights to the customer, the company, the AI Itself and why?

Adrien: That is a very complex and good question. Actually, you know the story of the monkey taking a photo: monkey does not have IP values. In the story, the photographer said that he pushed the button. If it was the case he would have the right. But if the monkey took the picture: monkey should normally get the right but it is not possible as it does not have any personality nor juridic values. So everyone is free to use this picture. If you take this as a first sight: pure AI can not receive any IP right. Because it is the same than the monkey, they do not have any juridic values. Personally I think that monkeys have right than ai but it is my personal opinion.

For the moment, I know that some creation of music, ip rights are granted to company that created or learned the AI. For me, it could have some reasonable rights: if you create an AI, you train/learn this AI to reply to do something. All those trainings take a lot of money, time, development (in term of people, infrastructures) and all this work needs to be remunerated. It is the principle of IP, it is about giving money because you divulgate everything. When a company creates an AI and this AI helps to be more accurate, for him it could be logical that this company could receive the rights. Now if the company puts this AI to internet and gives a public access to this AI, it is a tricky answer to give. If the user is only clicking one button to create a face or a music: this user can not receive any rights as he did not do anything than clicking. He did not train, he only clicked one or several buttons. But if the user needs to give samples, to train a little bit … then he could have some parts of the IP rights. For me, the rights is linked to the energy put in the training.

Manuel: And regarding the current legislation. What is the situation currently with the legislation in Europe concerning property rights and AI?

Adrien: For the music I do not know. For patent it is what he explained. You need a physical person to do that, the easy way would give to give name of one technical person and it would be enough for the EPO. They never asked to proof who is the real inventor. A competitor could

try to go to court and ask to prove but it would be complicated and the technical person took part in the process at some point.

Guillaume: Thank you for your opinion. As an expert in IP, what do you think will be the evolution regarding this matter? What are the evolutions that you would recommend?

Adrien: Currently, all the IP rights, not only the patent ownership but also for the music, pictures, it is written that a physical person has the ownership. This person can sell part of the IP right but the inventor and creator has specific rights.

To remind you, there are two parts of IP rights: some parts that you can transfer (ownership) but also the inventiveness which you can not transfer. For example, a sculptor can sell it to anybody but he is still the creator of the sculpture. If someone wants to add something to the sculpture, he needs to ask before any changes to the sculptor. It is the law. You need a physical person.

Guillaume: Could we imagine that it would change in a near future. That we have so many AI creating works such as music. Do you think that it could happen that we grant AI for ownership?

Adrien: It could happen but law people are very slow. To change something like that at the European level and on top of that the world level because the creator rights are the same everywhere in the wordl. Changing that means that you need a lot of approvals and I am not sure in a near future it could change. But it is an open question, I do not have answer.

Manuel: Do you have in minds any sectors where this challenge arises? They found a solution to that kind of question?

Adrien: I think everyone does the same and is cheating. They say that this person invents, creates the stuff helped by the AI. Because, right now there is no laws for rights for AI. If you want to keep the rights and the money, you need to do that. If you say the ai, monkey created the patent/ work you do not have any right and you lose everything. I am pretty sure that In every sector they are doing the same and put a physical name to have the rights.

I also want to insist on something else. The AI can have a big issue on the future of patent. I mentioned that AI could be an inventor but we could also consider than an AI creates and publish a lot of articles, paintings, everything… However, to receive a patent you need to be novel and inventive in view of what have been published (in videos, books). Imagine that AI is able to create fake prior arts. Then future inventions will not be inventive, new and there will not be any new patents because everything is published by AI and no one can have the right.

It is an easy way to stop the monopoly of patents. Well, it is not so easy because you need to be well trained and publish the good stuff but you can imagine it. For the moment, some AI are creating texts based on what they can get but we can imagine that it may happen. .

Manuel: Do you see a solution to this problem?

Adrien: I think there are two ways:

First solution I see, you need to be faster than the AI. Now it can be possible but in ten years I am not sure of that. The second way is to have a specific law saying that any publications of AI can not be used as prior art. It could be difficult, not only because law is slow.

Guillaume: An other problem that may therefore arise is that some people would be searching on what ai published and, knowing that what AI published can not get patented, they could use this gap to either grant those patents to themselves or use this technology without respecting the property rights.

Adrien: Yes exactly.

Guillaume: Also we had a very opened question: Can we consider for the specific example of music or music, that a a human creation (like a painting) would become more valuable than one made by artificial intelligence? If we take the extreme example where musics can be created pushing one button.

Adrien: My point of view will be different for painting and music. People are using Spotify, Deezer streaming services and not in live. While in Asia you have holographic artists who do not exist. But seen that most customers listen to music on their computer, phone, I do not think that there will be more values for human-made music than AI one. Most people listen to music they like and do not care about the artist. It is however a personal opinion.

While for painting, if you go to the auction and you see the prices of some paintings. Your realize that they care less of the painting than the signature, the name. For example, a drawing of da vinci, the price is more than 400 millions euros… I do not think that in a near future, an AI could get the same amount because people want the signatures of the artist. But it is for my opinion on the near future.

d) Use Case Business Models:

Manuel: Related to this, wesaw that some huge music platforms like Spotify started to develop their own AI music. They can use the huge dataset of their users to know what they like and

propose them directly with artificial intelligence music that fits their taste. By doing so they will overcome artists music on which they gain less royalties. How could the market be organised to prevent such behaviour and, still, encourage creation and enrichment of the AI?

Adrien: First of all they can have a patent on this because it is a technical solution on a technical problem. They can patent the system to create the music: how to create music picking up preferences.

You are right regarding your question and it is all the same with the huge IT companies: they are using datas to remunerate themselves. Data is coming from us, from our usage and from their own datas In other words, people who are putting their own data in the system and datas produced by our use. Right now Spotify is paying artists because it is the law, if you are producing music you need to pay for the music that you broadcast, so that you can remunerate the artist.

If it is their own music, first of all it is totally free to create new musics and they do not have to remunerate new people. Purely from the company side, it is the best way to earn money. I do not like those companies to be honest as you are the product and you can not manage your datas, even with the RGPD. Of course at the end, they will promote their own music. Small artists will lose and have far less money , they can not create their own platform.

But t is the same for the videos services such as Netflix and Amazon Prime. Of course it is not ai but they are creating their own content (series, movies) and promoting them on their system. And at the end people are paying to have the videos on Netflix. It is the vicious circle from my point of view.

Guillaume: How could we organize the market to prevent this issue ? Do you see any solutions to this issue? Could we imagine that artists would gather on a human-made music platform?

Adrien: That is the big problem. If you do a comparison with the video streaming market. For the moment there are 3 big actors: Netflix, amazon prime and Disney. But in Belgium there are AUVIO and in France SALTO who are trying to create their own platform with tv channels… But to have access to the premium service you need to pay nearly the same amount than Netflix with far less content in the catalog. Why people would pay the same amount for 100 old movies in comparison to Netflix where there are thousands of content? There a no place for every platform at the end… Everyone is trying to create its own platform but the customer do not follow.

Manuel: Maybe we should not rely on people but competition laws, that prevent big companies from doing that?

Adrien: Of course, they can try to regulate and to avoid the monopolies. But if we look at the example of Facebook: USA, Europe … are trying to dismember those companies. Even in this context, Facebook announced recently that even whatsapp will take information from your phone to Facebook which isat the opposite of what regulations want but they do the opposite. Those companies are remunerating from those moneys and datas and they will always find a way to rock around those regulations.

Guillaume: An other solution that we were considering was to remunerate an artist based on the percentage of inspiration of its music that we can perceive in an AI music. Could we imagine a solution where we can quantify the level of inspiration used by an AI?

Adrien: Theoretically yes, but technically no because the dataset used for the training is huge. AI want to take as much as they can take and thanks to the computing they can manage a lot of work in a short period of time. Theoretically yes we could say: this music used mainly this artist you should pay him. But in practice they will say, we used huge dataset and AI is autonomous, we do not know what is the inspiration, it's black box.

Guillaume: We do not know if it is really possible or not but , based on the very basic knowledge that we have of Blockchain, we were considering a footprint in each music so that we can track it on a AI-made music.

Adrien: Theoretically yes again but they are already doing it so the question is what could we do for those already trained system. There are plenty of potential solutions but we need to take the past into account. If a law is coming tomorrow saying: starting from tomorrow, everyone needs to have a tag and trainings need to take the tag into account. They can not come back from 5 years ago and Spotify started AI at least five years ago.

Again it is my solution, maybe IT guys can find solution but for me it tends to be complex.

Manuel: We saw that there is a tendency right now to have transparent algorithm, which specifies which source they are using and for what kind of output. It could become the norm and paradigm of a more transparent AI.

Adrien: I think it is the right way but difficult to be put into practice. For me, an AI is a trained system, most of the money is used for the data set and the data itself. How the owner received the data? Are they paid for that ? Do they receive freely? We do not know.

I am pretty sure that Spotify use their own servers to train the AI. And in addition to the music itself, they own the metadatas: what kind of music is it, when people are listening, which can of music do they listen after…It is more than the music itself but all the metadas they have regarding specific people and the ecosystem in its own. I am sure they have those metadatas. Based on that, ethically speaking, you need to remunerate correctly the contributors of the datas and for the moment we give all those datas for free to Facebook for example. Spotify it is the same, they keep a lot of datas on us: where,when you listen to music, what kind of music you like on your way to home, job… Based on the mood and the training from all the users, they can know which music you will like.

I will give you an other totally different example: the the company Grohe. They are the inventors of the connected shower head. Grohe made a lot of patent based on AI and digital stuff and one of the patent is based on the whole ecosystem between your bedroom, bathroom and dressing room if you have one. They know when you are waking up, when you start the phone, what kind of light you want. Based on that and the parameters they have, I do not know which parameters they use by the way, they put you a specific temperature of the water, a specifi light and smell in the bathroom. So they give you a specific mood based on what they know about you to give you the most appropriate experiment to prepare you for the new day.

Guillaume: With Manuel we saw different business models and one that we saw was AIVA and they have a tendency to commercialize the property rights on the AI music produced by versioning their technology and granting different copyrights depending on the price paid by the customer. If you pay the basic price you do not own the music while if you pay the full price you have the copyright on the music produced by the algorithm.

Manuel: Yes they are starting from the fact that they own the music at first then they license the rights based on the amount the user is willing to pay and the use he will have.

Adrien: And the user is only pushing on a button or training the system?

Guillaume: From what we know about AIVA, you can choose the beat, rythme and basic parameters. Based on that they will generate a music for you.

Manuel: Same for Amper Music but with more parameters. You can choose the BPM, the key of the music, you can add or remove some instruments, choose the length of the music as well as music gender and moods.

Adrien: Based on what we explain to him, when you can play with parameters (change parts of the music, instruments, modify) in my point of view you are the creator and you are using the AI as a computer. If you have a music and push on a button to get guitar, the computer is not creating the music, you are the owner. In this case, of course the computer is giving you because it is proposing you the flow but based on what yo think, we can manipulate the music. For me it is important because, once again a monkey can not have the right even if he pushed the button. Here you manipulate the system, use the system as a clever piano. You are the creator because it is your own feeling, you put something from you inside your music. When you only push on a button, what is your creation? Nothing.

If you say I want a classical music, 3 minutes with more piano than violon, it is difficult to say that you are creator of the music.

Guillaume: Yes it is more what happens in the business model. In fact with those tools you can not modify the music with a keyboard. Does your opinion change if we tell you just choose basic parameters and then push a button to generate the music?

Adrien: I think the first problem is that there is a lack of law. Then the only law you can use is the law of contracts. Because contracts can not be against the law but if you sign a contract it is more important than the law, you can add anything you want that is not against the law. If you accept these terms, it is part of the game. Is it fair or not? It is another story. It is the same with facebook, I know it is not AI, but you accept you give everything: your datas, all the datas in your phone, to use facebook. But you are aware of that.

For AIVA and the other businesses, that's the point. If you want a free version, you receive nothing. If you pay, depending on your willingness yo pay, you can have more or less rights. Contractually speaking, it seems fair because if you put only on a button with very basic parameter you are not the creator, the real creator is the machine. And the machine can not have rights, the system is using a lack of law: We can consider that you are the creator if you pay at the end and the computer is there to help you. You do not want to pay? Then okay everything is my ownership because I say the computer is my system and I am the owner of the rules.

Manuel: So you said that they are referring to licensing and contract rights to find a solution to the ambiguity problem that arises from the fact that we may have more or less implications in the creative processus.

Adrien: Yes but that could be only between different parties.

If the first party is the owner of the AI, he can sign a contract with a second party and, in this contracts, have an agreement that if you pay a certain amount you can receive part of the rights. If you pay 2 times more you can own the full rights.

I do not like the term license because licensie is only if you keep the rights and give someone the rights to use your rights. But here you give all the rights or part of the rights to one: you transfer the rights but it is not licensing. A license it means that for example, if I am the owner of the rights, I can give yo uthe rights to use my music but I can still use it. If I transfer the rights to you, I do not have the ownership anymore. It is different.

Manuel: And both are contracts?

Adrien: Yes based on what you explained.

Manuel: And for example for Amper Music , they transfer you the rights to use the music but they stipulate that if you use the music in a way you were not given the right to do so, they can stop the contract and become once again the only owner of the rights. Is it possible?

Adrien: If I understand well it is what I explained you before.You have the right that you can transfer and the right that you keep for yourself. For the sculpture for example.A sculptor is still the creator of the sculpture and he can sell the sculpture to someone. But he is still the creator of the sculpture. Here I do not know the contracts so I try to imagine.

If there is such clause, it means that they always keep part of the rights and, on my knowledge and from what I learned, maybe they consider that they still have the creation rights. For example, I am the sculptor and I sell you a sculpture and you place it inside the entrance of your company. Two years after you decide to change the colour of your façade and you think that you should paint the sculpture in blue to fit the façade. You can not do it without asking me, the sculptor, and I have the right to see my sculpture. It means, if I understood well what you said about the company, they keep the inventiveness of the invention and then they transfer you the right to use but they still have the right to be sure that you are using the music in the proper way. But once again I do not know the contract.

If you want to paint the sculpture in an other colour, you can not do it without asking to the sculptor itself. They still keep the inventiness and transfer use the right to use but they can still have the right to be sure that you are using the music in the proper way. Once again I am not an expert but I am pretty sure it is like that.

Guillaume: In our analysis we have been working on a south Korean company, called Moneybrain, who developed an ai version of real model such as a tv news presenter. The ai model can then totally replace the original model and act and speak like the original. For a certain number of models, they can generate videos of those models with a script in input and videos of those people as output. How could we organise contracts that take this reality into account? Where is the frontier between intellectual property and image rights? Similarly, for the video games, movie sector.

Adrien: For me there are two types of answer. The first is, based on the fact that the presenter it is not a human,it is a totally computing system with no face. It is based on a human however. The answer will be the same than for a training. If the presenter of the broadcast was used to train the AI, maybe this person would be able to receive parts of the money based on the training.

But linked to that is the problem with the people rights. This kind of system they can use the face of Donald Trump for example, they can virtually create a sentence of a fake Donald Trump saying fake stuffs. That is an other story because you still have your rights, people can not use your face and do what they want before your approbation.

Guillaume: With this question we were more focusing specific sectors where some kinds of contracts take place. The example we thought about is that, if you implement the same technology for movies, we take an actor like Georges Clooney and with his agreement we train an AI model to make him play in any movie that would be granted to use our technology. Would we need complete new contracts terms to take this technology into account?

Adrien: In your example you have the answer. In your example you said that George Clooney accepted, then it is a contract. You can accept freely or accept with specific terms and then you can discuss. I am pretty sure that George Clooney can discuss about a fake himself in a movie. It is always the same, you are using parts of the people, they are making movements, faces and they are recording.. I am pretty sure that actors need to give, have specific contracts for the future. If tomorrow all them ovements can be done by a fake George Clooney, I will not pay million euros to have him in a movie but use an AI.

And AI or computing captures is done since more than 15 years. You see the movie Avatar, they are using human for the movements and then replacing people. What AI brings is removing the part where actors move themselves. It is just a new organization of the market. If you take Lord of rings, I do not think that actor of Gollum has same amount of money for playing

movements of Gollum than to have a real actor character in the movie. I do not know the contracts for the movie but I am pretty sure.

Guillaume: Yes we understand , as the motion capture technology changed the market in the past, you also believe that this AI technology will change the market in the future. Because if we do not need actors to be present anymore you do not grant athem as much movies as if they were giving days and days to play in the movie.

Adrien: If you take all the Walt Disney Movies now, all the movements are made with AI. Of course with computer but based on AI. For the lions, the moving hairs of the creature are not made by human but an AI who tries to put movements inside the hair. There is already AI in the movies.

e) **Use Case of AGC:**

Guillaume: Now we have questions more focused on AGC.

Manuel: Do you use artificial intelligence in your company? If yes, do you develop them yourself?

Adrien: Yes.

Guillaume: Without disclosing information on those activities, can you tell us if you develop them yourself or call from external compagnies?

Adrien: Both. We develop some AI internally and we train them internally. We also pay to receive AI and train them internally. But on my knowledge, we do not have any trained and installed AI. Of course we need to train the AI with the datas of AGC but we have both: developed and paid.

Guillaume: Do you see a real added value in the process and output?

Adrien: Yes in process and money because it is more efficient.

Guillaume: Again without disclosing confidential intelligence. What is the attitude of your company regarding the dataset used for the company?

Adrien: There are some plans to have new AI for new systems and I think they are using datasets from external partners. For example, we can imagine a use case: we are a company making efficient glass. Of course we want the biggest efficiency at the best moment and based

on that you may need the statistic of weather for example. As we do not own a meteorologic system, we would pay for a dataset.

Guillaume: In this case, do you try to check the source of those collected datas?

Adrien: I can not reply because I do not know. I think people who buy those datas try to see where they come from because those companies want more datas then they give you. If they are looking where and how the company took the datas, I can not answer you.

Manuel: Based on what we learned at the beginning of this conversation, did u have struggles to use AI in business models Regarding difficulties to patent?

Adrien: In my expertise, for the moment no. Everything I explained to you is what I learned but at AGC it is still basic a project. Basic is not a bad term. I always have in mind an example of airbus: airbus developed a specific separation between economic and business seats with small basic barriers. Those barriers are quite heavy so they train and use AI to develop the strongest and lightest system that they can develop. No human was able to design this system because it has a lot of holes. Thanks to the AI they could optimise the model.

In opposition to the basic model I was explaining, this example is very complex. Airbus struggled to patent it because they have an optimal stuff but difficult to explain and represent. So, when it comes to me, I do not have issue with AI for the moment in 2021 as the output is not so complex to explain as a pattent attorney. And for the moment the AI help people to develop in AGC and AI are not developing alone so I do not face this other problem we talked about

Manuel: Going through your activities on the web, we identified two spinoffs of AGC, “Eclat digital” and “Genie vision”. The first one aims to provide predictive virtual image of windows on a building (visual rendering) and the second one allows to visualize construction plans on building sites through augmented reality (BIM). Based on those projects, if we imagine in a near future that AGC develops a tool based on artificial intelligence generating blueprints of architecture projects based on a data set of real architects, taking into account building constraints relative to glass. What would be the technical constraints of such a project first in term of patentability for your company?

Adrien: Not an easy question. In term of patentability, it could be patentable because you can have a real technical solution: you have a building at the end. Is it acceptable by the EPO? It

could be but the main concern would be to write it so that It would be considered as an invention and patentable invention. Because you can have inventions that are not patentable as a colour.

Guillaume: If we consider a bit further the final product and if we make a link with the example of Spotify. Who could we grant the rights of the product made by the AI? The customer ? AGC? Would AGC use the contract law to grant those property rights?

I think that here for this specific case of building, the concern is totally different from spotify. Because when it comes to ownership of architects, they have responsibilities. If the building is not correctly built or issues in the blueprint, the ownership is important to know who is responsible. In fact in a building it is great to say that I am the designer of the building but if I need to take all the responsability linked to viability of the building, I am not sure that AGC would like to keep the ownership. For music we do not care, we earn money because people are listening to your music. For a building, once it is built, no one will create the same one.

Manuel: Do you have specific sectors where two sides will not be willing to get property rights so that they do not get the responsibility on the output?

Adrien: I think it depends on the laws link to the sector. For example, a builder of a plane would have the same issues. You can take the example of boing, they had a problem with a plane and had to cancel all the planes. The owner of the plane has a responsibility too. Everywhere where you have responsibilities, you need to be sure that you won't receive or keep responsibilities. If an AI does not have responsibility because is not a person, it would lead to a big mess at the end. Imagine an AI is designing the highest tower in the world and , then, once built it is falling down. The builder will prove that he respected everything and come back to the AI which can not be taken responsible.

Guillaume: If the AI was built based on existing architectural projects, how can we imagine retribution to architects? For example if the AI produce a building in the style of Santiago Calatrava, would he have access to some royalties for you? How to organise the contract?

Adrien: For me, it is difficult because you do not have as much datas with buildings than with music. If you ask to architects: every creator is inspired by something. Of course an architect will see all the buildings around and being inspired by the nature, environment... It is the same for a musician, if he likes he is inspired but they do not pay for that inspiration. I do not think that for building we can ask to pay.

You can take pictures of this building and then those pictures are free to use. For example, a façade you can not use pictures of a façade as you want because they are parts of the right of the architect. But using pictures of a façade inside an AI, I do not think it could be an issue. It is a specific law so maybe you need to discuss with an AI expert lawyer. But for me, it will be dififcult to say in an AI-based building that they could remunerate other creators.

Guillaume: Do you have any questions for us? Or questions that you thought that we would ask you?

Adrien: No. Good luck because it is a complex and difficult subject. That's enough for me, I do not know if you have specific questions.

Guillaume: Not especially it was very interesting to see you opinion of expert on very open questions which we are aware that they are very large and open.

Appendix 3: Transcript of interview number two: Badr Boussabat

This interview took place on Teams on the 23rd of April 2021.

a) Presentation and position:

Guillaume: So, thank you very much for joining us. Maybe you can start with just a quick presentation of your background and your professional background?

Badr Boussabat: Thank you for the invitation. So, first of all, I graduated at the UCLouvain in economics. So, in the Economics School of Louvain, but I have also a master degree in international relations in UCLouvain as well. So, I started at KPMG as a financial risk advisor. Then I decided to move to go Degroof Petercam as a portfolio risk manager. But actually, simultaneously, I was starting to work in artificial intelligence on my own. So, it's not a field I've learned at university. It's something I find myself. And actually, I was starting to get to prepare a book in 2017, and actually, as a management committee member of the Budget Financing Center, I had the opportunity to travel to China and South Korea to meet giants of the industry. I had the opportunity to meet the CFO of Baidu, Xiaomi, Alibaba, and Tencent. And after these meetings, I was quite shocked and actually, it motivated me to go on and to go forward in this book, like, in an economic way, because if you visit libraries on artificial intelligence, you will find many books talking about politics, talking about ethics, but not on economics. So, my intention was, of course, to articulate my book around economics. And after that, I created two firms, one in adjutants consulting strategy and artificial intelligence strategy. And then lately I founded an NGO which is promoting the use of artificial intelligence. This is it in a nutshell.

b) Personal Experience in private company regarding obstacles

Guillaume: OK, thank you very much. So, we have some questions regarding some companies that we analyzed in the case of our master's thesis and also some questions related to your own experience. And we want to get your expertise on those subjects. First, we wanted to ask you in general, in your job as consulting company or for the NGO, do you have the impression that the current legislation is sufficient for the AI, or do you feel like companies are lost by an absence of legislation at the opposite?

Badr Boussabat: Yeah, but this is a really interesting question. There are two aspects. The first aspect is that there is no environment promoting artificial intelligence development, especially in Europe. This means that we are more focusing on how we can face the bad aspects of artificial intelligence instead of empowering the environment to push people forward in terms of creating big giants in artificial intelligence. Believe me, when I was in China in 2018, I have had a discussion with the CFO of Baidu, and I was so surprised about the way he talks about AI. I mean, there is no negativity on it. There is only positivity. And let me tell you something. Real-life is about international relations before it. If you want to impose or suggests a legislation on ethics, you must first be a leader in artificial intelligence. You cannot have a seat at the table with the big giants if you don't develop artificial intelligence. It's a very pragmatic approach, but which is very important. This is the first thing. Second thing is that lately, you are aware of it. The European Union has launched its first framework on artificial intelligence regulation. And we saw that again, there is no geopolitical orientation. There is no intention to develop a giant and to me, the main criterion to be a leadership in artificial intelligence is to have a giant. The example of South Korea is astonishing. South Korea went from the war in the 60s, with no commodities, nothing to exports. And they had this, let's say, intention to be a giant. And that's why they focused on the economy that articulates a partnership between the private and the public sector and actually a public sector in the private sector. And actually, that means that it's not about promoting competition within the country, but within the other countries. That's why they focus on creating Samsung. And this is very important because that pushed them forward. And now South Korea is a giant. And in Europe we don't have any giant. This is very important to make people know that before talking about politics, we need to first develop artificial intelligence to know what we are talking about.

Guillaume: Regarding your NGO, for example, do you promote or have any idea of internal processes that private companies should develop in order to assess the threats and opportunities regarding the AI and the digital economy in general?

Badr Boussabat: Actually, here in the NGO, to be honest with you, it's not politically oriented and we are still working on the brochure. We haven't released any brochures yet, so we're still working with the AI leaders. And I mean, it requests some work. And actually, I know that they're very busy, so we haven't released any brochures yet. So, we don't know what our direction will be, but we certainly know that it will be positive. And actually, we are planning to create something that will be acceptable by any country in the world. And we would like to give a world direction in this NGO, this direction in terms of good practices, but also in terms

of the way of accessing data. As you may know, we have a regulation in Europe named GDPR, a very interesting regulation in terms of protecting personal data for people. But actually, it gives no incentive to promote data processing in artificial intelligence. I've talked about it in my book, in one of my chapters. And actually, GDPR is, of course, an ideological regulation. Not something that will help artificial intelligence companies, because we know today that if you ask in the framework of GDPR if you ask a company for deleting your own data, this company can't retrain its artificial intelligence because we know that artificial intelligence needs training again and again and again. And my solution is about anonymizing names and let the artificial intelligence do the job. Because if the company is at risk in terms of deleting the data it gathers, actually, we cannot go forward. And that's why there is a big, huge gap between these AI-based companies in China and the US and the companies in Europe.

Guillaume: And what do you think about proposing a regular assessment for a company of the AI opportunities or is something that could be interesting, or do you feel like it's not especially always necessary for companies?

Badr Boussabat: It depends. What do you mean by assessments?

Guillaume: Like assessing the ecosystem in which the company evolves, for example, we had a discussion earlier with AGC, with my colleague and they have a huge quantity of data, but right now they do not really know what they can do from those data. And they have some contract regarding A.I. but they don't know which directions.

Badr Boussabat: Yes, this is a very interesting question, actually, we are working on that in the NGO, of course. But this is a separate work. We will, of course, ask for help from the AI leaders and actually, there are already some reports advising on how companies should start in the AI business, and of course, there are two important issues. First of all, it's about the hardware. If you don't have the powerful tools to integrate your artificial intelligence algorithm you can't grow. Simultaneously, you have, of course, to focus on the data quality. Let me tell you something. The most important issue in artificial intelligence development besides the hardware is the quality data, actually. Because I worked in a bank, I know the banking system very, very well. And I think it's key that we have data, we have a tremendous amount of data, but actually, the format is bad or maybe the data is unknown or we can't process it because the hardware is too old. So, this is the main issue of all companies. I'm just talking about banks or some financial institution. But believe me or some other companies, it's even worse. So here in the big, the big challenge for companies is about quality data assessments first. OK.

Manuel: OK, and in relation with these problems and obstacles for a company. Would you have tips or advice for a young company starting its business and it's in this field or willing to access the ecosystem of AI?

Badr Boussabat: Yes, sure. First of all, I would say if you wanted to start a business in artificial intelligence, a startup, for example, you have to keep in mind that you have to just set up a goal, your main goal. Because actually, if it's very clear in your head in terms of goals or targets, what do you want to provide to people? This is a first step. It seems like very basic, but actually, it's not because it will help you, of course, to gather the most consistent people around you in this start-up, for example, you need a scientist this is for sure because you need a very great quality of data. And let me tell you something, before launching any algorithm or any artificial intelligence in the marketplace, you need to make sure that this algorithm is very robust because if the regulator sees that your algorithm is biased and you are promoting, let's say, exclusion, for example, you will have a very bad reputation in the marketplace. You know that artificial intelligence universe is very small. We can think that this is a big word, big dimension. But I mean, many people know each other. So, reputation is very important. And you goal it's about having good quality data and very defined goal in a business. And there is also another let's say suggestion that because I know that you are abroad, first of all, you have to know about the local regulation in some countries, it's easier to manage or to launch a startup than some other more complicated. In some countries, of course, you can use personal information without any problem. In some countries, you have just to justify what do you do, what are you doing with those data? And in others, you can't use personal data to grow. And so, it's very important to know what the local regulation in which country is you want to develop your idea. Don't forget that in some countries the market is already, let's say, close for competition. And it would be much more difficult to create a competitor. For example, in South Korea, you have to know very well what kind of business you want to launch, because the configuration, let's say the settings, the way of doing economy in South Korea is very specific. And this is mainly a partnership between the private sector and the public sector in terms of creating giants that will compete with foreign firms and external players. So, this is the second thing. The third thing I would add in this interview, I would say that if you don't have a multidisciplinary team in the start, it cannot grow, it is very important to have a multidimensional approach of your business. And this will help you a lot because if you are just data scientist, it won't be enough. You need a lawyer to protect you because regulation is evolving over time. And you need, of course, some business developers. You need a multidisciplinary team. This is very important. This is in

general, but if you want to go deeper into business. We can it depends on your expectation on that.

Guillaume: OK, and we talked a lot about data already, and we were concerning, like, what do you think for you would be the most appropriate regulations regarding the data and more generally for companies? Do you think that especially regarding the music industry, we should end up a system that could like compute the level of inspiration that was used by an AI to produce a new music, to retribute the data owner that was used to nourish the application, for example?

Badr Boussabat: For example, in the music industry, you already have some scientists who created a big database in order to rethink copyrights. And actually, if you use the data in this database actually. You cannot be punished by law, and this is very interesting because it will push people to rethink our system. It means that we will. We are entering an area where producing music won't be profitable. If we keep the same business model and we already saw it with Spotify and Deezer, now people, I mean, singers want to make money, they perform music doing concerts, in fact selling CDs or anything like that, it's not profitable anymore. That's why artificial intelligence in the music industry is pushing artists to share experiences first because listening music today is totally free. You can listen to any music you want with opening anything. And I remember when I was eight years old, I bought my first single of Eminem. I remembered four euros. It's nothing possible today. You have to use another business model, and that's why some artists are successful. Others are not. And what was your first question when you talk about music,

Guillaume: Yes, about the data. But actually, I wanted to ask you, like, for example, you say that there was a database made by professionals and you cannot be punished by law, but how do they know that an AI wasn't nourished by those data, for example?

Badr Boussabat: Sorry? I was interrupted. What do you say?

Guillaume: You talked about a database that was made by professionals and if you use it, you cannot be punished by law. But how could they know that an AI was using those data has to be nourished, for example, like? What is the way for them to be aware of this?

Badr Boussabat: Yeah, it's very difficult because most of AI algorithms are Blackbox, so it's very difficult to predict what's inside. That's why there is a new movement lately on explainable artificial intelligence. But actually, there's a very big debate. To be honest with you, I am not

sure about my opinion on that, because it's very difficult to have a defined opinion on that because both parts have arguments and explainable AI is about giving the opportunity to auditors to know what's inside. But actually, you know, if you have a very transparent algorithm, you can't have great results because that means that the algorithm will be less powerful, and the development of AI will be at the lower level. So, there's a big debate on that. And I mean, most imminent AI leaders are still struggling in this arena. And to be honest with you, my opinion is not well-defined on that.

Guillaume: OK, thank you. Maybe Manuel we can move to the market threats if you have any questions regarding this section.

c) **Personal Experience in private company regarding market threats**

Manuel: My first question about market threats is that we saw that, still related with Spotify, some huge music platforms started to develop their own AI music so they can use huge datasets of their users to know what they like and propose them directly, with artificial intelligence, music that fits their taste. But by doing so, they will overcome out artists music on which they gain less royalties. So how could the market be organized to prevent such behavior, and still encourage creation and enrichment of the AI.

Badr Boussabat: Yes. This is a good question. Those platforms very smart, use data of artists and also data from coming from listeners like us, and in my point of view, let's take a long-term approach, in my point of view, in the near future, we will have the most, the smartest artist will create its own platform. And to me, we will have several platforms. They will compete between each other or maybe work between each other to be profitable. Let me give you an example. In 90s or 80s or 70s, to be an artist, you have to thrive deal with a big company like Universal or Disney or whatever. And this was your single way to be profitable and be successful. And after 2001, 2002, I saw a new trend, especially in hip hop games. Many artists are started to create their own label, their own company, and they are performing music independently. And as a result, if you see the ranking each week or each month, nine artists out then are independents and especially from the hip hop game. That means that being independent in creating your own music, you are freer to create whatever you want. And this is very important in terms of sharing experience with the listener. My point of view in the near future, probably we will have the same trend. But in terms of creating a platform, that means that you will have a unique experience with each artist. But of course, it will be very difficult because Deezer and Spotify, are still attractive for those artists to share their music online. But we had already some artists,

that are, let's say, denying that kind of platform in order to publish their music independently. I want you to take an example, very trivial example but very interesting. You know this, you know, French rapper a bit? OK, you have this famous artist named Booba, for example, lately, he launched his album I think the title was Ultra. He decided not to, let's say, release its album in the traditional way. You know, in music, you have producers, but also distributors. And he decided not to request help or let's say support from those distributors, and actually, in terms of results, you can think that he didn't perform very well because those platforms don't account the number of streams but actually, he has sold much more than anyone in the game because actually, he made it independently. And we know that he already created it OKLM which was a platform where many artists have been known by the general public lately, and I'm sorry, this is just the beginning of a trend, and I think it will be something that we can generalize in the music industry in the near future. And artificial intelligence will play such a big role on that because actually, it will help artists to create new songs with new instruments that you cannot think it exists and we know that artificial intelligence, it's about creating or having implied correlation between data and what that kind of tool and the artists will be most dominant in the market.

Guillaume: But you don't think that there is a threat that those huge platforms using AI, would be much more attractive than the artist because of their knowledge, they would be able to propose the perfect music to the listener because they know the taste of that person. And maybe in the future, they can also produce the voice of the singers and then they could be a disruption for the market.

Badr Boussabat: I don't think so, because the prediction rate is very low. The highest prediction rate in the marketplace in general, it's Amazon. It's over 15 percent. It's nothing. I mean, with that kind of prediction rate, you can't take the game, it's very difficult, that's why I wrote it in my book, actually, the competition is still very important. I mean, the competition is raging on. I mean, if you only have 15 percent of production, that means that you can really compete with the with Amazon or with Spotify or whatever. Let me give you an example. Lately, WhatsApp updated its policy. You've heard about it, I guess, and it's something I wrote last year in my book. I've said in my book that if a company. It's too disruptive in terms of using the data. Users will quit. Users will leave the application. And in this cognitive economy today, you can be profitable in very short time period, but you can also lose everything in a short time period. And this is what happened with WhatsApp when it updated its policy in terms of using data, because we know that's WhatsApp use our data daily to feed Facebook algorithms, many

people, including Elon Musk, suggest people to use signal. And I think you've heard about this. And you see that we had big, let's say, announcements from users and they leave WhatsApp to enter to signal because signal is much more respecting towards our preferences. People say that those big platforms will, of course, be dominant in the near future. I don't believe in that because if you're not client-centric, the business will fail. This is something we will witness in the future. We started with WhatsApp, but it will continue. Facebook faced the same issue whit the personal data of users that were used for no justifiable reason. And the market share of Facebook decreased over time, and we know that Facebook today, it's not as attractive as it was.

Guillaume: And we had another case study that we had maybe, you know, about this company because it's actually a South Korean company called Moneybrain. It is an AI company, and they have two main services called AI Studio and AI Speak Now, especially AI Studio, is very interesting for us. It's a program that sells especially to companies. They have a partnership with LG and MBN, a South Korean television, and it allows them to scan a human model, and then they can make this model say anything. But it doesn't just look like the robotic voice of Google. The model is acting like a real human-like it also learns how to move and how to express himself depending on the model it was trained on. And for example, they released a version of a South Korean presenter and yes, she was acting like the original. Like when we watched television, we couldn't make the difference. So, if we have a model that can totally replace the original and act and speak like the human one, how could we organize contracts that will take this new reality into account? And where is finally the frontier between IP and the image rights in this specific sector?

Badr Boussabat: Yes, I'm aware of that, actually. I just remember that this image video with the journalists being replaced by its own AI replication. It's a very interesting question, actually, Japan has already started this trend a few years ago with Hiroshi, a very big player in artificial intelligence. He created AI replication and he created a journalist AI-based. If you have an artificial intelligence in a sector, we need an artificial intelligence to first identify if we have a really human being in front of us. This is very important. This is the first thing if we don't have a counter AI Company that can work to identify if we are dealing with artificial intelligence or not, we will face some issues and it will be a very tough time. That's why here, first of all, we have a counter artificial intelligence. In the second time, I mean, I disagree with the fact that if there is something new, we should, set up a regulation to meet each new trend. It's an opportunity to do something else more profitable. This is the higher-level trend of history. I don't know why people still think about how we must maintain the same way of doing business,

the same way of being profitable as a company. I mean, for example, Amazon is a very great example of that. I mean, Amazon was not profitable for years. And after achieving their goals in terms of target settings, now it's one of the most profitable company and it takes advantage of the fact that its business model is subversive. You are in a certain or a specific environment. You have some rules. You have to play with those rules to be profitable. It's also a good new that means that the creativity of people, of human being, will be more important, that means that you will have to be more and more informed and smart in the market to be profitable. So, in terms of image rights or whatever, it's not a big issue in my point of view, as long as we can identify if the human which is talking to us is artificial intelligence or not.

Guillaume: So, you think we could organize some new contracts, like, for example, between the model who was scanned and the AI that was presenting to us like there is ways for us to organize the markets as an opportunity, not as a threat?

Badr Boussabat: Sure. And you point out a very important aspect. This new era should involve lawyers as much as possible, because actually if we see the evolution of AI trend and the evolution of law, we saw such a disconnected rhythm. And actually, the evolution of the rhythm of artificial intelligence is way higher than the evolution of the law rhythm. And actually, this gap will create some issues in the near future. That's why, especially in education, we have to push students and lawyers to have more interest in artificial intelligence in order to regulate it in a more efficient way. And this gap has to be it filled. This is very important.

Guillaume: OK. We also had, like a more general question regarding companies that create AI-based assets. I'm sure you already had a lot of question about this, like should we when like, for example, an AI is producing music, should be guaranty a copyright for the company to be sure that we support development the algorithm or should we give it to the user or even do you think it would be interesting to create a legal personality for the AI?

Badr Boussabat: Yeah, a legal person, I don't believe it yet. Actually, we have to share responsibility among the players. This is, of course, something that a lawyer should work on, but having a legal personality for artificial intelligence, I don't believe it because it means that it will give incentives to the scientists to be less careful on what they provide in terms of data. And as I said earlier, quality data is one of the most important challenge in the near future in artificial intelligence. And if we don't give pressure, let's say the time pressure to the data scientists in terms of robustness, we would have like bad development of the AI. And this is a very important question. There are many papers on it and it's very difficult to have a well-

defined opinion on that because, I mean, it's raised so many questions and, it's more difficult for me to give you a specific opinion or a specific analysis on that.

Guillaume: OK, we also had, like Manuel especially was working about this the last week. Can we consider in general that a human creation, like there, was this very famous painting that was just sold for one hundred thousand dollars? That was made by an AI, maybe a few months ago. Can we consider a human creation as more valuable than one made by artificial intelligence? This is a very open question.

Badr Boussabat: This is a very interesting question, but again, in the question, we will see something very interesting and it's also an automatic reaction. I don't understand why we should always oppose values. I mean, we have already creativity, human creativity, and it has value. And I don't think this value will decrease over time. I mean, a creativity of humans will still be important, very important. But creating a new way of doing music or doing paintings, it just opens the new door of creativity, a new way of doing arts. It will give opportunities. Some, for example, data scientists who are not very good at manipulating traditional tools of the painting to create their own art. And this is such a great used in my point of view because it will democratize the field. Not only people that are highly skilled in painting will share their feeling. Her we can, we will have the other people who will offer us a new dimension of arts by using AI as they do with this portrait of Edmond de Belamy. This is, I mean, a new way of doing art. And my point of view is just higher democratization rates of art. I'm standing for opening doors as long as we don't close to the previous ones. And that's kind of openness won't prevent traditional artists to perform.

Manuel: Still related with music and further with Spotify, as already said, they're developing their own solution of AI and they will maybe be able to generate unlimited music. There is maybe a threat for the market to see those companies generating unlimited base of content to limit the creativity of other people. We can extend this threat to other markets. We know that now artificial intelligence is able to generate text also. And we may see artificial intelligence used to generate patterns by generating a huge quantity of text and then preventing others to aboard the same thing.

Badr Boussabat: Yeah. But there's just one thing that I didn't get. You say that they use the platform to compete and to be dominant towards some specific players. This is what you say.

Manuel: Not for the moment, but here we are projecting in the future when they will be able to generate huge quantity of music assisted by artificial intelligence, and so maybe there is a

threat for artists. So that's imagining one day an artist create a music and then Spotify come in and say, listen, we have already that single that is close note by note to your music. And it was created by artificial intelligence. But is it still protected?

Badr Boussabat: Yes, this is a good question. But actually, I think in the near future, I think that, as I said earlier, listeners will need a new experience, a human experience like concert, etc. If you only release music by using data of the artists or users without including any human being in the project, it won't be as successful as we can expect because you can, of course, create music out of nothing or let's say out of data. But if we don't offer the opportunity to listeners to attend concerts with the real figure and real character, it won't work. We know today that the most important for the profitable aspect for an artist is the performance during festivals, during concerts, and less on Spotify or YouTube or whatever, but even though those platforms create music by using data of listeners and artists there is still a huge part missing. It means that artists can still perform and can still compete with that kind of platform. Because experience cannot be replaceable by data. We know that the trend is quite obvious in the near future, people need more and more experience, and we are all living in these difficult times and we know that sharing an experience for example in a festival is quite important. So, I think it's, of course, a very smart strategy from Spotify, for example. But if they don't have any character behind, or character they can of course promote, I don't think it will work. And you can already see this on YouTube, for example, some artists are reaching 3 billion of views and you are sometimes listening to this artist because it is this artist. On YouTube, you have many AI-based track lists and of course, it's quite interesting but you cannot feel this authenticity.

d) AI Together:

Guillaume: Actually, if we are finished with the market threats, we can maybe move to AI Together. So actually, we were very interested seeing on LinkedIn your new NGO AI Together. And we were wondering if you could tell us more about the motivation of this project. And especially more than government, public, and companies, do you plan to be a real consulting organism for companies?

Badr Boussabat: Yes. Actually, the foundation of is motivated by the fact that inclusion is a very important concern, in my opinion, I'm very obsessed by inclusion. To me, it's one of the most important things. AI is an important concept in our life to guarantee anyone to be part of our society, this is very important, and we know that artificial intelligence will create many opportunities, but also offer, let's say, some threats, then that's why we have to guarantee anyone

to be included in society. And actually, my intention is about gathering leaders from all companies all over the world, it could be leaders from big firms, but also very smart entrepreneurs that work on their own. And actually, by mixing and combining their knowledge, the approach of artificial intelligence in many projects, the goal is about creating such, let's say, best practices database to inspire other people or also to inspire governments in terms on how artificial intelligence is evolving the market nowadays because governments are aware of artificial intelligence, but they don't know how it evolves over time, every day. And by combining the different experiences from AI leaders, we can, of course, identify trends that can help us to rethink our system in terms of inclusion. And the most important aspect of this organization is about inclusion. And this is very interesting because those leaders are actually very concerned on inclusion, we may think that just because they work in very big firms, they don't care about truth-worthy AI, but actually, they do. And that means that we have something to do with this. And if we can help at the international level, governments or private companies to understand what the main concerns and artificial intelligence are, we can rethink the future.

Guillaume: And do you really have some concrete project of supporting some regulation or doing some specific guidelines for companies?

Badr Boussabat: Yes, I mean, more or less, we started to work on the specific brochure on AI in education or for education, and yes, we have so much to say on this field. And yes, there are some first recommendations we brought on this topic. And actually, so first of all, in education, the most important thing we have to put in place is to have a multi-dimensional approach in terms of teaching. Let me tell you what we did. The first of all, we have to put in place an artificial intelligence for each student at school in order to help the teacher to assist and support any students. For example, you have a Squirrel which is an artificial intelligence that has been created in China that has already highlighted very good results. This artificial intelligence is such a follow-up for any students. It gives them an automatic feedback after each exercise. That means that any student who will be shy to ask some questions, he will have its own actually results in its own recommendation to push him forward. And of course, the teacher has a transparent overview on the results. That means that the teacher can directly adapt his or her lessons based on what he or what she sees on the platform. That means that education has to be provided by a very powerful hardware. We know you are at UCLouvain. I've been there. The hardware is not very developed to create condition to integrate artificial intelligence. We need very developed hardware in order to create algorithms, to help teachers, to support students. And in general, the performance goes up. We've seen that in China, for example, with our

Squirrel, the performance went from 50 percent, for example, to 61 percent. So, 10 percent is very high results.

Guillaume: And actually, regarding the process of like, for example, this portion of education, those like ideas they come up by concerting with all the other AI leaders that you gather in your company or by doing some sessions where you gather that information or by talking to some experts, like how is the process to come up with those ideas of using the AI.

Badr Boussabat: Yes, sure. First of all, it was a personal and professional research because I gave like many conferences on AI, in education to universities and to high schools. So, actually, it was first of all about making research on that. Asking some experts in the field in terms of gathering our knowledge and suddenly, sure, it has some experts, including Vivienne Ming, which is a very well-known expert on education, and actually, she creates several tools on that. So, we have a more specific and more precise view on what artificial intelligence can do. And from this, we raised some recommendations we are still working on. Of course, it's not a done job, so that's why we are still working on it. And it will take some time, to be honest with you, because it requests time and dedication. And one of the recommendations, of course, comes from those experts.

Guillaume: And all of advice that you share on your website, they aim to be free and openly available for companies or public in general?

Badr Boussabat: Yes. Especially education, because to me it's the most important thing. An education should be profitable to anyone. So, our goal is to make it public and we don't want to make people pay for this. No, I am totally against it, actually.

Guillaume: Also, for companies, when you will develop some system to integrate AI in their business, the goal is sure to make this openly available?

Badr Boussabat: Sure. Actually, we will share also best practices. So, of course, I strongly recommend anyone, any firm to those practices. They will be out and available specifically for this target.

Guillaume: We saw that one of the goals on the website is sharing advice or in more general, you plan to focus on the opportunities for AI or you also plan to raise awareness of some treats and which form they will take this advice. Would it be like conferences that you organize or just openly giving the documentations, for example?

Badr Boussabat: Both. It will be conferences as well as releasing brochures. Actually, brochures we are still working on the structure because of course, we have to comply with the expectation of each leader. This, as you may know, working with someone who works in Spotify or working with someone who works in China is totally different. You have to adapt your work and to gather people around the targets. It is very important think it is a challenge, but it's also very interesting. So, it will be conferences, brochures. And we are going to try as well to create some events between officials and private companies in terms of raising, let's say, the main challenge for the future. My goal is not about talking about threats, to be honest with you, because it's the most dominant, let's say, trend in AI people more aboard stresses than benefits. And to me, the benefits are much higher than the threats. And it is important sometimes for our spirit to focus on the positive side of technology and to use it for a better place. And this is also something we are living through in Europe, meaning that we are focusing on threats, on bad sides of the new technology, of A.I. And actually, we are underestimating the benefits of AI in terms of market value, in terms of inclusion, in terms of entrepreneurship, etcetera. And it is first of all about the attitude. The attitude is much more important. It's about talking about positive things, positive sides, in order to motivate people and to encourage to develop AI for better use.

Guillaume: And do you plan to also finance some initiatives that will be friendly or in the goal of AI Together?

Badr Boussabat: Sure, we can sponsor anything related to AI as long as it's profitable for the marketplace. As you may know, we can't make money and be profitable. The money we have, we have to use it for this project. Our goal is of course to dedicate our time for it and to support initiatives. We are standing for a more efficient ecosystem, and if initiative can support the other one, I think it's it would be a great deal for the entire system.

Guillaume: You do not really have some plans or financial initiatives?

Badr Boussabat: Not yet. No, not yet. You know, we're not in this step yet.

Guillaume: Regarding AI do you think that this would allow a lot of companies to have a competitive advantage, like in all sectors? Or you think that some sectors would be much more profitable than others?

Badr Boussabat: I think that AI is one of the technologies that will have systemic impact. That means that the effect will be in the entire market, like electricity. That kind of technology is not

just a common technology that will impact two or three or four sectors. It will impact the entire system. So the market value or the market share will be very important for AI companies and companies that will refuse to use it will be exposed from the market, in my point of view, because if you don't use AI, you won't be able to automate tasks, you won't be able to suggest new things for clients, you won't have enough information in order to structure your decision-making policies. So, there's so many opportunities around AI and the company that will refuse will have some issues in terms of maintaining its position in the marketplace. Specifically, for example, in risk management, artificial intelligence is very important for risk management in terms of predicting liquidity, in terms of assessing credit situation. It's also about compliance policies, especially for the financial sector.

Guillaume: OK, thank you very much for those answers. Before we stop this interview first, we wanted to thank you again for all this time, especially in this very busy moment.

Badr Boussabat: Thank you so much also. And good evening. Thank you both.

Manuel: Thank you really much for your time dedicated, bye.

Appendix 4: Transcript of interview number three: Adrien Lemoine & Alexandre Thissen

This interview took place on Teams on the 19th April 2021.

a) Presentation of the academic and professional background:

Guillaume: Hello and thank you so much for this interview. Manuel and myself are students in Master in business engineering at the LSM. This interview is part of our thesis " AI-based production of content: obstacles, threats, and opportunities". In order to carry out qualitive study in this subject we conduct various interviews from AI and digital fields. We already had the opportunity to talk with Adrien earlier and are happy to meet you mr Alexandre Thissen. We can start with a brief introduction of your academic and professional background.

Alexandre Thissen: I've been a student as well in Louvain-la-Neuve. I did electronic-mechanic engineering. My first job was in AGC as well. I have been spending the first 2 years in R&D center. Then I left for Vancouver, Canada for 5 years. And now, I am back again to AGC as well as in the R&D center. But my job has changed a bit compared to the first time. I am trying to make life easier for my colleagues at R&D center. Nowadays we have a lot of technologies but are still working in the same way than 10 or maybe 15 years ago. As we are working in R&D environment, what we do is to generate data on a daily basis. It's hard to get those data structured in the way that we can use them afterwards for AI, machine-learning, etc. All of these require data on the first place. And that is exactly why I am working on the foundation to enable AGC to use those technologies to work efficiently.

b) AI Technologies in AGC Glass

Guillaume: Regarding the AGC company, do you use Artificial Intelligence? If yes, in what forms? You do not have to be precise obviously if there is information you can not disclose.

Alexandre Thissen: That is a very good question. AGC is a very big company worldwide. Regarding R&D center, we have one in the US, one in Europe, and a few ones in Japan and China. Basically, in Europe, our activities are mainly either for architectural business (glasses and buildings) and we have the automative business (glasses inside and outside vehicles). And I know that in Europe, I don't think that they use AI. But outside of R&D center (in the headquarter) they use AI in some ways. But I don't exactly know how they use it and why.

Adrien Lemoine: They use it for the process. They use AI to increase the capacity of the float. Because they have to learn the quality issues occurring in the floats or in the lines. By using the AI, they are able to minimize the trash-outs. And I also know that in automotive, they are trying to add some elements to use the AI in the future. But AGC is not trying to become an AI-company but for the moment it is not a case. But, Alexandre, in the digital transformation, do you have any projects using AI today?

Alexandre Thissen: Not now. Because, as I already said, the first goal is to structure the data. And that's really the key foundation. I know that in the past, some top managers wanted to use AI for some projects and they spend some money (I don't know how much) for external companies to help them develop AI. But the main conclusion was that we do not have enough structured data in order to have good insights and in order to do those projects in a smart way. It was a very expensive learning. It think it was needed to change the mindset of top managers in order to focus more on the data itself. And what we need to do right now in order to be able to use AI in 2-3 years.

Adrien: So, the first thing for you is to have structured data available?

Alexandre Thissen: Yes as I can see it here. I have done different jobs in different industries and the overview is similar. It is not common to have a company right now (at least old companies like AGC) having people working in the company with a same data mindset. That means that we work with very old technologies, like Excel. There are a lot and a lot of Excel files. And as you know, the information inside the Excel files is not usable directly for AI-based algorithm or machine-learning concepts and so on. Because it needs to be cleansed, it needs to be organized and structured. And we need a lot of it. And when you have a lot of data in Excel file, it's buggy and is not work anymore. Right now in our company we have different programs. I am working part in the digital-transformation program. It is not only in the technological aspect, we also have a change management. The change management is a key part. Let's say you have the best software ever to help you in the job. If you are not using it, the output of it is non-existent. Even if we bring the right tools to right people and they are not using it, then it's just useless.

Let's imagine for example that we have a team that has digital issues or problems to record or save specific data. We are developing solutions for them (that's a technical part). And after, we have a team to ensure they are using the solutions (to ask if they're facing difficulties, if the

solutions are new, is it new but can you accommodate, if they need some changes). Because, if they do not do a close follow-up (esp. right after the proposal), the first difficulty that we can encounter is they go back to Excel or paper-based solution. Because it is easier, more comfortable and they know it. They like doing what they already know.

Thus, our company has a change management and people that are there to help us on non-technical aspects of AI. We have been interviewing a lot of other companies to know what they are doing for us to convince our top management. And for what I read and witnessed from other companies is what is working and not working for them or for us, what is their strategy. The change management is a key part. The digital management is not solely about the technical aspect, but also about the mindset in the change management as well.

Guillaume: So, the necessity to structure the data is because using the AI is one of your goals in the future among others. Could you please give any examples on how you are planning to use AI in a few years when the data will be structured?

Alexandre Thissen: Before the AI. We have a need to have a structured data, a good database, and a good access to data. Before the AI, it would be very useful. First example, when someone in the company is leaving and a new one is coming. That person will know what has been done in the past and where he can start to search for a new glass composition for example or specific chemical composition etc. Having all data structured in the same place we can also avoid duplicates of old experiments we are doing. Because some of the experiments are super expensive and we have people working in different ways. It can be database or Excel. If they are not talking together, they don't know what their colleague is doing. For this part, we can have significant gains to have the data structured before even talking to the AI. Clearly after, the goal is to be able to cross the data from one department to the other.

In AGC in the R&D center, we have 3 main departments. Each department is focused on one field related to glass for example. So you have a glass composition department. And the main objective of that department is to develop new glass composition from a chemical point of view. On another side, you have a surface department. And this department is working to create new chemical layer to put on top of the glass to change the color, the appearance, or solar effect on the glass when put on the buildings etc. Right now, those departments are not talking that much together. Tomorrow, you can imagine that a new layer will have more better effect when put on some specific glass composition. You can have all the good effects without having any bad

ones. But right now what we do is to try different glass compositions on different surfaces to reach the goal. But we do not have the whole picture. That is why we are trying to use AI or other deep statistics in the future to be able to cross the data from different departments of the R&D center. Even though we don't know if there are links between them, we try to cluster the data, to clean the data, and to find links in which people before couldn't find any correlations.

Guillaume: One of the applications we talked with Adrien last time when we talked about the plans and new materials thanks to the crossing the data. One of the advantages for the AGC in using the AI is that it would be useful to optimize the different materials based on the materials you have from different departments.

Alexandre Thissen: That's a good point.

Manuel: Regarding the data, I have a question for both of you. You talked about the importance of structuring the internal data. But when talking about external data, what is your point of view? Will you pay attention if you use external data for future applications of the AI if this data will be protected? Maybe there is a special exception because it will be used in research purposes.

Adrien Lemoine: In my point of view, first and foremost it depends on how you can access those data. Because a lot of data can be used freely on the Internet. For example, we paid for some programs and software to get access to data. And we could retrieve some data from this software. An example for the external data is that most of the patent information in the world we have access is available for free on the Internet. But we also pay for software to be able to search on the database. But of course we can use freely this database to do something. I do not know what but it is not an issue. And the confidentiality will depend on how you can retrieve this information from these datasets. There are a lot of companies on the Internet that are selling datasets. By buying them you can get access to data and do what you want because you buy it (most of the time). So for me the question is very large. But of course, we need the data from the outside to be able to cross. For example, if we take the example of Alexandre, we can get the data for AGC to make a glass but we also can buy it from other companies engineering glasses. Then we can get the composition and make inverse engineering. We can use this data to make our database more powerful. And they are not confidential because we can buy the glass or the composition, or even get the data from the website of a competitor.

Guillaume: As you are not using AI right now, you have to project your company in a few years. Do you face limitations or obstacles in your job due to the current legislation regarding the data gathering or the project regarding the AI? Or at the opposite do you feel like there is a lot of absence of legislation and you are acting in an uncertain context?

Adrien Lemoine: It depends on the data itself because the protection of the data. If it is a personal data, linked to a person, you can not do what you want because it is a person. If we come back to the composition of a glass we do not have any limitation to use that. It depends really on the data and data sets we want to use. And today one example of AI used in data in AGC is the float lines which use the data from the float. There is no restriction to use such data. It is internal in the AGC of course, we cannot sell the data because they are typically linked to the float. Inside the AGC such kind of data has any kind of issue.

Guillaume: So you don't have a review of legislation when using the AI? You feel like because it is internal data, you don't have to pay a lot of attention to the data?

Adrien Lemoine: No it is because it is an internal data and also technical data only.

Guillaume: Okay.

Adrien Lemoine: But of course if AGC wants to know if someone is more powerful than another one, they then might have issues. And the legal department is well aware about that.

Alexandre Thissen: You mean the data about the employees, Adrien?

Adrien Lemoine: For example.

Alexandre Thissen: Okay, understand.

Adrien Lemoine: If you speak only about technical Alexandre, if we talk about only the composition. For example the temperature of the float. When I say technical, I mean the data that are not linked to anyone and are free to use for the legislation. And AGC is well aware of that.

Guillaume: I have another example related to AGC that may require new legislations, when companies are using AI to generate the limited number of assets. But again, we have to project ourselves in the future. For example AGC will be able to produce new materials thanks to AI

and those materials will be optimized in such a way that AGC could generate 100,000 different materials and then protecting them by copyright.

Adrien Lemoine: Okay, that's the second question. Using the data is not an issue because it's technical. Creating new materials on new data could be an issue. And we already discussed about that. Because for the moment, the legislation is quite clear and that is the issue. To have a protection, you need to be a physical person or legal entity. For the moment, the AI has no legal entity, thus it's difficult for AI to be protected. The AI itself and the result of the AI.

But from a patent point of view, can manage that quite easily. For example, Alexandre is the inventor, then he is a physical person and you can protect the new results. The problem happens only if you name the AI entity as the author. But the legislation is quite clear. You have to be physical or legal entity.

c) Personal Experience in private company regarding market threats

Guillaume: Do you have inside AGC any internal processes to assess the threats or opportunities regarding the digital economy and AI regarding the core market of AGC?

Adrien Lemoine: For the business point of it, I do not know. You mean creating new business possibilities using the AI?

Guillaume: New business possibilities or treats for AGC. I wonder if there are internal processes to assess them on a regular basis.

Alexandre Thissen: You mean some internal tools that we could have in order to analyze the business of competitors?

Guillaume: Yes, business competitors and also some internal tools to assess how AGC is working internally regarding the AI tools you're talking about.

Adrien Lemoine: We are using AI-based programs to analyze patent application from competitors and we pay a software for that. When it comes to business point of view, I know that the legal department is trying to do bots to reply some basic questions. I am not in direct contact with the business part. I am thinking about the price. I am sur that AGC is not using AI to give the correct price compared to the competition for example.

Alexandre Thissen: But also the price of a glass is very complicated. It depends on demand.

Adrien Lemoine: For some cost or business evaluation, I am pretty sure that AGC is not using such AI system.

Alexandre Thissen: I would say the same.

Guillaume: Do you think AI could be a threat in the future for AGC?

Adrien Lemoine: It could be. Because you have to define a correct price, if a competitor has an AI which can define the correct price…

Alexandre Thissen: But what kind of data you can use to assess what the competition is doing, the price or the patent?

Adrien Lemoine: Yes but the price is private. If Saint-Gobain Is furnishing 2 tons of glass to a customer, you know that you are losing a market but you do not know the price. Pricing is totally secret.

Alexandre Thissen: that's true.

Adrien Lemoine: I mean the trading is a secret by its definition.

Guillaume: Regarding the AI developments, when it comes to new materials developed by the AI, you do not see it as a treat for the future? You do not feel threatened by a competitor who could develop this technology?

Adrien Lemoine: We need to be the first for sure. If AGC is capable of doing it, the other will be able to do so as well. And then only the first one with the structured data, the correct dataset and a correct algorithm will have an advantage.

Manuel: Still projecting in the future, Sain-Gobain is developing a technology of a perfect material and can create a lot of different assets and overflow by patents our capabilities and prevents AGC from creating the same assets. Could it be seen as unfair competition and threat for AGC ?

Adrien Lemoine: For me, it's not unfair. Let imagine that AGC wants to began the first with this perfect material. Then it hires 200 engineers and then they develop it without AI. Is it

unfair? No.. It is the way of using the money of the company. If to protect it by patents, you could say it's unfair. That's the main principle of the patent- to give you protection compare to the others.

Manuel: Let's imagine the output of their AI algorithm is a million of composition of materials to prevent you from developing those.

Adrien Lemoine: If Saint-Gobain is using AI to patent a million of composition to block AGC. First of all a patent is quite expensive. Secondly there are exceptions regarding patent, you can still use what is protected by a patent for research purpose. So AGC will still be able to develop products. Thirdly, we can pay licenses if we want to produce or sell this new composition. Then for m it is not unfair but the goal of IP. For example Peugeot-Citroen is one of the best patent writer. Every year, they write thousands of patents only to place everything everywhere to block competition to go on the market and after that competition are paying licenses and PSA ears money for that. If we go back to the question of Saint-Gobain they could try but filing patent is expensive. Then they will receive licenses, but they need to have only friends licenses. It basically means that it is a fair, reasonable license agreement. For glass composition it is max 4% of the price. It is quite a big amount of money in comparison to patent but not so much at the end. So it is not unfair but you need to be the first to license.

Manuel: For you there is no need from regulators to prevent this attitude?

Adrien Lemoine: No and I do not know how regulators could do it. If they try to block it, they will block the research in certain ways.

Guillaume: More broadly, we consider the dangers that filing thousands of patents or a competitor having this perfect product. But you Alexandre, as AGC digital leader, do you see any other threats in the future for AGC from AI technology?

Alexandre Thissen: The thing is that the core business of the company itself is really based on old process technique. It is an old type of economy. I am wondering if AI could be a threat or poorutnities in the new kind of business that we are trying to launch. I do not know because I do not have a full overview of what AI can do in those projects. There are two topics I can think about. We have two projects: the first one is about designing antennas for cars. I do not know if you know but we can build antennas which can be part of the glass now. In order to design those antennas, there are high competition between glass producers to put as much antennas in

the smallest area possible without blocking the vision on the windshield. I consider that his field could be a threat if a company is doing it and it works better for them than for us.

We also have one start up from AGC which is not directly related to glass industry. For example when you are exploring a construction site to build a house or building, the start up is trying to create a technology where on your tablet or glasses you can see all electric wires, water pipes and concrete walls. This to be sure and avoid construction mistakes which cost a huhe amount of money because they cause delay. I know that they want to use AI to decrease the delay and accelerate the construction.

Other than that I do not have any idea. Because the origin of all the data we want to use are the one we are creating ourselves and those with the highest values for us.

Guillaume: When we do this brainstorming, when we see the kind of application you have of AI inside AGC, it is a very specified subject. Do you think that AGC should implement an internal process of reflection on AI on a regular basis? Or you feel like it is not a need right now.

Alexandre Thissen: You should interview our director after that. First I would say that we need to educate people to AI. It is not easy to explain it and understand it for everyone. Like for some of us, it is easy to understand that to do AI you need data. And we want to do AI because we have a goal or we want to explore. But anyway we have an action plan and know what we need to get there. When talking about AI, a lot of people do not really know it implies, what it stakes and what it is. AI is basically just mathematics and statistics. Linear regression is already AI because you are predicting something on a very simple model. Behind the word AI, you can have a lot of good and bad things and the meaning behind is different form one person to another one. Educating people and talking the same language is key before having the discussion about “Do we need to do more regarding AI” or “Do we think we are doing enough regarding AI”. And I like those questions because it is also recurrent from our managers: Do we do enough? Can we do more? What do we need to do more? People ? Data? Ideas… I do not have answer.

Adrien Lemoine: I also like the question and the answer of Alexandre. Of course education is key and structured data is also key. Then having that and educated people we can have a vision and based on this vision we can put in place a strategy to bring more value from the data itself.

Of course we can do more but we need to know what we want to do and whith what kind of data. People need to understand what AI can bring to them.

Alexandre Thissen: One threat or difficulty that managers or top managers are facing is that when deciding to do something which AI related or to mathematics, the results are not direct, not for tomorrow. Because we have data scientists in house, we know it but 90 % of their job is to clean and structure data in order to do what they are paying for in the last 10% of their job. There is a delay when you say, we want to invest in AI but we know that before 2 or 3 years we will not have good results. We do not need to wait for results absolutely because we need time to collect data, structure data, educate people, find models and sponsors even inside the company.

Adrien Lemoine: And the training of the algorithm also.

Alexandre Thissen: Yes and when it works it works well but many steps before in order to have a successful story. It is really true.

Adrien Lemoine: You can not imagine the quantity of data AGC has.. but those data are in excel files, in books and not in a structured way. If we are able to structure all the internal data of AGC, I am pretty sure that we can bring brilliant values for the future of AGC. But the most important first task is to retrieve this data, to clean. Then based on where we want to go, we need to select the appropriate algorithm and train.

Alexandre Thissen: Sorry guys but I will have to leave you.

Guillaume: Thank you very much it was really interesting for us to see how a private company react with the development of AI. Actually, Mr Lemoine, we had some more questions but they are more related to the IP field.

As AGC is not really dealing with analyzing threats and opportunities, I am not sure how we could answer the question but are wondering if AGC would have advices for company who will start in the field of AI and is willing to analyze the ecosystem.

Adrien Lemoine: From scratch you mean ?

Guillaume: Yes.

Adrien Lemoine: As I said before, the threats or opportunities is to have the data. And data you have plenty in house for old companies, but they need to structure them or buying data. But when you buy data you do not know what is inside. For example, if you take data from Facebook. People are not saying the reality on Facebook but saying what they want people to see. If you are buying data from Facebook, you are buying data which are not the correct feeling of people. You not that there is a bias and you pay for it. If you are buying data from google, on what and when you are using your phone, those are real data. For example, I see that it is raining and I am wondering how to keep the water, it is a good question that I do not put on facebook but search on google. The value of those data and how you can use those data knowing that potentially you have a bias.

Guillaume: Another question, we had your answer regarding the unlimited generation of composition from Saint-Gobin. But if we go back to the question of Spotify creating unlimited music that we proposed last time, is your answer different from the Saint-Gobin case? To remember, they would generate unlimited music and protect each song by a copyright to prevent artists from creating this content. Do you think it would be a threat for the market? Is your answer different?

Adrien Lemoine: Yes totally. The difference between a publication and a patent is that some AI are trying to destroy the patent world by creating fake texts by bringing words together. By doing so they build sentences, then texts and if the paragraph is published, you can not patent something that is not new. That is why the question earlier, I tackled it directly. But if you think on AI creating a new composition of materials, then the company can publish or keep secret. However, if AI is creating new stuffs that are publishing directly then it is a real threat because this automatic generation blocks the protection of a real person. When it is not new you can not have a copyright so it would block it.

Manuel: To go a bit further, we talked about threats for your company but if now you place yourself in the position in which you develop an AI and is able to generate opportunities for the companies. Can you imagine a threat that you would pose to the market, maybe in term of competition? A threat that would require a reaction of the regulator regarding your activities.

Adrien Lemoine: I think one of the problem is that regulators can not make a difference between an AI creation and a real creation? That connects with my answer earlier. If you can put a real name, you can have patent while if you put the name of an AI you can not have a

patent. The difference is only: who is the creator of the system? It is difficult for me to see how regulator can see if it is AI-generated or AI-generated but labelled by a human. Maybe it is threat for regulators as it would be difficult for them to regulate.

Guillaume: Something that may help in this discussion is that in the USA they found an alternative for the attribution of authorsip for AI. They may consider AI outputs such as "Works made for hire". For example, in the US law, they protect the work made by an employee in the context f his job. They get automatically the ownership. They could consider that the ownership is automatically transferred to the company for AI output.

Adrien Lemoine: Yes but the basic of this regulation is that there is a link between company and the worker. The worker has a contract and in the contract it is written that everything creating during the hours of job in the mission given by the company is owned by the company; but AI is not a worker as to be a worker you need to be a physical person. However, AI does not have legal personality.

Guillaume: Actually, I think they were trying to contour the issue.

Adrien Lemoine: Yes they try. There is a famous case in the US of Dabus which wrote the inventor as AI which will be settled at supreme court. But all the previous court settled that they could not consider AI as author.

Guillaume: Actually, I also forgot to give an important part of the statement in the US law. What they also consider as work made for hire is a work made in a collective work such as diagram, picture…

Adrien Lemoine: It is also the same story. In fact in case of collaboration, you always find inside the collaboration physical people and that is a way that Airbus tried to do it. I think they won. AI do not know if you remember but Airbus used a specific panel in the specific design to reduce the weight by reinforcing the mechanical strength. And this is only based on AI. In fact Airbus said that it was a collaborative work made by human and AI but at the beginning in the patent they put the nae of the human and AI. Few moment after they withdraw the name of the AI saying that these people collaboratively with the AI developed the solution. But if you have only AI, even if it is more than one AI collaboratively working to find the solution you still have the same problem : you do not have nay physical people. But if you put real workers

as inventors or creators in a large way and AI, that could be a way to protect it. But you need always at least a human or physical company.

Guillaume: I will try to find the case. Do you remember if it was in the US or in Europe the Airbus case. In our research we saw that this collaborative work is only applicable in the US, not in Europe.

Adrien Lemoine: In EU regulation it is clear you need a physical inventor. In the US, they changed the law under Obama to first inventor. They defined inventor as physical person. Before Obama, to file a patent application it was only the inventor and not the company who was the owner of the patent. Then the company needed to buy it or shew a specific contract with the owner. During the Obama administration, they modified it to become the first to file and then became the company based as in Europe but always with the inventor. So maybe they found something else but I am trying to find the case.

Appendix 5: Transcript of interview number four: Migle Laukyte

This interview took place on Teams on the 12th of May 2021.

a) Presentation and position:

Guillaume: Thank you so much for joining us, especially in those times for our thesis. It's really interesting for us to have this exchange.

Migle Laukyte: You're welcome.

Guillaume: Thank you. So maybe first we can begin with a brief presentation of your academic and professional backgrounds.

Migle Laukyte: OK, so I'm a tenured professor in the law faculty of Pompeu Fabra University in Barcelona, so my tenure track is in cyber law and cyber rights, but I have been working on legal questions related to the artificial intelligence for quite a while already and basically my interests in artificial intelligence lie in the very idea of the artificial intelligence in the legal transformation of law, that it brings into being and to a variety of aspects that, well, generally speaking, artificial intelligence make us reconsider. And of course, again, when we speak about the artificial intelligence, we have to bear in mind the variety of meanings that we attribute this term with. So basically, my interests range from philosophy of law to more practical questions like legal, ethics and how we could use the smart technologies to improve, to make more accessible and more inclusive the legal domain for citizens and for people, especially those who cannot afford legal assistance.

Manuel: OK, thank you very much.

Migle Laukyte: If you need my CV, I can just send you.

b) Legislative interrogations :

Guillaume: No thanks, really, it is just for us to introduce the person we are talking to. So, thanks to our analysis, we have specific questions, legislative questions that we analyzed because our goal is to write about the obstacles faced by companies in their development. One of the questions they have to address is the legal uncertainty regarding the AI right now, and especially the first one regards the data, the data set that is used by the algorithm. We've been analyzing some countries, for example, Japan released a Copyright Law of Japan a few years ago, in which they indicate that it is permissible to exploit a work in any way. So, without regard

to the IP rights, it is the case of development of a technology which is linked to recorded sounds or visual works. And we would like to ask you as a first questions, do you think that the interpretation of this law would be correct if we consider a company such as Spotify, for example, or Amper Music, which are companies who produce AI-based music, falling under this statement? And one other question would be if we interpret this law, does this mean that without any regard to IP rights, those companies would be allowed to use a data set of all singers and all music produced so far? Do you think it would be a good interpretation of this law?

Migle Laukyte: Well, there I have a comment regarding the copyright of databases, which in terms of artificial intelligence, takes the meaning of datasets. So, I think we have to make clear one thing with that, with the database, is that what copyright law protects in case of databases is not data, but the way this data is put together.

Guillaume: Yes, I see what you mean, like the protection of the database in itself, but here it's more specifically if you take individual works, such as a song, for example, make by an artist, which is technically protected by copyright in the specific case of using it along other music as a data set for an algorithm, in the European legislation and the UK British legislation, for example, so far those are still protected. So, you cannot use protected works to nourish an algorithm but into the Japanese laws that they wrote a few years ago, they implemented the idea that now it is totally allowed to use any protected works. So individual protective works and create a new dataset of those protected works, to nourish an algorithm.

Migle Laukyte: OK, so you are basically wondering whether in Europe it is not allowed, whereas in Japan it is.

Guillaume: In Japan yeah it is just allowed. And our question is like the statement in the copyright law of Japan is that it is permissible to exploit a work in any way in the case of development of a technology which is linked to recorded sounds or visual works. So, if you take the musical industry, for example, do you think that a good interpretation of this statement would be that therefore, without any regard to the copyright law, those industry would be able to use individual protected copyright elements and nourish their AI algorithms then?

Migle Laukyte: Well, I think it would very much depend on whether they would use, for example, songs as such or whether, for example, they could cut them into chunks. You know, you have the copyright guarantees, the integrity of the work. So, it very much depends on whether I think so. I don't know, I'm not aware of the Japanese law in this regard. But I also know that copyright law protects the integrity of work, and it leaves for the copyright owner or

for the author also through the moral right to decide on the destiny of the use of his or her work. So, in this case of Japanese law, I don't really know what they mean with this possibility to use this so freely. And I think it very much depends on whether the data is used for research purposes or for commercial purposes.

Guillaume: Yes, but here, regarding the law, they were considering also the business point of view and the question is that they also had, as you said, another exception in the list. They say that companies would not have to care about the protection of the data in the specific case or their AI algorithm will not involve or alter the expression of the feelings underlying in the people's work. So, our question is more does it mean, and is it not dangerous to consider that as long as companies do not express the feelings underlying the work, which is quite vague also in itself, it would be not considered as an infringement of the copyrights. Companies such as Spotify and Amper Music like with Manuel we worked a bit about those companies, so it's musical industries and they had the ability either in development or in their business, like Amper Music, to develop AI-based music. So totally new music. And our question is, regarding the copyright law of Japan, this would not be an infringement, or would it be an infringement of the copyrights using this statement of the law to use individual works made by artists as an input for AI algorithms?

Migle Laukyte: Well, again, it's a kind of complicated question. Well, you generate new works on the basis of works already protected by the copyright?

Guillaume: Yes.

Migle Laukyte: I think that something similar has been done with the paintings. Right?

Guillaume: Yes

Migle Laukyte: I think it was called, I don't remember but it is a Canadian, I think, or French company, but I can imagine that there are more right now, that there is no problem. Well, to generate new again, what is new or original? What is original because we have always linked originality with human ability. Right? The whole idea of copyright is that we so to say we have developed it. To make sure that the human intellectual endeavors create creative endeavors which have been perfected, and in this case, the human creativity point of that side of the copyright idea and idea in general of intellectual property somehow parked on the side, we are moving away from it. And I think it is also very interesting, those applications that, ..., have

you seen, the one for music generation, that it's also Japanese, I think, where you put a melody like a short piece of melody and the system generates different variations. Of that melody.

Guillaume: Jukebox, but I don't think it is Japanese is kind of doing the same stuff. Maybe it's not this one.

Migle Laukyte: Well, I will look for that product for you, OK? And I can send more information. But there is the idea that you will feed the composer some short melody so that the system generates just two different versions of this melody. And then, well, the composer chooses the one that he likes more and then they work together, so to speak. So, in this case, we have kind of a middle ground between completely AI-generated work and human work. So, this make sure that I think it's also very interesting, from the copyright point of view, because we have kind of augmented creativity.

Guillaume: Yeah, but those are like more specific cases where the AI would be used as a tool. It's true that right now we do not have a specific case where the AI is the whole author by itself. But the question itself is really interesting. We also had the opportunity in our research to see as you say that there is actually an anthropocentric view in the legislation when it comes to the copyright and the originality, statement, which are complicated to apply to the specific case where the AI in itself, would be the only author. Regarding this, I had like one specific more question. It's more about the authorship this time. So, when we have an output made by an AI algorithm and we need to decide who holds the right of the algorithm, we analyze with Manuel the British legislation. As you probably know, it was one of the first legislation in the world who was considering the specific case of the AI algorithm and they added already, like more than 10 years ago, this specific statement in the legislation, which was the fact that the author of the computer-generated work will be a person by whom the arrangements necessary for the creation of the work are undertaken.

Guillaume: And with Manuel, we wanted to ask you regarding this specific statement, does it mean that the owner of the output would be the company or the customer, for example, using the AI-generated algorithm?

Migle Laukyte: Can you maybe write in the chat exact wording of this?

Guillaume: Sure, and I can even send you the legislation.

Migle Laukyte: Ok let me use the glasses. Well, "by whom the arrangements necessary for the creation of the work are undertaken. By whom the arrangements necessary. OK, so I see it as ...

Guillaume: There is the link if you prefer. Maybe it will be easier for you to judge based on the underling of the legislation.

Migle Laukyte: Yes, I think that.

Guillaume: It's the number three

Migle Laukyte: In the case of registered dramatic musical or artistic work, which is computer generated. They also shall be taken to be the person by whom the arrangements necessary for the creation of the work are undertaken. OK, so I think by default. It would be a company. But again, it's very much depends. Also, it might depend on the fact of on the way on the kind of contract that a company has with the user. Because let us take into account that many times certain programs are developed under the request of other company or other individual. So, I think in case someone like, specific, asks to develop for him or her or for a company, a program that could generate the works, I think one of the things that this kind of request will include is the agreement on how the authorship of the eventual works will be settled. And again, it's also very much depends on the later involvement of the company that developed the algorithm or the system in the life cycle of this program. So does it mean that, well, you just give it to the user, the package, so to say. And you say, well, it's yours, do whatever. So, it's all yours. And you can go from their making it, personalizing it, developing, making experiments, or you want me to continue to accompany you and we'll make the checks whether we'll collaborate with you in its improvements and developments.

Guillaume: OK, thank you. Thank you very much for this explanation. This question is more an opinion. We wanted to ask you when we analyze with Manuel the current legislation and which directions countries are going regarding the data and the input for AI algorithms, we saw, that there was a tendency for countries to believe that they should democratize and ease the access to data for company, also in the case of business and we wanted to ask your thoughts about this specifications, even if in the case of Europe, for example, they limit, access to data under certain conditions and the respect of the GDPR, for example.

Migle Laukyte: Well, I think, first of all, we have to bear in mind that GDPR in Europe, well, it's well, it's a kind of legal culture related to personal data it is strongest in Europe than in other regions of the world. So, when in the United States we have personal data that is usually in the hands of the businesses, and in China, the personal data is in the hands of the state, European

Union has chosen the path to put the personal data in the hands of the citizen. So, the citizen is in charge and takes the decisions and makes the final so to say decisions that concerns personal data. So, however, it is also true as concerns to data in general, not just personal data, I think we are moving more and more to the idea of the open data. What I seen, the idea of the open data was originated more in relation to the public administration. But I think right now, even the companies understand that data could be a way to contribute to everyone's so to say, well-being. So, it's very important, but how you use it, it's also very important. And the use you put it to, the algorithms you feed it to, of course, it is business, and it is not open, but data can be open and it's beneficial for everyone. To have it as open as possible. And not necessarily, well, keep it under protection and a lot of conditions.

c) Authorship:

Guillaume: OK, thank you and we had this opinion regarding the fact that maybe, you know, the professor Lionel Bently of the Faculty of Law at the University of Cambridge, we saw one of his opinions in another text regarding this fear that AI would disrupt the copyright content market with low cost and highly produced work and this fear of the legislature, we believe may induce some obstacles in the future for AI business. So, what are your thoughts regarding this specific case, and do you think that the current antitrust regulations are not sufficient?

Migle Laukyte: Well, if you think about the Uber case, I think it is the Uber case clash with taxi drivers, right. Where we have a price-setting algorithm. And it is really not very compatible with the antitrust idea because, well, they compete for the clients. It is just that the taxi drivers have to follow, they cannot price whatever they want, right, they have to price on the basis of the municipality rules. Whether it's the case of Uber, for example, in Spain, they price on the basis of how many people are asking for their service. Because the algorithm is calculating the price on the basis of the request of the cars. So, I think in this case, we're really talking about unfair competition. So, I cannot understand how it is fair, because basically at the end, the service is the same, we cannot somehow differentiate it as we could in case of Airbnb, or other sectors in gig economy. But in terms of antitrust, I think it's also very much relates to how you really use artificial intelligence here. I mean, algorithms. So, one thing is the algorithm as decision-maker of the business strategy, of the company strategy. Overall strategy of how to compete with others. And another thing is to use an algorithm as a tool for example, for presetting. So, kind of different dimensions, because in the second case, we use, for example, price-setting algorithms. So, however, final decision on the use of this algorithm is taken by the heads of the company. But if we so to say, substitute this head of the company with the

algorithm which elaborates the strategies of how to compete for the company, you elaborate ways to push out of the market, other players. Well do other practice unfair competition so to say activities or invent new ones, I think this is also something to be explored. So, to see who is accountable here.

Guillaume: And in the specific case of, for example, Amper Music, that you may know. The company produces music based on AI algorithms. Do you think that the current legislation would be enough to prevent the unfair competition that you talked about with Uber for example, in the specific case of the music industry, or would new regulations be needed?

Migle Laukyte: Well, I don't see. Well, if you produce music well, I don't see unfair competition here, actually.

Guillaume: Like an example that we took, maybe Manuel you can explain the Spotify and the question we had related to that.

d) General questions:

Manuel: Yes exactly. So, we saw that, for example, Spotify started to develop their own AI music algorithm. And so now they can use a huge dataset of their users to know what they like and propose them directly with artificial intelligence-made music directly aligned with their tastes. By doing so, we may fear that they will overcome real artists music on which they gain less royalties, maybe how could the market be organized to prevent such behavior? There is maybe a need for regulators to act against that behavior?

Migle Laukyte: Well, I am not sure about that because, well, I think it's not yet got to the levels that are really threatening. Well, the royalties of the other artists, first of all, I think well, it would also mean that suddenly we start to regulate to early if there will be any need for that. Another thing is that, well, again, it is the thing with the paintings you can generate things from the already existing things, and it doesn't mean that you're infringe anyone's copyright. It again, of course, very much depends how similar eventual result could be to the existing work. So, again, an algorithm should somehow do the same as ... I think it's done similar to the way in which the painting generating algorithms work. They go through the paintings and elaborate a new painting on the basis of what is processed and the other side of the algorithm, which checks how similar this painting is to the existing one. And when it cannot be sort of related, when it looks original enough, again what it is, then it can be put on sales. And another thing I think it would also be a good idea, in this case, use the block chain, right, to manage the copyright of for example, of one particular song. So, any kind of download, for example, the use of a song

would also mean that a small payment is paid, but really a small one to the owner of the copyright so that, through the blockchain, so everything would be automatic and there wouldn't be any problem at all. So no new legislation would be necessary.

Guillaume: So, you think that we could end up with a system where automatically the music that is used to nourish the algorithm, for example, thanks to block change, will be able to retribute the artist in the fact that his music was used in the data set of an algorithm.

Migle Laukyte: Yes, so I think it's one of the best solutions because algorithm developers are free to develop, so to say, and the copyright owners are also to get their due.

Guillaume: OK, thank you. I had another question, and I know we are going from very diverse topics in law right now. So, thank you very much for all your answers. Like this one is more about legal personality, like we saw that some researchers were for or against granting the legal personality to an AI. Among other arguments, one was saying that it will fill the responsibility gap in the case where, for example, AI is driving a car, is a very famous case, but also when AI are designing, for example, parts of buildings or parts of car, but also foster innovation and arguments and at the opposite other people stance that it will be a negative incentive for the human developers as being less careful about what they are developing. And the EU considers that there is no time to ask the question right now. So, what are your thoughts regarding granting the legal personality to an AI algorithm?

Migle Laukyte: OK, I think that you have the arguments on both sides, but basically, well, when we speak about the legal personhood, we have to, first of all, ask what we need it for, what's the purpose? Right. So right now, well, there is no responsibility gap because whatever the tool basically does or would do, the any robot or artificial intelligence, there is always the company that developed it, right, to respond for whatever. I think it might be a question for the future. Especially because on the side of the company's well, on the one hand, you know, the society is asking for more and more sophisticated technologies. We need assistive robotics because people are getting older. There are not enough young people. Nobody wants to do a dirty job, so to say. And immigration, again, is not the answer. So, we need sophisticated technologies. However, we would need to incentivize their development. And companies, many times would say, well, if I'm always liable for whatever happens, it might not be convenient for me to invest that much and to develop such a structure, for example, as assistive robots, because well, I risk a lot if something goes wrong. And surely something will go wrong because, well, we cannot invest from one day we don't have any robots like that, and the day after we have

them errorless, completely perfect. So, I think this is the reason why there is this kind of problem. In many cases, I think the huge part of this discussion is about the fact that people mix terms. Basically, when we speak about the personhood, many people think about the humans, think about the human rights, they think that machines will take the world and, you know, Terminator and all that kind of, you know, doom, apocalypse, and things like that. So, I think why did we created a legal person of a corporation? Of a company? Because we needed to find a way to permit people to do business without risking their property, right? Yes. So, if we get to the level of technological advancement and will we'll see that companies already have not enough as a legal person to guarantee the possibility to risk again, so we might think of, well, creating something like that for the kind of parallel legal personhood to the machines. Again, we have to decide what we talk about when we talk about the legal personhood for the machines. Because there are a lot of also philosophical questions related to what about autonomy?

Guillaume: Yes, we are not going so far into granting citizenship or as much legal person as you say, like as assimilating them as between people rights and machine rights. The question was more about, what do you think that if we grant the legal personality to the AI algorithm, do you think that it would be a solution to incentivize companies to, as you say, produce the AI and being less regarding about the responsibility that they will have regarding the final product of the AI? Like an incentive for the development?

Migle Laukyte: Well, I think that even if we grant some sort of legal personhood because again, in this case, we have to think about what do we mean by legal personhood? What do we mean by what kind of rights we would recognize, what kinds of duties? And I think in any case, and even if we grant legal personhood to the machines, there will still be some sort of link between the machine and someone who created it, because the machine didn't learn from the aliens. So, I think maybe, the legal personhood could be useful to shift apart a really small part of the accountability burden from the producer of the machine, but not completely. So, this is why there is this idea of the insurance of the compensation funds. Right. Attached to the machine. But it never ever talks about the idea that, well, legal personhood doesn't mean that producer just washes his or her hands and says, well, the machine is responsible for everything. We can only in certain specific cases, in certain specific circumstances, well, we can introduce this kind of shift of the liability and well, of course, again, see how it works and whether this shift can be increased in time. But well, it's for the future.

Guillaume: Thank you. I think that Manuel said that we have 30 minutes. Do you still have time?

Migle Laukyte: Yeah.

Guillaume: So maybe Manuel, you can ask other general questions regarding Market Threats.

e) **General Questions:**

Manuel: Yes, exactly, it's more an ethical question for us, but, you know, today there is like a huge facility to create artworks and music assisted by AI. So, we may fear in the case of companies like Amper Music or Spotify and so on, that have already implemented the AI-based solution, that it may be a threat for the market to see those companies generating unlimited base of content, to maybe either limit the creativity of other people or after all hinder the work that required a huge quantity of dedication like, you know, music created by real human person. Is it for you a serious threat in terms of ethical concerns? Uh, maybe again, um, will it need, like, uh, the intervention of, uh, regulator?

Migle Laukyte: Well, I actually do not see a lot of a big threat. I also think that, well, if more and more, we move to the machine or algorithm-generated artwork. I think more and more we will start to value human arts like human art by humans. Like today, you know all those products that have additional value when they are handmade. Right. The parallel would be that in this case of music, we would speak about the human-made music as more authentic, more original, more human. Right. So, I think it is not necessarily detrimental for the human creators if we have the artificial intelligence-based work generated from theirs. In particular, if we could somehow think also about the possibility to introduce the blockchain in making the digital rights management more and more easy, accessible, and easier to carry out.

Manuel: OK. And regarding the same question, but if we think very later in the future companies will be able to generate as we say, huge quantity of music, there is not a threat that at some point huge quantity of music will limit the creativity of human people because maybe in a far future everything will be created.

Migle Laukyte: Well, I don't think that everything will be great, basically. And we cannot stop human creativity and well, you see it in the patent law. I think in the 18th century already, some of the judges were saying that there is nothing new under the sun made by a man or something like that. Well, there is a lot of new things, and I think it won't have a negative impact on human creativity because, well, I don't think that anything can stop human creativity. And on the

contrary, this creativity could be enhanced by a new means by the new a stimulus, so to say, by the new ways of, well, producing music, listening to the music, and generating the music so well, I don't see any problem here, especially with bear in mind that the best of the artificial intelligence comes out when it collaborates with a human being.

Manuel: OK, so it was also a question we had for you, like through a philosophical angle. Currently, AI is more like a tool or an independent working agent for you in the case of music.

Migle Laukyte: Well, it's still a tool from my point of view, because it processes music not the way we process it. Right. It doesn't make an algorithm feel like, you know, the music, it lifts you while you have the music for different moments of your day or the sad music when you're sad or whatever. So, you know, music goes much more beyond the sounds and, well, the data that the algorithm reads in it.

Manuel: Yes ok.

Migle Laukyte: So, I think in this sense, we are still in the tool phase.

Manuel: OK, perfect.

Guillaume: Maybe I can ask a question about the business case of Moneybrain. In the case of our thesis, we analyzed a South Korean company called Moneybrain and this company hit the headlines. Maybe you heard about this a few months ago, when a TV presenter of a South Korean TV channel was a AI representation of one of their TV presenter. So, they do not need the employee to be present on the workplace anymore. They can just broadcast an AI version which is not only speaking like the original but also moving like the original. And it's nearly impossible to differentiate the AI version from its original model. And it leads us to one specific question. If we consider this specific business case and we end up in a few years where companies are able to scan people like that, it could have implications for not only the TV market but the video games market or the movie sector. And we wanted to ask you, how do you think we could organize the contracts to take this reality into account?

Migle Laukyte: Well, I think you're interested in the business perspective because basically, you're talking about the substitute of the human employee in certain jobs, right?

Guillaume: Yeah, but the question was more about the ability of scanning this TV presenter, and maybe during the night when she's not active, the AI version would replace him or her. From a legal perspective, how do you think we could organize the contract to take this new

reality into account? How the contracts can be organized, like to sell not only your picture but also your voice, your movement, like a complete replica of yourself.

Migle Laukyte: So, I think in this case we would speak about what you would need. First of all, it's about the personal data, right. Because, well, face is already biometrical data, so it's sensitive data which is super super-protected. So, I think if a person agrees, you can do whatever you want, but you cannot do it without an informed consent, thus a very clear written permission for the person. So, it is possible, because if you want to scan instrument and the instrument says I don't have any problems with that. It could be a very interesting case in those cases when someone's image is very much related to the company. Right. You know, you have Larry King who was so much about the face. So, I think there could be an eventual further difficulty in case that you want to scan someone whose face is also part of the company's image, and well, permitting to scan this face by competitors could actually bring a certain mess from the legal point of view. But I think any person if he or she doesn't have any problem with that, of course, it would also mean that the company should be very specific what the scan is for, how it will be used, and, you know, all the details that are related to all the information that the company must provide the person with. Well, in case of the deep fakes, there's something of the kind is already happening. So, we would also have a problem of the right to one's image because you can also ruin reputation and ruin people's lives. I think that was the whole mess with the deep fakes because you can use them in many, many ways, that are not necessarily legally positive, so to say. But again, it's more a question for people who are famous or who are celebrities.

Guillaume: OK, thank you. I don't know if you have any other questions regarding market threats.

Manuel: I've a last question still about the facility to which a company can produce work by AI-based solution. We also saw that now it is possible to generate relevant text with AI. Are you familiar with I-Depot from Benelux used to protect the idea? They are used to secretly secure ideas, in order to retrieve them later in case of defense-related to patent law. There is thus maybe a threat about company generating relevant text about something in order to produce a high quantity of I-Depot on a solution or technical field that will give them advantages for future patent defense.

Migle Laukyte: So, you're talking about the patent law here?

Manuel: Yes, I provide you here with the link referring to Benelux's I-Depot.

Migle Laukyte: Well, you cannot protect ideas as you can read here. It should be well-developed idea with already a practical application. So, to see all the details and everything like that, like you, have in the patent law.

Manuel: So, there is no threats about companies using a text algorithm to generate huge quantities of, I will say, technical text about a solution just to prevent other companies to book patents after about this kind of technology.

Migle Laukyte: Well, I think with the text-generating artificial intelligence, eventually you could have a different problem is that you could prevent others. If you have an algorithm that generates a lot of text related to a certain idea that has already saw physical embodiment, you would also then be able to fight any sort of patentability claims on the basis of this idea by others. Because what basically patent will ask, it will ask novelty. And you don't have novelty when you have information about this invention already available someplace.

Manuel: Yes.

Migle Laukyte: So, it could be a way to fight against the patentability of algorithms. Applicable to certain things.

Manuel: OK, thank you.

Guillaume: Thank you so much for this meeting.

Migle Laukyte: Thank you for talking. Thank you for researching on this.

Guillaume: Have a nice afternoon.

Migle Laukyte: You too. Bye.

Manuel: Goodbye.

Appendix 6: Transcript of interview number five: Ana Andrijevic:

This interview took place on Teams on the 13th May 2021.

a) Presentation of the academic and professional background:

Manuel: We can start with a brief introduction of your academic and professional background.

Ana Andrijevic: So I did my Bachelor's and Master's degree at the University of Geneva in Switzerland. I did a Master's degree in International and European law which was followed by a series of summer schools, including the Internet Law Summer School which is now called the Digital Law Summer School. It was the first step for me towards technology law given the fact that I really decided to dive into technology law thanks to this summer school. It was followed by two internships, one at the Geneva Internet Platform and the other at the International Telecommunications Union (ITU). I started working as a teaching and research teaching assistant at the University of Geneva at the Faculty of Law in 2017 and I am also doing a PhD on the impact of AI on copyright law from a Swiss perspective, with comparative laws aspects, including European and US law.

b) Legislative interrogations

Guillaume: It would be interesting for us to have your opinion on a specific law we analyzed in the case of our work. Certain chapters explore the legal uncertainty and we tried to see in which country the use of copyright protected works would be allowed in the dataset for AI Algorithm. One specific country, Japan, implemented a law where they consider "*permissible to exploit a work in any way*" in "*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*". We are wondering if this article would allow AI-based firms such as Spotify and Amper Music to use copyright-protected songs in their dataset for their algorithm.

Ana Andrijevic: Japan has one of the most AI friendly copyright regulation in the world. It was the first country in the world to include a Text and Data Mining exception back in 2009 which was amended in 2018. If I understood correctly, art. 30 – 4 paragraph 2 allows any user to access data or information in a form where the copyrighted expression of the works is not perceived by the user and would therefore not cause any harm to the rights holders. In other words, they wanted to make sure to have a provision that would enhance machine learning development without causing any harm to copyright holders.

In Switzerland, we have recently added a Text and Data Mining exception, in 2020, and the European Union did it not long before, in 2019. Text and Data Mining is a research method which uses automatic technical analyses procedures on large data corpuses to identify patterns and/or trends in voluminous quantities of data. It is used to uncover new knowledge, new correlations or insights in the scientific and scholarly literature to accelerate the research process and to capitalize on work that has been done in the past in an effective way. These data corpuses incorporate texts, images, sounds, pictures, graphics, maps, videos, and more, which can all be covered by copyright law protection. In the U.S., they also have a broad Text and Data Mining exception which is based on what is called the fair use doctrine.

Guillaume: We saw for the U.S. that they considered that the goal of the applications of the fair use law was to be profitable most of the time for not profit organizations. There was however this case of Google Books showing that it is not limited to non profit organizations. So in the case of the U.S. do you think that this fair use law could be apply broadly for private companies.

Ana Andrijevic: Yes, it is also used for private companies and it explains why the U.S. are an interesting market for Text and Data mining even though, comparatively, the Text and Data Mining exception is not included in their Copyright Act as such but is applicable through the fair use doctrine which can be found in section 107 of the U.S. Copyright Act.

Guillaume: To come back quickly to the case of Amper Music and Spotify, which are using copyright-protected music of artists in their dataset, do you think that this article allows those companies to use copyright-protected works in their dataset. Because they allow to use recordings of sounds or visuals works or with the "any other case" statement when they do not enjoy or cause another person to enjoy the thought or sentiments expressed in that work. This new regulation eases the access to data and its regulation of copyright-protected work. They consider that this regulation will stop Japan from being considered as the machine learning paradise but we believe this is still much broader of any western regulations.

Ana Andrijevic: Yes, I think so as well. I have found the following statement regarding the first paragraph of this provision. It was provided by the Japanese Copyright Office and they explained: "*It is considered that the economic value of a work is, normally, realized when a person who views or listens to the work pays compensation for such work in order to enjoy the ideas or emotions expressed in a work and satisfies the person's intellectual or emotional desires. Therefore, acts not for enjoying the ideas or emotions expressed in a work do not*

prejudice the opportunities of the copyright owner to receive compensations from those who in-tend to enjoy the ideas or emotions expressed in the work and the interests of such copyright owner intended to be protected by the Copyright Act will, normally, not be prejudiced."

For the second paragraph of this provision, on Text and Data Mining, it applies both to private companies and research institutions. This exception is broader than the one provided in the Digital Single Market Directive considering that under Japanese Copyright Law, there isn't any "opt-out" such as the one found in article 4 paragraph 3 of the Digital Single Market Directive in the EU.

c) General questions:

Manuel: Maybe you know Amper Music? Or Moneybrain? Two companies focusing on AI.

Ana Andrijevic: Yes.

Manuel: Amper Music is acting on music sector as well as Spotify they developed their own AI music. With Spotify, we fear that there is a threat where they will use a dataset of their users to know what they like and propose them directly with AI music that fit their taste. In other words fully personalized music for their users. By doing so they will overcome real artists taking time to make music on why Spotify gain less royalties as they have to retribute them. Would you consider this as a real threat? Would the Market adapt itself? Or need an intervention of regulators?

Ana Andrijevic: Isn't Spotify already doing that?

Manuel: Yes

Ana Andrijevic: So, it is not just an assumption.

Manuel: Yes for the moment it is kind of elevator music, more peaceful pianos but it may quickly evolve and become a threat.

Ana Andrijevic: So there are two things: 1) They are using AI to propose specific music to users and 2) they are producing their own AI music and proposing it to the users.

Guillaume: I do not think they are already proposing it to their users but they are developing it.

Ana Andrijevic: I am not sure AI music will become a real threat to other artists so far, but maybe I am wrong. Artists are more and more interested in using AI as a tool to create music,

but I don't believe we are in a situation of real threat to "human" music. We are either going through some sort of hype, or AI will really become a lasting creative tool. Especially when you think about paintings, such as those sold at very high prices, I am wondering how long this is going to last.

Guillaume: Yes Edmond de Bellamy.

Ana Andrijevic: Yes, I would say it's one of the most well-known examples. Edmond de Bellamy was sold in 2018 for almost half a million dollars. I am not sure any other "AI" created painting has been sold at a similar price. It might become one day a real threat and a real competition to human artists but so far, it seems really to be perceived as a tool.

An important thing to keep in mind is that lots of these technologies used to develop algorithmic art are used for other purposes. We can take the example of Natural Language Processing which can be used to generate new books, scripts, poems etc., but this technology is also used for translation, vocal assistants, chat bots and many other technologies. So, I don't believe that generating new artworks is necessarily the most interesting aspect to these companies that are investing large amounts of money to create new innovative AI systems.

So, once again, I don't think that AI technologies are a real threat but maybe I am mistaken Do you know about AIVA?

Guillaume: Yes.

Ana Andrijevic: This is an interesting example. If you go on their website, you can see on the front page that depending on your subscription, you can have a different set of rights. If you pay enough money, you can own the copyright over the music you will generate thanks to their platform. So, depending on the price you pay every month, you can get a different set of rights for the same amount of creative work. This may be really problematic considering that, If I am not mistaken, you don't need to select a lot of features to generate new pieces of music with AIVA. But if we go back to the example of Spotify, when I am hearing that Spotify is generating new music with AI, I am not sure that this would become a real competition to human artists. People are still hooked by the processes: where does this artist get his inspiration? What is his or her story?

Guillaume: On this subject we had another person we interviewed on this subject and, regarding this problem, proposed to use the blockchain technology to automatically retribute an artist through smart contracts every time his music is used in the dataset of an algorithm to

generate an AI music. Do you think that it would be technically applicable, a solution for this issue?

Ana Andrijevic:

Yes, it would an interesting solution to explore. Blockchain is already used in the art world, for paintings for instance. However, I think there is an important thing to keep in mind when you talk about algorithmic art. A lot of AI researchers use works that are already in the public domain, which means that you do not have a copyright anymore on those works and you can use them freely. When you read articles about machine learning, it is interesting to see the kind of advice they give each other as machine learning experts such as: if you want to use a set of data, be sure to use something data that are free of rights, and ideally, works that are in the public domain. I was recently reading a book about Natural Language Processing and they were saying: if you want to use some texts to train your neural network, you can use for instance a said version of Moby Dick which is in the public domain. You see a lot of this kind of advice in various articles and books on machine learning.

Another thing I am interested in is that sometimes, those technologies do not use the work *per se* but they use the characteristics of the works. Therefore, when they use images in machine learning processes, they will generate new data to train neural networks, but they will not use necessarily the image as such but only those characteristics which are extracted from the images. But you will not necessarily have the possibility from the data generated out of the source image, you will not have the possibility to go back if you have the data. If you only have the data and not their image anymore, you do not have the possibility to go back and recreate the image anymore.

Guillaume: In the case where the original data is erased, can we say that it is also more interesting for the company as there is no way from the output you get to know which data was used at first.

Ana Andrijevic: The risk is always, indeed, to create what we call a derivative work, a new work in which you can recognize a first one that may be protected under copyright law. I can show a very well-known example which is the case with a picture of Obama during a press conference in 2008 which was then the basis to create a new artwork by Shepard Fairey. The first work, the photograph, was taken by a photographer who was next to many other photographers who took almost the same picture. Then, Shepard Fairey created a new work based on the photograph, which was a clear source of inspiration and is clearly recognizable in

the second work. This second work is what we call a derivative work. Therefore, even though this second work is really a new one and you can see new elements that were added to the picture, all the changes etc., you can still recognize the original work, the photograph taken during the press conference. In this case, you have two authors : the author of the photograph and Shepard Fairey. The case was settled between the parties but it is interesting to use this example to show you how it looks like.

When you create a derivative work, you need to make sure that you have the right to use the first work which is the primal source of inspiration. It is the same for music, if you can really recognize an important part of the first work, it can be problematic. In any case, you will probably have to go in front of a judge to settle the case.

In the case of algorithmic art, if you are using massively works that are protected to train your neural network, you will have to be careful. For now, we don't have yet a copyright exception for machine learning purposes in Switzerland or in the EU for instance, with the exception of Text and Data Mining which can use machine learning for data analysis purposes. Does it help?

Guillaume: Yes totally it is a major implications for business companies, they should be careful on what they are using as inputs for their algorithm, especially if it is recognizable.

Ana Andrijevic: Yes, I talk about it with AI experts and I am trying to see even if they are paying attention to this kind of things. Some of them told me: "Honestly, we do not know anything about copyright and we do not care much. Our goal is to make sure we have enough data to train our neural networks." It is interesting to me because it allows me to see where there can be some issues. Once again it depends on the technology, there are so many technologies that some of them actually use the image itself as I was mentioning before and some of them just use some data out of it, some characteristics from the image and will not use their mage anymore or, if they use the image, they will not keep it for a very long time. They will just use it to generate new data out of it.

d) Importance of Data structuration in companies

Guillaume: Concerning data, I have a follow-up question: With the increasing development of Bid Data, especially in huge companies, what are the risks and opportunities for a company to structure its data? More especially we saw that some companies are offering their AI services to other companies and in the case the customer did not structure its data it could be an obstacle for the AI company. For example they propose to create chatbots for companies but the data that they have are not structured and they can not apply their algorithm.

Ana Andrijevic: Sorry I am not sure I have answer on this question.

a) **Business Model cases:**

Manuel: Related to the creation of text with AI. Now that we can create easily relevant texts about subjects, technics… Is there a risk that some companies will create technic documentations around process/technology in order to block future patents of other rival companies? Maybe you know e-depot: it consists on deposing documentations around processes/technologies in order to defend a company in the future if somebody else comes with development about this technic. It allows a company to say "I was already working on this development in the past". If we apply this system to an algorithm of AI producing patents, they could prevent other companies to develop those processes/technologies.

Ana Andrijevic: That's the whole point of having a patent actually. When you register your patent, you have a monopoly over your registered invention. I will not go too much into details here.

Manuel: It will therefore be seen as a tool if they use AI to produce this documentation?

Ana Andrijevic: I think we are talking about different things.

Manuel: We can produce texts with artificial intelligence, what we assume is that companies could use AI to produce documentations in order to protect some processes/technologies. It will broaden the field of possible patents.

Ana Andrijevic: Ha okay, I understand. In the EU and the US, we have seen several cases where the patent offices underlined very clearly that there is always of need of having a human inventor behind the registered invention and not an AI system.

Therefore, even though the AI is generating products or technical documentations, you still need to register a human being as the inventor. I believe AI systems will definitely become more and more important tools to develop more inventions. One concern could be to know what to do with an AI system that produces new inventions all the time.

Manuel: Sor for you there is currently no need for regulators to prevent companies from doing that.

Ana Andrijevic: So far, I would say the general statement is that you always need a human being either as an inventor or an author. Therefore, even though AI systems generate themselves

new inventions or new artworks, if you are not able to attribute the paternity of these technologies to a human being, the new creation will certainly fall into the public domain.

If you are interested in artists who use AI as a tool, you can visit the website aiartists.org which features AI artists who use AI as a tool. In this case, I think we will be rather in a case of "computer-aided work" where the human artist plays a important role in the creative process and simply uses AI as a tool. In contrast, in cases of "computer-generated works", the idea is that the AI system does most of the work thanks to automatic processes.

Manuel: It was indeed one of our underlying questions: should we consider today AI as a tool or as an independent agent in the process of creation? Sor for you it remains a tool for the moment but it may evolve in the future?

Ana Andrijevic: Yes, definitely. It is very impressive what AI systems can do but we are still at the level of using it as a tool. You can really see it when you analyze how many human beings actually participate in the process of creating a neural network.

Manuel: Related to the music industry, in the future, if we consider that Companies like Amper Music and Spotify will be able to generate unlimited music and so to limit the creativity of real artists by saying: your music is too close to my AI music. It would be unfair competition as they can create unlimited music.

Ana Andrijevic: That's an interesting point. I think you might, indeed, have an interesting case for competition law.

Manuel: Maybe it requires time to connect it to human, you can not do a huge amount of music?

Ana Andrijevic: Yeah exactly and it might be complicated to do so.

In these cases, sometimes it's useful to go back to the "raison d'être" of copyright law. The goal was to protect those who contribute to society and to give a set of rights/monopoly to a selected number of artists who created works which are deemed original enough. Originality depends not only on the type of work but also on the jurisdiction at stake.

Manuel: Maybe you have an idea of a solution?

Ana Andrijevic: I tend to agree with the idea of putting all of this computer-generated music in the public domain, especially when you generate billions of pieces of music with an AI system. The risk I see is that if you generate all of this music automatically, any human artist

might then be confronted to copyright infringement with these pieces of music and it might really hinder the music industry.

In addition, if you think about the whole process of generating a neuronal network, a lot of people participate in the process, including people who already own copyrights. You can think of the programmers who create the code or the authors of the works that are used to train the neuronal network.

Guillaume: In our analysis we have been working on a south Korean company, called Moneybrain, who develop ai version of real model such as a tv news presenter. The ai model can then totally replace the original model and act and speak like the original. From your legal prospective, do you think that we will have to reorganize the contracts between the tv presenter and the company? We can also make parallel to what is happening in the cinema industry when they use the capture movements technology. They had to reorganize the contract as the actors did not appear on the screen anymore.

Ana Andrijevic: Here the most important issue I can see are personality rights. If you are reproducing a person's face and/or voice, you will need to have his or her consent. It is a very important aspect to take into account. Imagine for instance that the AI says something that hurts the reputation of the real presenter Therefore, you have to determine very clearly the extent of the use of this AI and what it can say.

Guillaume: Do you think that the new contract would have to take this into account? We do not have this information but we can guess that when the TV presenter was scanning by his employer, there was an agreement or contract that was sign with the tv presenter.

Ana Andrijevic: When you use the image of a person, you need to have his/her consent. There are exceptions but there are always risks to hurt personality rights which need to be taken into account.

Guillaume: Do you think there will be a shift in the industry/sector opening new legal questions?

Ana Andrijevic: It is possible but I do not know how many people really want to have AI presenters. I do not know how much they want to replace human beings by machines. There are interesting cases such as those in Japan where they were using robots in homes for elderly people. Some preferred their interactions with robots because they seem to be nicer to them but I am not sure human beings want to see machines in every aspects of their lives.

Manuel: About companies relaying on contract law to gain ownership on artworks or music. You talked about AIVA, is it for you unfair behavior, a threat for the market?

Ana Andrijevic: It may be simply not in line with copyright law in general. I really have to dive into what they propose but If you create a new artwork, you are the author of this work and you can transfer your rights via different licenses for instance.

Guillaume: If we take the example of AIVA, if AIVA makes customers pay to get the ownership of the law and not the authorship then they will be respecting the copyright law?

Ana Andrijevic: Yes, but first and foremost, you need to have an author. If you don't have an author, it means that nobody has any rights over the said creation. Therefore, you have to be sure first that AIVA is actually copyright owner.

Guillaume: On the website they say for the pricing, they state it as "Copyright owned by AIVA"' for the cheaper service and "Copyright owned by you" when you pay more. They do not say ownership or authorship it is not very clear.

Ana Andrijevic: I have to analyze it more. The only thing is that, if I remember well, as a user of the platform, you just have to select very few features: the length, the type of music and 2 or 3 other things which is very limited in terms of creativity. In this context, I am not sure that you can consider that the user is really the author of the music as she/he did not put too much creativity into that. There isn't any personal touch or intellectual creation really. It is very limited in terms of creation. In the case of AIVA, I am not even sure you can really say that the user can be the author in these cases.

Appendix 7: Report of the webinar on new technologies and artificial intelligence laws

From the 23rd February 2021 to the 26th February 2021, we followed a webinar organized by the ELSA, the European Law Students' Association, on the subject of new technologies and artificial intelligence laws. This seminar was the occasion for us to meet experts from different horizons but, nevertheless, with a link to artificial intelligence and its regulation. It also allowed us to gain contacts with two specific experts that we we were able for an interview.

As the organizers of this webinar did not allow us to transcript the different presentations, we decided to provide you here with a short summary of the presentations which focus on our problematic. Those presentations, and the exchanges followed, nourished our reflection.

1. Badr Boussabat

Badr Boussabat is an AI speaker and a member of Management Committee of the Belgian Finance Center. The presentation of Badr was the only one focusing on the economic point of view. After a short introduction to the concept of Artificial Intelligence, he insisted on the capacity of AI to drop the costs in sectors as various as healthcare, finance… For him, while in some sectors links cannot be made with traditional means, AI allows to project an entire system by analyzing test, documents and automatizing the creation of relations between information.

As an economist, he believes that AI is a viable instrument and the key to prevent the wasting of the debt. As more data are available, he argued that by feeding AI algorithm with those data we could create a new economic system relying on data as a replacement of the current currency. As money is limited in space and time, data could replace it and allow people to create value without relying on a governing authority. He gave the example of the firm Presearch which launched a new internet browser paying you in cryptocurrency in exchange of information. By doing so it is a new way of creating wealth.

Finally, he believes that this new framework would make the future more positive.

2. Gregory Lewkowicz

Gregory Lewkowicz is a professor of global law at the University of Brussels. In his presentation he argued that law and technology are not opposed and that law needs to evolve to take technology into consideration. He argues that there are 3 levels of law: law 1.0 which apply a set of facts, law 2.0 which wonders if the rules are fit for purpose and the law 3.0 which measures if the rules are better fit for regulatory purposes. He tackles the question on how we can have rules and technological measures which work well together.

He further develops a case study on high frequency trading. A concept that relies on mathematic models to realize trade actions in nanoseconds. He believes that regulations regarding this practice should be define as threshold to define if there is an intention to influence the price with thousands of microtransactions. This is a phenomenon called spoofing. He believes that a good way to regulate this phenomenon would be to supervise application of financial rules with new technologies and introduce the idea of a third party regulating the phenomenon.

3. Nicolas Vermeys

Nicoals Vermeys is a professor at the University of Montreal and assistant director of the cyberjustice laboratory. He started his presentation by giving his definition of Cyberjustice and AI. He argued that artificial intelligence is an umbrella term which regroups a certain number of technologies and algorithms. For him there are two general types of AI: the symbolic AI referring to the Turing test and the connectionist AI referring to machine learning. Then, he developed the different typologies of AI: Narrow, General and superintelligence. He also emphasized the different ethical risk of AI technologies and expressed his concerns towards softer law on AI.

4. Patrick Penninckx

Patrick Peninckx is the head of information society department of the Council of Europe. He started his presentation by emphasizing the role of data and statistics in artificial intelligence. His main statement was that law enforcement and justice will rely on algorithms in the future.

He further developed his ethical concerns regarding AI and the necessity for fundamental rights to be protected. As an example, he cited the tracing apps during the pandemic and the fact that most privacy agreement of applications are set by default on "agree". For him, there are many actors who try to apply soft law and ethical framework to AI practices but without general regulation.

He was pushing for a defined legal framework regarding AI and highlighted the necessity to define it at the European level with the creation for example of an Ad Hoc committee on AI at the European Council.

5. Peter Kimpian

Peter kimpian is a program manager in the data protection unit of the Council of Europe. In his presentations he talked about the tools and goals of the Council of Europe regarding AI. He highlighted that his institution must balance human rights and check the obligations for the member states to respect the right to privacy and freedom of expressions among others.

He then gave a list of laws that should be considered when it comes to AI regarding the obtention of data, transborder dataflows…Finally he ended up with the "guidelines on artificial intelligence and data protection" (2019) which balance between the positive effects of AI and the needs for regulation. On the latter, he emphasized that the new policy should be inclusive and based on serious evidence with a great focus on human dignity and the right to privacy. He further developed the key elements of this general guidance of privacy, responsibility,

lawfulness, fairness, and transparency. Those guidelines also recommend a risk-based approach to mitigate the side risks of AI by considering ethical and social values among others. Furthermore, it provides several guidance for developers, manufacturers and service provides to consider values, human rights, adverse impact of their AI solution. It also recommends the consultation of external bodies and the existence of feasible alternatives to AI solution for users. The users should also be informed that their data are processing and object any AI solutions likely to influence opinions or modify the development of individuals.

6. Julien Cabay

Julien Cabay is a professor at the University of Brussels and Liège teaching legal methodology in economic law, copyright law and IP. After a short explanation of his definition of AI and the distinction between machine learning and deep learning, he emphasized that there is a legal black box regarding the inputs and outputs of AI algorithm.

Then he highlighted a possible difference of values between AI and human creations in their process and not in their output. For him, there is a consensus that assets fully created by AI should not be protected while the protection may remain if the outputs generation is only assisted by AI. He then realized a comparative study regarding IP rights between European copyright laws and the doctrine of fair use of the US. Afterwards, he came back to nature of the copyright protection and underlined that those copyrights are designed to incentivize creations. While a machine does not need to be incentivized to work, a company needs those incentives to develop the algorithm. This led to the essence of patent protection.

Finally, he provided different statements and learnings coming from European parliament resolutions and European Commission analysis regarding the development of AI and intellectual property rights. The main message is that the European Commission strongly sides against any copyright protections for AI generated production.

7. Irina Orssich

Irina Orssich is working for the European Commission in the field of communication networks, more especially on the artificial intelligence policy development and coordination. In her presentation, she focused on the strategies of the European commission for AI and data governance. The commission has two main missions: foster trust and excellence on AI and increase the availability of data.

She started with a simple but important constate: AI brings several advantages but create some risks that need to be thought upwards. She defined 5 key actions to accelerate the development of AI in the EU: 1) Join the force of Member states 2) Strengthen research and innovation 3) Strengthen industrial research 4) Support testing and experimentation 5) Help SMEs. She also promoted a risk-based approach towards artificial intelligence with an identification of the risks and ex-ante conformity assessment for high risk systems.

8. Jacques de Werra & Ana Andrijevic

Jacques de Werra is a professor of contract law and intellectual property at the Law School of the University of Geneva and Ana Andrijevic is a researcher and teaching assistant to Professor de Werra with her thesis focusing on technology law and artificial intelligence. Jacques de Werra started the first part of the presentation by emphasizing the anthropocentric nature of the IP ecosystem. Th legislation requires a human author and refuses the copyright protection if the work is not creative enough. For him it is more and more difficult to be creative with the emergence of AI. And he draws a parallel between art and patents as he also believes that AI will make it more complicated to file patents. He believes that we have to move from our traditional human centric view to a view considering both human and AI. And, this, will have an impact on how we see the creativity in AI.

Ana Andrijevic, in the second part of the presentation, focused on natural language processing and recommended the website of the World Intellectual Property Organization. She then provides her definition and classification of different AI systems.

Appendix 8: Interview Guide: Patent attorney:

Adrien LEMOINE, European patent attorney

Introduction

Hello and thanks for this interview.

Who: We are Manuel Martins da Silva and Guillaume Nicolas, students in master in business Engineering at the LSM Louvain School of Management, which is part of UCLouvain.

What: This interview is part of our master's thesis "*AI-based production of content: obstacles, threats, and opportunities*". Indeed, in order to carry out qualitative study of the subject, we aim at conduct various interviews with professionals from both the IP and AI fields.
Why: Mr Adrien LEMOINE is an IP expert at AGC Glass Europe and an European Patent attorney. With his knowledge in IP and experience in a multinational facing digital economy, he is a good witness of the revolution provoked by artificial intelligence in the domain of property rights.

How: This conversation will be registered for the only purpose of this master's thesis and will never be broadcast. The answers of this interview will only be used in our master's thesis as well as the transcription of this interview. Do you agree with the modality of this interview?

Interview

Subjects	**Additional questions**
e) Presentation and position	a. Brief presentation of your academic and professional background b. In what consists your work? *Key activities, key competences, degrees, uniqueness* c. Presentation of the AGC company *Number of facilities, geographic repartition, sectors of activities, activities carried out, key products, number of employees, year of establishment*
f) IP and AI definition	a. What is your definition of AI? b. What is the legal definition of AI in terms of IP? c. What are the main challenges and concerns these definitions imply
g) Digital Economy and IP	

	a. What is your opinion on the property rights granted for works made by artificial intelligence? Should we give the property rights to the customer, the company, the AI Itself and why? b. What is the situation currently with the legislation in Europe concerning property rights and AI? What is the evolution that we can expect regarding this matter? What are the evolutions that you would recommend? c. How a company willing to integrate AI in its business model could protect it? Which are the key challenges arising from AI patentability? Some algorithms are designed to generate a huge number of robust patents, is AI even affecting the way businesses register patent and their competitive intelligence? d. Can we consider a human creation (like a painting) more valuable than one made by artificial intelligence?
h) Use Case business model	a. Some huge music platforms like Spotify started to develop their own AI music. They can use the huge dataset of their users to know what they like and propose them directly with artificial intelligence music that fits their taste. By doing so they will overcome artists music on which they gain less royalties. How could the market be organised to prevent such behaviour and, still, encourage creation and enrichment of the AI? b. How can we remunerate artists which take part in the data set used by an artificial intelligence? Can we imagine a retribution based on a percentage of inspiration identified in a work made by an AI? Could we consider the Blockchain technology to be sure to trace which works was used in a data set? c. What do you think of the tendency of companies to commercialize the property rights by versioning their business models and granting different property rights depending on the price paid by the user? Is it legally acceptable? What is the state of legislation on this question? *Is therefore licensing, and thus referring to contract rights instead of property rights, the solution to this ambiguity*

	d. In our analysis we have been working on a south Korean company, called Moneybrain, who develop ai version of real model such as a tv news presenter. The ai model can then totally replace the original model and act and speak like the original. How could we organise contracts that take this reality into account? Where is the frontier between intellectual property and image rights? Similarly, for the video games, movie sector.
e. AI Technologies in AGC Glass	a. Do you use artificial intelligence in your company? If yes, do you develop them yourself? b. Do you ask external companies? c. What is the value added of this technology? d. What is the attitude of your company regarding the dataset used for this artificial company?
f. Use Case of AGC :	*Going through your activities, we identified two spinoffs of AGC, "Eclat digital" and "Genie vision". The first one aims to provide predictive virtual image of windows on a building (visual rendering) and the second one allows to visualize construction plans on building sites through augmented reality (BIM). Based on those projects, if we imagine in a near future that AGC develops a tool based on artificial intelligence generating blueprints of architecture projects based on a data set of real architects, taking into account building constraints relative to glass.* a. What would be the technical constraints of such a project (in term of patentability)? b. In term of IP how would AGC grant the property rights and to who? The customer ? AGC? c. If the AI was built based on existing architectural projects, how can we imagine rettribution to architects? For example if the AI produce a building in the style of Santiago Calatrava, would he have access to some royalties for you? How to organise the contract?
Conclusion	Thanks for your time, would you be okay to have a second meeting in a few months?

Appendix 9: Interview Guide: President of AITogether:

Bad BOUSSABAT, president of AITogether

Introduction

Hello and thanks for this interview.

Who: We are Manuel Martins da Silva and Guillaume Nicolas, students in master in business Engineering at the LSM Louvain School of Management, which is part of UCLouvain.

What: This interview is part of our master's thesis "*AI-based production of content: obstacles, threats, and opportunities*.". Indeed, in order to carry out qualitative study of the subject, we aim at conduct various interviews with professionals from AI & digital fields.

Why: Mr Badr BOUSSABAT is the president of "AI Together" an international non-profit organization to raise awareness and teach the general public about artificial intelligence, he is also AI author and speaker.

How: This conversation will be registered for the only purpose of this master's thesis and will never be broadcast. The answers of this interview will only be used in our master's thesis as well as the transcription of this interview. Do you agree with the modality of this interview?

Interview

Subjects	**Additional questions**
1) Presentation and position	d. Brief presentation of your academic and professional background e. In what consists of your work? *Key activities, key competences, degrees, uniqueness*
2) Personal Experience in private company regarding obstacles	d. In general, are there limitations/obstacles due to current legislation? Or at the opposite did you feel lost by the absence of legislation regarding AI? e. Do you promote internal processes for private companies to assess threats/opportunities regarding AI and digital economy in general? f. Would you have tips/advices for a company starting its business in its field and willing to assess the ecosystem and prevent threats?

	g. What is the general attitude of companies regarding the dataset used for this AI solution? Do they pay attention to not use protected datas (by copyright) as input? Or the legislation allows it? Access of data
3) Personal Experience in private company regarding market threats	a. Regarding the music sector. Some huge music platforms like Spotify started to develop their own AI music. They can use the huge dataset of their users to know what they like and propose them directly with artificial intelligence music that fits their taste. By doing so they will overcome artists music on which they gain less royalties. How could the market be organized to prevent such behavior and, still, encourage creation and enrichment of the AI? b. Regarding AI-based works, how do you think the market will evolve? Guarantee the copyright for the company to support the development of algorithm, create an AI legal personality? Should a separate sui generis system of protection be envisaged for original literary and artistic works autonomously generated by ai? *c.* In our analysis we have been working on a south Korean company, called Moneybrain, who develop ai version of real model such as a tv news presenter. The ai model can then totally replace the original model and act and speak like the original. How could we organize contracts that take this reality into account? Where is the frontier between intellectual property and image rights? Similarly, for the video games, movie sector. d. Companies like Amper Music and Spotify have already implemented AI able to generate unlimited music. There is a threat for the market to see those companies generate unlimited base of content to limit the creativity. Is this for you a serious threat? Could similar threat apply to your sector? (Regarding the generation of optimized AI-based materials). e. Can we consider a human creation (like a painting) more valuable than one made by artificial intelligence?

4) As president of AI Together	a. Can you tell us more about your initiative, AI Together. What were the motivations in creating this NGO? b. Do you already have concrete projects of supporting regulations, advising some specific companies/governments? c. One of your goal is "sharing advice", in other words you plan to raise awareness of threats/opportunities for companies? In which forms will it take? Would it be free? d. How do you plan to guide your projects? Which forms they will take? Financing initiatives, conferences?
Importance of Data structuration in companies	e. With the increasing development of Bid Data, especially in Huge companies, what are the risks and opportunities for a company to structure its data? f. And one of this advantage would be AI, what are ur beliefs regarding the development of AI in all sectors as a competitive advantage?
Conclusion	We are looking for interviews with experts in the field, especially in private companies. Would you have anyone you could put us in contact with for another interview ?

Appendix 10: Interview Guide: Digital Project Leader:

Alexandre THISSEN, Digital Project Leader of AGC

Introduction

Hello and thanks for this interview.

Who: We are Manuel Martins da Silva and Guillaume Nicolas, students in master in business Engineering at the LSM Louvain School of Management, which is part of UCLouvain.

What: This interview is part of our master's thesis "*AI-based production of content: obstacles, threats, and opportunities*.". Indeed, in order to carry out qualitative study of the subject, we aim at conduct various interviews with professionals from AI & digital fields.

Why: Mr Alexandre THISSEN is digital project leader at AGC. He has concrete experiences of the obstacles and opportunities of AI in a private company.

How: This conversation will be registered for the only purpose of this master's thesis and will never be broadcast. The answers of this interview will only be used in our master's thesis as well as the transcription of this interview. Do you agree with the modality of this interview?

Interview

Subjects	**Additional questions**
5) Presentation and position	f. Brief presentation of your academic and professional background g. In what consists your work? *Key activities, key competences, degrees, uniqueness*
6) AI Technologies in AGC Glass	g. Do you use artificial intelligence in your company? In what forms? If yes, do you develop them yourself? h. Do you ask external companies? i. What is the value added of this technology?
7) Personal Experience in	

private company regarding obstacles	h. Did you face limitations/obstacles due to current legislation? Or at the opposite did you feel lost by the absence of legislation regarding AI? i. Do you have internal processes to assess threats/opportunities regarding AI and digital economy in general? Would you have tips/advices for a company starting its business in its field and willing to assess the ecosystem and prevent threats? j. Have you ever developed ai-based solutions? You do not have to precise in what forms but what were the obstacles for its patentability regarding the use of AI? k. What is the attitude of your company regarding the dataset used for this AI solution? Do you pay attention to not use protected datas (by copyright) as input? Or the legislation allows it? Access of data
8) Personal Experience in private company regarding market threats	a. AI bring amazing opportunities but also threats, are you concerned of the future of AI developments regarding your field? In what forms? b. Regarding an other sector. Some huge music platforms like Spotify started to develop their own AI music. They can use the huge dataset of their users to know what they like and propose them directly with artificial intelligence music that fits their taste. By doing so they will overcome artists music on which they gain less royalties. How could the market be organized to prevent such behavior and, still, encourage creation and enrichment of the AI? *c.* In our analysis we have been working on a south Korean company, called Moneybrain, who develop ai version of real model such as a tv news presenter. The ai model can then totally replace the original model and act and speak like the original. How could we organize contracts that take this reality into account? Where is the frontier between intellectual property and image rights? Similarly, for the video games, movie sector. d. Companies like Amper Music and Spotify have already implemented AI able to generate unlimited music. There is a threat for the market to see those companies generate unlimited base of content to limit the creativity. Is this for you a serious threat? Could similar threat apply to your sector?

	(Regarding the generation of optimized AI-based materials). e. Can we consider a human creation (like a painting) more valuable than one made by artificial intelligence?
9) IP and Digital economy	e. What is your opinion on the property rights granted for works made by artificial intelligence? Should we give the property rights to the customer, the company, the AI Itself and why? f. How a company willing to integrate AI in its business model could protect it? Which are the key challenges arising from AI patentability? Some algorithms are designed to generate a huge number of robust patents, is AI even affecting the way businesses register patent and their competitive intelligence?
Conclusion	Thanks for your time

Appendix 11:: Interview Guide: Law Experts

Migle LAUKYTE, Professor of cyberlaw and cyberights at Pompeu Fabra University & Ana ANDRIJEVIC, teaching and research teaching assistant at the University of Geneva

Introduction

Hello and thanks for this interview.

Who: We are Manuel Martins da Silva and Guillaume Nicolas, we are master students in business Engineering at the LSM Louvain School of Management, which is part of UCLouvain.

What: This interview is part of our master's thesis "*AI-based production of content: obstacles, threats, and opportunities*.". Indeed, in order to carry out qualitative study of the subject, we aim at conduct various interviews with professionals from AI & digital fields.

Why: Migle Laukyte, Professor of the course "Law and AI".

How: This conversation will be registered for the only purpose of this master's thesis and will never be broadcast. The answers of this interview will only be used in our master's thesis as well as the transcription of this interview. Do you agree with the modality of this interview?

Interview

Subjects	**Additional questions**
10) Presentation and position	h. Brief presentation of your academic and professional background i. In what consists of your work? *Key activities, key competences, degrees, uniqueness*
11) Legislative interrogations	l. Regarding the use of protected works in a dataset to nourish an AI algorithm, some countries (such as Japan) already indicated that it would be "permissible to exploit a work in any way" in the case of development of a technology linked to recorded sounds or visual works." m. Does this interpretation of the law is correct: does it mean therefore that Amper Music for example or Spotify could use dataset of real singers to produce their own music? If not does the condition "any case that

	does not involve the expressions of feelings underlying in one's work" allows it? n. What are your thoughts regarding a liberation of copyright rights regarding the use of AI algorithm as UK / Europe promotes extended use of data under certain conditions (respect IP rights so far)?
12) Authorship	a. The UK legislation considers the author of a computer-generated work a "*person by whom the arrangements necessary for the creation of the work are undertake*n". This lead to an anthropocentric definition of the authorshipas it requires a human author for the computer-generated works. For the case of Amper Music/Spotify does it mean that the music generated would be owned by company/ the customer? b. Professor Lionel Bently of the faculty of Law of the University of Cambridge, cited by González Otero & Quintais (2018) wonders on this subject if AI would not disrupt the copyright content market with low-cost and highly produced works. This fear of the legislator may induce obstacles in the future for ai-based businesses. What are your thoughts, are current anti-trust regulations not sufficient? c. What are your thoughts on granting legal personality to an AI? Arguments for: will fill the responsibility gap, but also foster innovation and developments. Arguments again: negative consequences of such a decision regarding the negative incentives for human developers. EU considers it is no time to ask the question right now.
13) General questions	d. Regarding the music sector. Some huge music platforms like Spotify started to develop their own AI music. They can use the huge dataset of their users to know what they like and propose them directly with artificial intelligence music that fits their taste. By doing so they will overcome artists music on which they gain less royalties. How could the market be organized to prevent such behavior and, still, encourage creation and enrichment of the AI?

	e. Regarding AI-based works, how do you think the market will evolve? Guarantee the copyright for the company to support the development of algorithm, create an AI legal personality? Should a separate sui generis system of protection be envisaged for original literary and artistic works autonomously generated by ai? *f.* In our analysis we have been working on a south Korean company, called Moneybrain, who develop ai version of real model such as a tv news presenter. The ai model can then totally replace the original model and act and speak like the original. How could we organize contracts that take this reality into account? Where is the frontier between intellectual property and image rights? Similarly, for the video games, movie sector. g. Companies like Amper Music and Spotify have already implemented AI able to generate unlimited music. There is a threat for the market to see those companies generate unlimited base of content to limit the creativity. Is this for you a serious threat? Could similar threat apply to your sector? (Regarding the generation of optimized AI-based materials). h. Can we consider a human creation (like a painting) more valuable than one made by artificial intelligence?
Importance of Data structuration in companies	j. With the increasing development of Bid Data, especially in Huge companies, what are the risks and opportunities for a company to structure its data? k. And one of this advantage would be AI, what are ur beliefs regarding the development of AI in all sectors as a competitive advantage?
Conclusion	Any further questions to us?

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Place des Doyens, 1 bte L2.01.01, 1348 Louvain-la-Neuve, Belgique | **www.uclouvain.be/lsm**