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The Use of AI in the Fashion Industry: The Impacts on Intellectual Property Rights

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Abstract

The fashion industry is constantly evolving and adapting to new technologies. Artificial Intelligence (AI) is one of the most transformative and disruptive technologies that are being adopted by the fashion industry as it can be used to create designs, and patterns, analyse consumer data, and help customer services.

With the increasing use of AI in the fashion industry, important legal questions arise, especially in terms of intellectual property (IP). Therefore, understanding how AI impacts intellectual property rights is important as AI tools are disrupting some central concepts in IP law. This master thesis will explore the impact of AI-generated outputs on the different IP rights, namely copyright, patents, designs, trademarks, and trade secrets, as well as the challenges and strategies for protecting AI-generated outputs in the fashion industry.

Considering the impact of AI on IP rights, this master thesis aims to analyse the different legal questions that are emerging from AI-generated outputs, and which are being objects of discussion by the IP community, regarding copyright, patents, designs, trademarks, and trade secrets. In particular, in this thesis we are going to explore the challenges of protecting AI-generated outputs within the current European legal frameworks, namely, we will examine each requirement for protection under each European legal IP right system using for this purpose literature, legislation, and case studies. Moreover, we intend to point out these issues because AI can be helpful and be seen an opportunity for fashion brands, but they also can lead to legal conflictive situations.

Keywords: Fashion; Artificial Intelligence; AI systems; AI-generated works; Copyright; Patents; Designs; Trademarks; Trade Secrets; Protection of IP rights; EU law.

Abbreviations

AG: Advocate General

AI: Artificial Intelligence

AGI: Artificial General Intelligence

ANI: Artificial Narrow Intelligence

ASI: Artificial Super Intelligence

CJEU: Court of Justice of the European Union

CDR: Community Designs Regulation

DD: Design Directive

DL: Deep Learning

EC: European Commission

EPC: European Patent Convention

EPO: European Patent Office

EUIPO: European Union Intellectual Property Office

EU: European Union

EUTM: European Union Trademark

EUTMD: European Union Trademark Directive

EUTMR: European Union Trademark Regulation

GDPR: General Data Protection Regulation

Ibid: Ibidem

IP: Intellectual Property

ML: Machine Learning

Pg: page

RCD: Registered Community Designs

TS: Trade Secrets

The Berne Convention: The Berne Convention for the Protection for Literary and Artistic Works of 1886

TRIPs Agreement: Agreement on Trade-Related Aspects of Intellectual Property Rights

UCD: Unregistered Community Designs

WIPO: World Intellectual Property Organization

WTC: World Intellectual Property Organization Copyright Treaty

1 Introduction

Fashion brands are increasing their investments in technology, and according to the McKinsey State of Fashion Technology Report for 2022, it is expected that fashion companies by 2030 will have invested between 3 and 3.5 percent of their revenues in technology[1]. Moreover, the global artificial intelligence (AI) in the fashion market is expected to grow at a CAGR[2] of 36.9 percent between 2019 and 2027, amounting to 4.4 billion US dollars by 2027[3]. Therefore, we are assisting a continuous growth of the fashion industry and its transformation by adopting AI systems. Many fashion brands are integrating AI technologies to support their businesses, for example, using these technologies in their creative processes, to provide personalised services to customers, to forecast and predict trends, etc. Thus, we can say that fashion brands and AI systems are working together to enhance their strengths and to achieve innovation. However, as GUADAMUZ stated, "*the rise of the machines is here, but they do not come as conquerors, they come as creators*"[4]. With the increasing use of AI systems in the fashion industry it is important to analyse how AI can impact intellectual property (IP) rights.

The aim of this master thesis is to have an overview of the current technologies being used by fashion companies, see how the European legal framework is dealing with issues that this usage brings, how these issues are being tackled, and obtain solutions for the protection of outputs created with the assistance or autonomously by AI systems. Furthermore, the protection of AI tools as IP raises interesting legal questions to which we will try to get answers.

This dissertation consists of a literature review and is structured into five chapters, being the first one the introduction.

Secondly, we address different definitions to the concept of artificial intelligence and legally analyse it.

In the third chapter we mention the relation between AI and the fashion industry and show how fashion companies are using AI systems, by enumerating different examples of these applications.

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[1] McKinsey State of Fashion Technology Report for 2022, May 2022. Available at: <https://www.mckinsey.com/industries/retail/our-insights/state-of-fashion-technology-report-2022#/>. Accessed on 04/03/2023.

[2] Compound Annual Growth Rate

[3] SMITH, P. Global artificial intelligence in the fashion market value 2018-2027. Statista. February 17, 2022. Available at: <https://www.statista.com/statistics/1070736/global-artificial-intelligence-fashion-market-size/>. Accessed on 04/03/2023.

[4] GUADAMUZ, A. Artificial Intelligence and Copyright, WIPO Magazine (2017). Available at: <https://www.wipo.int/wipo_magazine/en/2017/05/article_0003.html>. Accessed on 10/02/2023.

The fourth and main part of the thesis includes an analysis of the impact of AI on each one of the IP rights. In the sub-chapter 4.1. we address the impact on the EU copyright system, and focus on the following questions: Can AI generated content be considered works and be protected as such under the copyright law? And if so, who will hold the rights? Then, in the sub-chapter 4.2., we centre our analysis on AI and patents by answering questions such as if AI is allowed to be the inventor or owner of IP rights or this nomination should be exclusively attributed to human beings. Moreover, in the sub-chapter 4.3, we take a look at the impact of AI in designs and consider if the result generated by an AI system can or cannot be protected as a design. In the sub-chapter 4.4 the focal point is on trade marks and the issue of ownership of an EU trade mark by an AI tool and on the potential infringements that AI can have on trade marks. Finally, in the sub-chapter 4.5. we study the potential protection of AI-generated outputs under the trade secret framework.

Lastly, final considerations are presented enlightening the main findings pointed out in the thesis. Furthermore, attention to the implications of AI in IP rights it's called out especially to the users of these technologies.

2 Artificial Intelligence

This chapter aims to provide a definition of AI, a summary description of AI systems, and a brief mention of the legal background within the EU.

2.1 Definition

There are many definitions for AI, so in the absence of a universal one, the right definition will depend on the context and on the field that is being used.

In the context of this thesis and especially for the Intellectual Property approach, the EUIPO already mentioned that "*AI is commonly understood as a subfield of computer science that focuses on the development of computer systems that can perform tasks that would normally require human intelligence*"[5]. WIPO has also defined the concept of AI in a similar way, i.e., as "*a discipline of computer science that is aimed at developing machines and systems that can carry out tasks considered to require human intelligence, with limited or no human intervention*"[6]. Moreover, the AI Act[7], which establishes mandatory requirements applicable to the development of AI systems before they are placed on the market, provides us with a definition for AI in article 3(1). Thus, according to this article, AI system means "*software that is developed with techniques and approaches (listed in Annex I) and can, for a given set of human-defined objectives, generate outputs such as content, predictions, recommendations, or decisions influencing the environments they interact with*".

Apart from the definition provided in the AI Act, defining the concept of AI has been a sensitive matter for lawmakers, therefore, on March 3, 2023, the European Parliament seemed to reach a clearer definition of AI. Thus, this new definition describes AI as "a *system designed to operate with varying levels of autonomy that can, for explicit or implicit objectives, generate outputs such as predictions, recommendations, or decisions influencing physical or virtual*

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[5] EUIPO, "*Impact of Technology Deep Dive Report I: Study on the Impact of Artificial Intelligence on the Infringement and Enforcement of Copyright and Design*", March 2022, pg. 40. Available at: <https://euipo.europa.eu/tunnel-web/secure/webdav/guest/document_library/observatory/documents/reports/2022_Impact_AI_on_the_Infringement_and_Enforcement_CR_Designs/2022_Impact_AI_on_the_Infringement_and_Enforcement_CR_Designs_FullR_en.pdf>. Accessed on 05/01/2023.

[6] WIPO CONVERSATION ON INTELLECTUAL PROPERTY (IP) AND ARTIFICIAL INTELLIGENCE (AI) Second Session. *Revised Issues Paper on Intellectual Property Policy and Artificial Intelligence prepared by the WIPO Secretariat*. WIPO/IP/AI/2/GE/20/1 REV. May 21, 2020. Available at: <https://www.wipo.int/edocs/mdocs/mdocs/en/wipo_ip_ai_2_ge_20/wipo_ip_ai_2_ge_20_1_rev.pdf>. Accessed on 05/01/2023.

[7] European Commission, "*Proposal for a Regulation of the European Parliament and of the Council: Laying Down Harmonised Rules on Artificial Intelligence (Artificial Intelligence Act) and Amending certain Union Legislative Acts"*, Brussels, 21.4.2021 COM (2021) 206 final. Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A52021PC0206>. Accessed on 05/01/2023.

environments"[8]. Nevertheless, reaching a harmonised definition for AI is not an easy work as this technology is always evolving, so it is possible that further changes to this definition will occur in the future.

2.2 Classification of AI

According to SARKER[9], there are five types of AI, such as analytical, functional, interactive, textual, and visual. Analytical AI is used to assist in data-driven decision-making as it identifies and interprets patterns of data. The functional AI similarly to the analytical AI, can process large quantities of data, but instead of only making recommendations, it executes actions. In terms of interactive AI, this type refers to interactive and communication automation. While the textual AI refers to textual analytics and can recognise text and generate content. Finally, visual AI is capable of recognising, classifying, and converting images into insights.

Moreover, we can distinguish three categories of AI based on the weakness and strongness of this technology. Therefore, from the weakest to the strongest AI we can classify it as artificial narrow intelligence (ANI), artificial general intelligence (AGI), and artificial super intelligence (ASI). So, ANI is considered weak in the sense that it is only able to complete a very specific task, whereas AGI and ASI can perform tasks on par with another human[10].

Lastly, it is relevant to mention the relation between AI, ML, neural networks and DL. So, as EUIPO defined "*machine learning is a subfield of AI that focuses on the creation of applications that learn from data and are able to progressively improve their accuracy*."[11] Thus, a neural network[12] is a system in which machine learning algorithms work together and process complex data entries. In turn, DL is a subset of ML and refers to the depth layers in a neural network, as it automates feature extraction piece of the process, eliminating the human intervention[13].

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[8] BERTUZZI, L. EU lawmakers set to settle on OECD definition for Artificial Intelligence. March 7, 2023. EUROACTIV. Available at: <https://www.euractiv.com/section/artificial-intelligence/news/eu-lawmakers-set-to-settle-on-oecd-definition-for-artificial-intelligence/>. Accessed on 10/03/2023.

[9] SARKER, I.H. *AI-Based Modeling: Techniques, Applications and Research Issues Towards Automation, Intelligent and Smart Systems.* SN Computer Science (2022) 3:158. Available at: <https://link.springer.com/article/10.1007/s42979-022-01043-x#citeas>. Accessed on 20/12/2022.

[10] KAVLAKOGU, E. AI vs. Machine Learning vs. Deep Learning vs. Neural Networks: What's the Difference? IBM. May 27, 2020. Available at: <https://www.ibm.com/cloud/blog/ai-vs-machine-learning-vs-deep-learning-vs-neural-networks>. Accessed on 20/12/2022.

[11] See *supra* note 5.

[12] According to LUCE, "*neural networks are a subcategory of machine learning* [and] *are created with layers that compute information in parallel"*. – See LUCE, L. 2018. *Artificial Intelligence for Fashion: How AI is Revolutionizing the Fashion Industry*. Apress Berkeley, CA. 1st Edition. 2019. Pg. 13. Available at: <https://doi.org/10.1007/978-1-4842-3931-5>. Accessed on 16/02/2023.

[13] See *supra* note 10.

2.3 Legal analysis

The European Commission published in April 2021 an important legislative proposal for an AI Act, the first legal framework on AI.

According to the AI Act, we can characterise risks in four levels: unacceptable risk; high-risk; limited risk, and minimal risk. In a simple way, the unacceptable risk incorporates four types of technologies, such as social scoring, dark-pattern AI, manipulations, and real-time biometric identification systems[14]. The high-risk level refers to AI systems intended for use "*as safety components of products subject to third party ex ante conformity assessment and autonomous AI systems with implications on fundamental rights"*[15]. Regarding the limited risk level, it applies to three types of technologies: deep fakes; AI systems that are meant to interact with people, and AI biometric categorization systems. Therefore, and taking into consideration all the risks appointed, we can say that AI systems used by companies in the fashion industry are on the limited risk level, because the technologies used, as we are going to see in the next section, are intended to interact with customers through the collection of large amounts of data which allows fashion brands to predict trends, provide personalised services and recommendations to customers.

[14] GESLEY, J. European Union: Commission Publishes Proposal to Regulate Artificial Intelligence. Library of Congress, May 26, 2021. Available at: <https://www.loc.gov/item/global-legal-monitor/2021-05-26/european-union-commission-publishes-proposal-to-regulate-artificial-intelligence/>. Accessed on 09/01/2023.
[15] See *supra* note 7.

3 Artificial Intelligence and the Fashion Industry

The fashion industry is embracing the opportunities that come with the integration of AI. Currently, we are assisting a transformation in fashion industry by the introduction of AI applications in different processes of the production and creation of designs and in day-to-day activities of fashion brands. AI is seen as an opportunity due to the fact that it is capable of handling the 5V of big data, i.e., velocity, volume, variety, veracity and value[16].

In fact, AI allows fashion designers to create innovative designs and patterns, analyse consumer data and helps customer services. Moreover, AI-generated designs are becoming increasingly popular in the fashion industry, as they can be created in a fastest way and are cost-effective. Therefore, for the purpose of introducing the main topic of this thesis, i.e., the impact of AI in the IP rights, it is important to firstly enumerate the current applications of AI by fashion companies.

3.1 Current artificial intelligence applications in the fashion sector

Before going into more detail about the protection of AI-generated designs, we must address the different ways that AI is being used in the fashion industry.

As mentioned previously, AI can help fashion retailers, brands, and designers make data-driven decisions that improve customer experience, reduce costs, increase profits, and make fashion more efficient.

AI can be used to analyse customer preferences and build personalised shopping experiences. In this regard, AI chatbots are used to interact with costumers and to make recommendations on what products match customers' needs, as well as to suggest additional products that may interest them, helping retailers in a certain way to become more efficient by predicting what people will want to buy. In other words, AI can be used to collect and analyse customer data to better understand their behaviour, which in turn can be used to create more effective marketing campaigns. Nowadays there are great AI-based services available for the general people, which improve their shopping satisfaction. For example, companies are using *Stich Fix*[17], a "virtual stylist", this means a personal styling service capable of creating suggestions suitable to its subscribers because of artificial intelligence-based algorithms that recognise tendencies and designs using a combination of clients' preferences answered in a first

[16] ABDALLA, H.B. *A brief survey on big data: technologies, terminologies and data-intensive applications*. Journal of Big Data 9:107 (2022). Pg. 4. Available at: <https://journalofbigdata.springeropen.com/articles/10.1186/s40537-022-00659-3>. Accessed on 04/01/2023.
[17] Women's Clothes | Men's Clothes | Kid's Clothing Boxes | Stitch Fix. Accessed on 04/01/2023.

quiz filled out by the subscribers. Moreover, some fashion companies are starting to use chatbots or AI smart assistants which help and assist clients in their shopping decisions. Some authors refer that "*chatbots may be seen as an essential, relevant interface element for many fashion e-commerce tasks such as providing recommendations, exploring and searching huge catalogues, complementing virtual fitting room's features, and delivering (post-sale) customer services*."[18] According to Schmelzer (2019) by "*using conversational interfaces, fashion brands can gather data by asking customers questions, understanding customer desires and trends, diving deeper into their purchase patterns, and suggesting related and add-on items.*"[19] An example of this is Louis Vuitton's Digital Assistant Chatbot[20] implemented by the luxury brand in 2017, in connection with Facebook messenger, which gives customers a more sophisticated, visual and conversational online buying experience with the use of AI technology.

Additionally, AI can be used to predict future trends, which is beneficial to stay ahead of the competition. An innovative platform is *Stylumia*[21], "*a trends forecasting solution company*"[22], which predicts customer trend demand and future fashion trends, and their "*products are powered by proprietary fashion AI, one-of-its-kind Demand Sensing machine learning algorithms augmented with customer demand signals*"[23]. According to Kavya Arora[24], director of a fashion brand called *Femella*, through the use of *Stylumia* they were able to improve the wholesale adoption of their designs in 300%. Moreover, some fashion brands are now celebrating partnerships to optimize their business. For example, in June 2021, *Moët Hennessy Louis Vuitton* and *Google Cloud* announced a partnership[25] to develop new cloud-based artificial intelligence solutions, which is expected not only to enhance demand forecasting and inventory optimization but also to elevate customer experiences by

[18] LANDIM, A. R. D. B.; PEREIRA, A. M.; VIEIRA, T.; COSTA E. de B.; MOURAC, J. A. B.; WANICK, V., BAZAKI, E. *Chatbot Design Approaches For Fashion E-Commerce: An Interdisciplinary Review*. International Journal of Fashion Design, Technology and Education, 2022, Vol. 15, NO. 2, 200-210. Available at: <https://www.tandfonline.com/doi/epdf/10.1080/17543266.2021.1990417?needAccess=true&role=button>. Accessed on 07/01/2023.

[19] SCHMELZER, R. *The Fashion Industry is Getting More Intelligent With AI.* Forbes. July 16, 2019. Available at: <https://www.forbes.com/sites/cognitiveworld/2019/07/16/the-fashion-industry-is-getting-more-intelligent-with-ai/?sh=53b339e33c74>. Accessed on 08/01/2023.

20 ARTHUR, R. *Louis Vuitton Becomes Latest Luxury Brand to Launch a Chatbot.* Forbes. December 8, 2017. Available at: < https://www.forbes.com/sites/rachelarthur/2017/12/08/louis-vuitton-becomes-latest-luxury-brand-to-launch-a-chatbot/?sh=3516a51bfe10>. Accessed on 04/02/2023.

[21] Stylumia | Trend Forecasting Solution For Fashion & Lifestyle | Fashion AI. Accessed on 10/02/2023.

[22] Ibid.

[23] Ibid.

[24] Ibid.

[25]BOULLARD, F. *LVMH and Google Cloud Create Strategic Partnership for AI and Cloud-Based Innovation*. Available at: <https://r.lvmh-static.com/uploads/2021/06/pr_lvmh_google.pdf>. Accessed on 10/01/2023.

personalization. Another example is *Heuritech*[26]'s AI-based trend forecasting which allows fashion brands to develop their creative process due to the technology' capacity to predict trends up to one year in advance.

AI-enabled tools can also be used for inventory management, i.e., fashion companies can track the status of their inventory in real-time and receive updates on new products or restocking needs. By helping with supply chain management, retailers and brands can manage their inventory and automate the production process, reducing the amount of time and resources it takes to produce a product.

Moreover, AI can also be used to automate the design process. Fashion companies can use AI to create unique designs and patterns, or even to generate entire collections based on customer feedback. AI can optimise the production process, for example by helping to identify the most cost-effective production methods and materials. In this field, the first operating system for fashion is *CALA*[27], "*the leading fashion design interface that unifies the entire design process – from product ideation all the way through e-commerce enablement and order fulfilment – into a single digital platform.*"[28] Another example is the Japanese designer Yuima Nakazato who is considered the pioneer of the future of AI-infused fashion. This designer combines 3D technology with AI systems to make his creations. So, "*he first takes the client's measurements using a 3D scanner, before transferring the data to a machine which directly cuts the different parts of the fabric to assemble the full garment*"[29]. Lastly, with the same aim of producing sustainable fashion, some designers collaborated with a machine learning engineer and created the laboratory *Synflux*[30], which "*generates optimized fashion pattern modules which are then modeled using computer-aided design software*"[31].

Finally, AI is also being used to detect fashion forgeries and counterfeit goods and can be used to analyse the patterns of authentic items, and then automatically detect counterfeits, helping fashion retailers protect their intellectual property. For instance, *Burberry*[32], a well-

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[26] <https://www.heuritech.com/heuritech-suite/#market-insight>.
PONCELIN, C. *How The Platform Forecasts Fashion Trends*. February 24, 2020. Available at <https://www.heuritech.com/articles/fashion-solutions/how-heuritech-forecasts-fashion-trends-thanks-to-artificial-intelligence/>. Accessed on 10/01/2023.
[27] CALA · Run your fashion brand. Accessed on 04/02/2023.
[28] Ibid.
[29] MOLLARD, M. *Bridging the gap between Artificial Intelligence and creativity in fashion*. Heuritech. June 2, 2020. Available at: <https://www.heuritech.com/articles/fashion-solutions/artificial-intelligence-fashion-creativity/>. Accessed on 04/02/2023.
[30] https://synflux.io/. Accessed on 04/02/2023.
[31] See *supra* note 25.
[32] NATTER, B. *Artificial Intelligence and Its Impact on the Fashion Industry: Contemporary Legal Considerations*. Haug Partners LLP. October 9, 2020. Pg.2. Available at:

known fashion brand started to use AI and big data to enhance its customers' shopping experience and as a tool to circumvent counterfeit goods. In fact, to detect if a product is real or fake, the brand is using Entrupy's AI-empowered, image-recognition technology, which is claimed to have a 99% of accuracy in the identification of counterfeit goods[33].

So, we can divide the use of AI in the fashion industry into two categories: use in the retail process and use in the designing process. Therefore, it is in this second category that more potential legal issues arise in respect of the protection of AI-generated fashion outputs, which we will analyse and focus in the next chapter.

<https://haugpartners.com/article/artificial-intelligence-and-its-impact-on-the-fashion-industry-contemporary-legal-considerations-2/>. Accessed on 20/11/2022.

[33] Ibid.

4 Implications of AI on IP Rights

As nothing comes without a cost or a consequence, the use of AI in the fashion industry is not an exception. In other words, despite all the mentioned benefits that AI brings to fashion brands, legal implications and issues arise from its growing application.

In this section we are going to analyse and tackle the different legal issues and cases that are starting to appear in the field of IP rights and that threaten the protection of fashion brands.

4.1 AI and Copyright

The protection under copyright laws has been for so long an ally of fashion brands since they protect a wide range of creations, in specific literary and artistic works. But when AI starts to be used in fashion designs, we end up with questions such as: Is a production made with the aid of AI systems a work? Can AI systems output be protected as work under EU copyright law? If so, who will be considered the author? Who will own the creation?

These are all the questions that arise from the use of AI in fashion and that will be analysed in this chapter.

4.1.1 Legal Framework

To answer all those questions, we firstly need to look at the EU copyright law and especially at the requirements to be protected.

There are three main international conventions relevant to the EU copyright law, namely the Berne Convention for the Protection of Literary and Artistic Works[34], the World Intellectual Property Organization Copyright Treaty[35], and the Agreement on Trade-Related Aspects of Intellectual Property Rights[36].

The EU copyright law does not have a definition for the concept of work. Nevertheless, the Term Directive states that a copyrighted work is "*an intellectual and artistic work within the meaning of the Berne Convention*". This is also not a general definition of work. Hence, we should see the concept of work in the Berne Convention. Under this Convention, creation is considered as work if four basic requirements are fulfilled: *(i)* production in the 'literary,

[34] Berne Convention for the Protection of Literary and Artistic Works of 1886. (The Berne Convention) Available at: <https://www.wipo.int/edocs/pubdocs/en/wipo_pub_berne_birpi.pdf>. Accessed on 15/01/2023.
[35] World Intellectual Property Organization Copyright Treaty of 1996. (WTC). Available at: <https://www.wipo.int/wipolex/en/text/295157>. Accessed on 15/01/2023.
[36] Agreement on Trade-Related Aspects of Intellectual Property Rights. (TRIPs Agreement). Available at: <https://www.wto.org/english/docs_e/legal_e/27-trips.pdf>. Accessed on 15/01/2023.

scientific or artistic domain'; *(ii)* be the product of human intellectual effort; *(iii)* originality/creativity; and *(iv)* expression.

In accordance with article 2(1) of the Berne Convention the expression 'literary and artistic works' means that it includes "*every production in the literary, scientific and artistic domain, whatever may be the mode or form of its expression*". This article provides us with a non-exhaustive list of what is considered as 'literary and artistic works', such as, for example, "*books, pamphlets and other writings*; (…) *works of drawing, painting*; (…); *photographic works to which are assimilated works expressed by a process analogous to photography; works of applied art; illustrations, maps, plans, sketches* (…)"[37]. In addition, the WTC and TRIPs Agreement and EU directives have harmonised types of works, such as computer programs[38], databases,[39] and visual works of art[40]. Moreover, in the CJEU *Cofemel*[41] case, it was stated that fashion designs are capable of being classified as works if fulfilling the requirements established in the *Infopaq*[42] and *Levola Hengelo*[43] cases, i.e., if they are original in the sense of being the author's own intellectual creation and are the expression of such creation[44].

The requirement of human intellectual effort means that only creations produced with human intervention are copyright protectable[45]. This goes in accordance with the finality of copyright laws in the sense that they aim to protect "*original expression directly emanating from a human creator*."[46]

[37] Article 2(1) of Berne Convention.
[38] Article 4 of the WTC; article 10(1) of TRIPs Agreement; and article 1 of the Software Directive – DIRECTIVE 2009/24/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 April 2009 on the legal protection of computer programs. Available at: <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32009L0024>. Accessed on 15/02/2023.
[39] Article 5 of the WTC; article 10(2) of the TRIPs Agreement; and article 3 of the Database Directive – DIRECTIVE 96/9/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 11 March 1996 on the legal protection of databases. Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A31996L0009>. Accessed on 15/01/2023.
[40] Article 14 of the Digital Single Market Directive
[41] Case C-683/17 – Cofemel – Sociedade de Vestuário SA v. G-Star Raw CV (2019) ECLI:EU:C:2019:721, par. 48.
[42] Case C-5/08 – Infopaq International A/S v. Danske Dagblades Forening (2009) ECR I-6569, par. 37.
[43] Case C-310/17 – Levola Hengelo BV v. Smile Foods BV (2018) ECLI:EU:C:2018:899, par. 40 and 41.
[44] Supra 23, par. 29.
[45] Opinion AG Trstenjak in Case C-145/10 – Painer, par. 121: "only human creations are therefore protected, which can also include those for which the person employs a technical aid, such as a camera". Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:62010CC0145&from=HR>. Accessed on 14/01/2023.
[46] HUGENHOLTZ, B., QUINTAIS, J.P., *Copyright and Artificial Creation: Does EU Copyright Law Protect AI-Assisted Output?* Springer Link. October 4, 2021. Pg. 1194-1195. Available at: <https://link.springer.com/article/10.1007/s40319-021-01115-0>. Accessed on 14/01/2023.

In terms of the originality criteria, in the EU, we have three Directives[47] that define a work as original if it is "*the author's own intellectual creation*". Moreover, in several CJEU cases, it was possible to harmonise the notion of originality. In *Infopaq*[48], the CJEU stated that an author could express his/her "*creativity in an original manner and achieve a result that is an intellectual creation*" "*through the choice, sequence and combination of those words*". Additionally, in the *Eva-Maria Painer*[49] case, the CJEU explained that a work is original and can be protected if it is an intellectual creation of the author which reflects his/her personality; and expresses his/her free and creative choices in its production.

Regarding the last requirement and not least important, the CJEU *Levola Hengelo*[50] case mentioned that a work must be expressed "*in a manner which makes it identifiable with sufficient precision and objectivity, even though that expression is not necessarily in permanent form*"[51].

So, in the next section, we will access if those requirements are met to consider AI-assisted creations as works and therefore copyright protected.

4.1.2 AI-generated designs are qualified as works?

As mentioned, the *Cofemel*[52] case was an important case as it harmonised the protection of fashion designs as works by copyright law in addition to design law. For that reason, we will now have to analyse if that protection can also be applicable to AI-assisted fashion outputs.

Regarding the first criterion, there is no doubt that AI fashion outputs and creations, such as designs and clothes produced with the aid of AI systems are in the artistic domain, and therefore meet this first requirement.

The second criterion, i.e., the human intellectual effort is also not problematic in terms of AI-generated designs because, as we saw in the *Painer* case, if the generated output has human intervention and contribution this requirement is fulfilled. In this sense, completely

[47] Article 1(3) of The Software Directive; Article 3(1) of the Database Directive; and Article 6 of the Term Directive – DIRECTIVE 2006/116/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 12 December 2006 on the term of protection of copyright and certain related rights. Available at: <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32006L0116>. Accessed on 15/01/2023.
[48] Case C-5/08 – Infopaq, par. 45.
[49] Case C-145/10 – Eva-Maria Painer (2011) ECLI:EU:C:2011:798, par. 99.
[50] Case C-310/17 – Levola Hengelo.
[51] Ibid, par. 40.
[52] Case C-683/17 – Cofemel.

autonomous AI creations i.e., outputs entirely generated by an AI system, copyright protection should not be granted[53].

The criterion of originality and creativity is the most important one. So, as mentioned in the previous section, the original requirement is met when it is "the author's own intellectual creation", in the sense that it must reflect the creative freedom of the author's choices. When it comes to AI-generated or assisted works we need to assess the level of creative choices that the author had to produce the final work because if "*the output lack*[s] *sufficient human creative effort expressing the exercise of free and creative choices and bearing the personal stamp of its human creator*, [it will] *not qualify as a copyright-protected work under EU copyright law*"[54]. Hence, once again, in *Painer*, the CJEU mentioned that we can have creative choices at various points in its production – in the preparation; when taking; when selecting.[55] Taking this case as a basis for our analysis, and as HUGENHOLTZ and QUINTAIS[56] underlined, we can have three stages of the creative process: conception, execution, and redaction[57]. According to those authors, the conception phase refers to the creation and elaboration of the design or plan of a work, while the execution phase involves converting that design or plan into a draft version of the final work, and finally, the redaction phase concerns the processing and reworks the draft version produced in the previous phase into a finalised product[58]. So, taking into consideration the various examples mentioned in the Chapter 3, AI systems are starting to produce fashion designs. However AI-generated designs nowadays still need some sort of human intervention to produce high-quality and value clothing. This is to say that AI-generated designs need human contribution whether at a preliminary stage, i.e., when configuring the machine and planning what the output will be, or at a later stage, in the redaction phase, as designers will have the final "word" as they will select what designs, products they will use and deliver to the market. Those kinds of interventions clearly show that even though machines/AI systems replace

[53] See *supra* note 46, Pg. 1196 and 2020 EP Resolution on IP rights for the development of AI technologies (2020/2015(INI)), P9_TA(2020)0277 par. 15. Available at: <https://www.europarl.europa.eu/doceo/document/TA-9-2020-0277_EN.html>. Accessed on 11/02/2023. According to the recent guidance published by the U.S. Copyright Office, like in the EU, the Office stated that "*to qualify as a work of 'authorship' a work must be created by a human being" and that it "will not register works produced by a machine or mere mechanical process that operates randomly or automatically without any creative input or intervention from a human author."* – See *Copyright Registration Guidance: Works Containing Material Generated by Artificial Intelligence*. U.S. Copyright Office. 37 CFR Part 202. March 16, 2023. Available at: 2023-05321.pdf (federalregister.gov)>. Accessed on 16/03/2023.

[54] BULAYENKO, O., QUINTAIS, J.P., GERVAIS, D, POORT, J. *AI Music Outputs: Challenges to the Copyright Legal Framework*. reCreating Europe Report. February 2022. Pg. 34 – 35. Available at: <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4072806>. Accessed on 11/02/2023.

[55] Case C-145/10 – Painer, par. 90 and 91.

[56] See *supra* note 46.

[57] See *supra* note 46, Pg. 1201.

[58] See *supra* note 46, Pg. 1202 – 1203.

humans in some phases, such as when processing data to map users' preferences to create personalised designs, humans still have an important role in the creation process. Having this said, if fashion designers and creators intervene in this process, the original and creative requirements will be fulfilled[59].

Finally, if the creator's creativity is "expressed" in the AI-assisted production we met the last criterion. That is "*the human author must have a general conception of the work before it is expressed, while leaving room for unintended expressive features*"[60]. In HUGENHOLTZ and QUINTAIS opinion even though it may be difficult for authors to predict or explain the outputs due to the "black box" characteristic of the ML system, it will be possible to consider this requirement met, and therefore consider the AI-assisted output as a work if the "*output stays within the ambit of the author's general intent*"[61].

In light of the above, not all AI-assisted or generated outputs will qualify as copyright-protected work, however, in terms of AI-generated designs in the fashion industry, if a human author is present in the production, then we can consider that it deserves to qualify as a work under the EU copyright law. This is to say that on the contrary, purely AI-generated works, i.e., produced without the presence of a human author, cannot be granted copyright protection[62].

Furthermore, AI tools, generally, are integrated with databases to provide value-added services, and this raises the question of whether the databases related to an AI system are object of protection under the sui generis right. So, the sui generis right for database makers is provided by the Database Directive[63] and it protects the content of databases. So, to obtain sui generis protection the maker of a database needs to show that "*there has been qualitatively and/or quantitatively a substantial investment in either the obtaining, verification or presentation of the contents to prevent extraction and/or re-utilization of the whole substantial part"*[64]. So, if the database is an original work of art, it can be protected through copyright, which ensures that no one else will be able to duplicate, modify, or share the database in any way. This database's content is not protected by copyright, only its structure[65]. So, if an AI tool has a database that

[59] The U.S. Copyright Office recently published a guidance for copyright protection, where the Office stated that "*In these cases, copyright will only protect the human-authored aspects of the work, which are "independent of" and do "not affect" the copyright status of the AI-generated material itself."* – See *supra* note 56.
[60] See *supra* note 46, Pg. 1025.
[61] See *supra* note 46, Pg. 1206.
[62] The U.S. Copyright Office recently published a guidance for copyright protection, where it concludes in this same way, i.e., the Office stated that "If a work's traditional elements of authorship were produced by a machine, the work lacks human authorship and the Office will not register it." – See *supra* note 56.
[63] Article 7 of the Database Directive.
[64] Ibid.
[65] Article 3(2) of the Database Directive

can be accessed electronically or by other methods, it can be protected through sui generis rights for its content or through copyright for its form.

4.1.3 Authorship of AI-generated works

A work and authorship are complementary because if there is no work, there will be no authorship, and vice-versa[66]. When there is a contribution from both a human and a machine, the AI-generated designs will be qualified as works, which then leads to an authorship issue. This is who will be the author of AI-assisted creations? The AI itself, the AI developer, or the user of the AI system?

The Berne Convention does not define authorship. However, it seems only logical to define author and authorship as the person who created the work, i.e., "*the person whose expression originates from the intellectual creation*"[67]. Moreover, according to FROSIO[68], "*an author is defined as a natural person, a group of persons or a legal person*." In this sense, we can completely exclude from the equation the AI itself because it is a machine and not a natural person and therefore we should not give a legal personality to an AI system[69].

Hence, for the purpose of analysing who will be considered the author of the AI-generated work, we may have two "candidates": the user of the AI system and the AI developer[70]. So, on the one hand, the user of the AI system is the person that engaged in creative choice, even if he/she did not execute the work him/herself. In their analysis, HUGENHOLTZ and QUINTAIS[71] followed the three-phase model of creativity and mentioned that when the conception and the redaction phases entail creative choices by human beings which justify the protection under copyright law, we may attribute authorship to the person or persons[72] individually or collectively engaging in those creative choices. However, when the user of the AI system has a passive action, i.e., as these authors mentioned, he/she only "pushes buttons"[73], then in those cases the user will not be considered an author. On the other hand, attributing

[66] See *supra* note 46, Pg. 1207.
[67] YILMAZTEKIN, H.K. (2022). *Artificial Intelligence, Design Law and Fashion* (1st ed.). Routledge. Pg. 110. https://doi.org/10.4324/9781003355922.
[68] FROSIO, G. *Four theories in search of an A(I)uthor*. Chapter 8 [156-178]. In Research Handbook on Intellectual Property and Artificial Intelligence. Edited by Ryan Abbott. Published by Edward Elgar Publishing Limited. 2022. Pg. 162.
[69] NOTO LA DIEGA, G., *Associate Professor Guido Noto La Diega's Comments on WIPO's 'Draft Issues Paper on Intellectual Property and Artificial Intelligence'* (WIPO/IP/AI/2/GE/20/1) (December 21, 2019). WIPO Public Consultation on AI and IP Policy, 2020, Available at SSRN: <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3551908>. Pg. 12. Accessed on 16/02/2023.
[70] See *supra* note 46, Pg. 1208.
[71] Ibid.
[72] When more than one person contributed to the process and creation of a work, we have a case of co-authorship.
[73] See *supra* note 46.

authorship to the AI developer may not be possible as they do not "*collaborate in a material way with the users in generating specific output*"[74]. For instance, we might have here a case of co-authorship in particular cases of concerted creative effort between the user and the developer of the AI system, but this will be unlikely for commercial reasons[75]. Overall, the possible author for AI-generated outputs and specifically AI-generated designs will be the users of the AI systems, i.e., the companies' designers.

However, we should also take into consideration that the concept of authorship in the fashion industry can be different from the legal concept under the copyright framework. HÄRKÖNEN and SÄRMÄKARI stated that "[a]*uthorship in fashion has traditionally been difficult to achieve, and a status primarily given to designer with fame and accolades. However, copyright law grants any human being who produces an identifiable subject matter by making free and creative choices the position of 'author'. Copyright-authorship pays no attention to fame and merits*"[76]. So, the appearance of digital fashion[77] designs, which are created with 3D software, and are being used in games, virtual realities platforms such as the Metaverse, brings the fashion authorship and copyright-authorship concepts closer, because if a digital fashion design meets the requirements of originality, it will be considered as a work, which, in consequence, will be copyright protected.

4.1.4 Ownership of AI-generated works

In relation to the previously analysed issue of authorship regarding AI-generated designs there is also the problem of ownership of those works.

Generally, the owner of a work is the person responsible for its creations, therefore in the same logic regarding AI-generated works the person who has the responsibility for the creation should be aimed as the owner, which will usually be the user of the AI system.

However, in projects of fashion design, we may have specialised groups allocated to the development of a design with AI, this is a team of persons that can be designers and contribute to the creation of a work. Those groups are constituted by different actors each one of them with specific roles, i.e., the principal designer, the AI coder, the AI goal selector, the AI data

[74] See *supra* note 46, Pg. 1209 and reference mentioned there.
[75] Ibid.
[76] HÄRKÖNEN, H., SÄRMÄKARI, N. *Copyright and digital fashion designers: the democratization of authorship?* Journal of Intellectual Property Law & Practice. January 2023. Pg. 27. Available at: https://www.researchgate.net/publication/366961513_Copyright_and_digital_fashion_designers_the_democratization_of_authorship>. Accessed on 14/02/2023.
[77] The emergence of digital fashion requires attention to the issue of authorship as it is not only a tool but a "*novel fashion culture linked to digital culture, the open-source attitude that characterises the values of digital fashion designers impacts their view of themselves as authors*". – Ibid. Pg. 3.

selector, and the AI trainer[78]. According to YILMAZTEKIN, "*if there is no principal designer, the five actors specified in the proximity approach should be given the co-ownership of a design, as there is a correlation between their actions and the development of the final appearance of the product*"[79].

4.1.5 AI and Copyright infringement

As we previously saw, AI systems are able of creating new works based on data, e.g., texts, images uploaded by users, creative works which are copyrightable. Thus, as AI cannot function without these inputs and learns from them, AI-generated works might sometimes engage in infringe activities. So, who will be liable when AI systems infringe? Can AI infringements be exempted? These are questions that lawmakers should take into consideration because nowadays, as mentioned previously, AI tools have not legal personality, leaving the role of author and owner of a work to the user or the developer of the machine. In this sense, we can say that when the AI-generated works infringes another work, we should hold the responsibility for the infringe activities to the users and/or developers of the AI system. Contrarily, when AI generates works autonomously, the question of who will face liability is still to be answered by lawmakers.

As the current EU copyright system does not gives us a precise answer to these issues, it is expected that in the future some changes will be adopted because by holding accountable the users and/or developers it might give rise to conflictive situations and discourage the use of AI technologies[80].

4.2 AI and Patents

AI applications can be used to assist fashion brands in the invention process or can constitute a part of the invention, and they are viewed as tools and not as systems that can invent. In a lot of cases, AI tools function based on computer programs, and it is here that the patentability of those programs might cause a problem, as it is not harmonised across jurisdictions. In addition, as the use of AI in invention processes is increasing[81], AI-

[78] See *supra* note 67, Pg. 179.
[79] Ibid.
[80] BONADIO, E. DINEV, P., MACDONAGH, L. *Can artificial intelligence infringe copyright? Some reflections*. Chapter 13 [245-257]. In Research Handbook on Intellectual Property and Artificial Intelligence. Edited by Ryan Abbott. Published by Edward Elgar Publishing Limited. 2022. Pg. 255 – 257.
[81] According to WIPO, the growth of AI as percent of total patents average growth between 2016-2020 was 718%. – See World Intellectual Property Report 2022: The Direction of Innovation. WIPO, 2022. Pg. 8. Available at: <https://www.wipo.int/wipr/en/2022/>. Accessed on 16/02/2023.

generated/assisted inventions rise questions about inventorship. Moreover, although AI-generated inventions make the process of inventing easier, it becomes more difficult to assess the inventive step. Thus, in this chapter we will try to answer the following questions: Should an AI system be considered the inventor or the owner of a patent? Are AI-generated inventions patentable?

4.2.1 Legal Framework

According to article 52(1) of the EPC[82], any invention in all fields of technology should be considered patentable as long as they are *(i)* new[83], *(ii)* involve an inventive step[84] and *(iii)* are susceptible of industrial application[85]. So, the requirements for patentability are that it must be an invention considered new which involves an inventive step and has an industrial application. Furthermore, in accordance with article 83 of the EPC, an invention shall be sufficiently disclosed in a "*clear and complete* manner that it *can be carried out by a person skilled in the art"* and must, according to article 42 of the EPC, relate to a technical field.

So, firstly, to be patentable, something should be considered an invention, however, the EPC does not provide us with a definition. But Article 52(2) of the EPC, inversely, contains a non-exhaustive list of what shall not be regarded as inventions, like discoveries or scientific theories, aesthetic creations, schemes, rules and methods, computer programs, and presentations of information. Thus, the inventive step is an important requirement for defining an invention. Article 56 of the EPC mentions that "*an invention is considered as involving an inventive step if, having regard to the state of the art, it is not obvious to a person skilled in the art*". Moreover, a 'person skilled in the art' "*is presumed to be a skilled practitioner in the relevant field of technology who is possessed of average knowledge and ability*"[86]. In accessing the inventive step, the EPO applies a 'problem-solution approach', which consists of three steps: *(i)* determining the closest prior art; *(ii)* establishing the objective technical problem to be solved and *(iii)* considering whether the claimed invention would have been obvious to the skilled person.[87]

[82]Convention on the Grant of European Patents (European Patent Convention) of 5 October 1973. Available at: <https://www.epo.org/law-practice/legal-texts/html/epc/2020/e/EPC_conv_20230201_en_20230201.pdf>. Accessed on 20/01/2023.
[83] Article 54 of the EPC.
[84] Article 56 of the EPC.
[85] Article 57 of the EPC.
[86] EPO Guidelines for Examination, Part G – Chapter VII – 3. Available at: <https://www.epo.org/law-practice/legal-texts/html/guidelines/e/g_vii.htm>. Accessed on 20/01/2023.
[87] Ibid. Chapter VII – 5.

4.2.2 Patentability of AI-generated inventions

The rationale of the patent system is namely to incentivise innovation and reward inventors as well as promote economic growth. According to ABBOTT, the recognition of AI as inventors will incentivise investment and thereby innovation[88]. This author also states that when it comes to AI-generated inventions, the applicant should be the owner of the patented invention.

Regarding the question of whether an AI system can be named an inventor, we should take as an example the *Thaler v Vidal* case[89] which concerned the applications filed by Thaler naming an AI system (DABUS) as the inventor. So, Thaler has sought to obtain patent protection by considering DABUS as the inventor in several jurisdictions[90]. In all jurisdictions, the applications have been rejected by the courts as they all considered that only a natural person can be an inventor, consequently, this role cannot be attributed to an AI. Furthermore, some authors say that AI-generated inventions should not be patentable because AI systems do not need incentives to invent as human beings do, and considering the current IP legal framework AI cannot be listed as the inventor in relation to patent applications.

Nevertheless, as the use of AI in inventive processes is starting to grow, the legal framework might change in the future. Along this line, the European Parliament stated that "*the legislative framework on IP must continue to incentivise and protect AI innovators by granting them patents as a reward for developing and publishing their creations* and that *the existing laws are mostly future-proof"*[91], though certain adjustments can be implemented.

4.3 AI and Designs

Designs are extremely relevant in the fashion industry, therefore with the constant growth of the production of designs with the help of AI systems, this alliance between AI and

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[88] MITRA-KAHN, B. *Economic reasons to recognise AI inventors*. Chapter 20 [376-390]. In Research Handbook on Intellectual Property and Artificial Intelligence. Edited by Ryan Abbott. Published by Edward Elgar Publishing Limited. 2022. Pg. 377.

[89] Case No. 21-2347 – Thaler v. Vidal. United States Court of Appeals for the Federal Circuit. Available at: <https://law.justia.com/cases/federal/appellate-courts/cafc/21-2347/21-2347-2022-08-05.html>. Accessed on 25/01/2023.

[90] EPO – see the decision of 21 December 2021. ECLI:EP:BA:2021:J000820.20211221. Available at: <https://www.epo.org/law-practice/case-law-appeals/recent/j200008eu1.html>.
Australia – see case Commissioner of Patents v Thaler (2022) FCAFC 62. Available at: <Commissioner of Patents v Thaler [2022] FCAFC 62 (13 April 2022) (austlii.edu.au)>. Accessed on 25/01/2023.
UK – see case Thaler v. Comptroller (2021/0201). Available at: <https://www.bailii.org/ew/cases/EWCA/2021/1374.html>. Accessed on 25/01/2023.

[91] European Parliament Resolution of May 3, 2022, on Artificial Intelligence in a digital age (2020/2266(INI)). Par. 140. Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52022IP0140&qid=1670499536488>. Accessed on 29/01/2023.

designs results in some IP issues. So, the main issue that arises is whether AI can fulfil the legal requisites to be considered as a designer and, therefore, be protected by design law.

This subchapter seeks to address this issue and get an insight into the relationship between AI-generated designs and design protection while trying to answer the questions of who will own the design rights and who will be liable when an AI-generated fashion design commits infringements?

4.3.1 Legal Framework

As designs are important in a variety of fields, principally, in the fashion industry, it is essential to define the concept of design and see how it is being protected under the EU IP framework. The two main legislative instruments that aimed to unify the protection of designs within the EU are the Community Design Regulation[92] (CDR) and the Design Directive (DD)[93]. So, according to article 3(a) of the CDR, a design refers to *"the appearance of the whole or a part of a product resulting from the features of, in particular, the lines, contours, colours, shape, texture and/or materials of the product itself and/or its ornamentation*". On 29 November 2022, the EC published proposals for a new CDR[94] and Directive[95]. These two legal instruments aim to reform the system for the protection of designs and, in addition, to encourage innovation and the creation of new designs in the digital age. So, among the various amendments proposed, there is a new definition of design and product which aims to cover the future of designs due to the constant advances in technology and the emergence of new technologies, such as 3D technology, non-fungible tokens (NFTs) and the metaverse. Thus, the new definition of design includes "*the movement, transition or any other sort of animation of those features"*[96] that contribute to the appearance of designs and the definition of product

[92] COUNCIL REGULATION (EC) No 6/2002 of 12 December 2001 on Community designs. Official Journal of the European Communities. L003, 05/01/2022. Available at: < https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=celex%3A32002R0006>. Accessed on 29/01/2023.
[93] DIRECTIVE 98/71/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 13 October 1998 on the legal protection of designs. Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A31998L0071>. Accessed on 29/01/2023.
[94] Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL amending Council Regulation (EC) No 6/2002 on Community designs and repealing Commission Regulation (EC) No 2246/2002, COM(2022) 666 final. Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52022PC0666>. Accessed on 29/01/2023.
[95] Proposal for a DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on the legal protection of designs (recast), COM(2022) 667 final. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52022PC0667>. Accessed on 29/01/2023.
[96] Ibid, Article 2(3).

covers "*any industrial or handicraft item other than computer programs, regardless of whether it is embodied in a physical object or materialises in a digital form*"[97].

Some authors[98] mention that design law cannot be addressed as an independent area of law but instead as "*an accidental hybrid with features of both patents and copyright*"[99]. Like patent and copyright laws protect inventions and creations and attribute IP rights to an inventor or author, design law also guarantees the protection of designs and the exclusive right to use that design, which includes "*making, offering, putting on the market, importing, exporting or using the product in which the design is incorporated or to which it is applied, or stocking such a product for those purposes*"[100] and also gives authorisation to third parties' usage.

As mentioned previously in the subchapter 4.1., under EU law fashion designs can be, in some cases, double protected, i.e., under copyright and design law[101]. In accordance with article 1 of the CDR, designs can be protected as Registered Community Designs (RCD)[102] and Unregistered Community Designs (UCDs)[103]. Nevertheless, for fashion designs to be protected as that, they must meet some criteria, namely *(i)* be new and *(ii)* have individual character[104]. Hence, a design will be considered new "*if no identical[105] design has been made available to the public*"[106] and will be considered to have individual character "*if the overall impression it produces on the informed user differs from the overall impression produced on such a user by any design which has been made available to the public"*[107]. It is to be underlined that in accessing the individual character, the degree of freedom of a designer while developing the design will be taken into consideration. In addition, the act of making it available to the public[108], essentially, means disclosing it. Furthermore, designs that disrespect public policies and moral standards are excluded from the protection under design law[109].

Additionally, there are three ways in which we can register fashions designs, namely, *"(i) a line drawing of the whole product and any unusual parts of the product such as a collar,*

[97] Supra 93, Article 2(4).
[98] COOK, T. *The impact of AI on designs law*. Chapter 18 [346-355]. In Research Handbook on Intellectual Property and Artificial Intelligence. Edited by Ryan Abbott. Published by Edward Elgar Publishing Limited. 2022.
[99] Ibid, p. 353.
[100] Article 19 of the CDR and Article 12 of the DD.
[101] Article 17(a) of the DD.
[102] RCD protects design owners against close copy designs and is valid throughout the EU. It can be renewed every five years giving appliers a maximum of 25 years of ownership.
[103] UCD can be obtained without formalities and gives protection to a design for a short period of time, i.e., 3 years, within the EU level. However, UCD cannot be renewed after that period.
[104] Article 4(1) of the CDR.
[105] Article 5(2) of the CDR: Designs are identical "*if their features differ only in immaterial details*".
[106] Article 5(1) of the CDR.
[107] Article 6(1) of the CDR.
[108] Article 7(1) of the CDR.
[109] Article 9 of the CDR.

sleeve or bag handle or clasp; (ii) a computer-aided drawing of the same item with shading to show depth, tone and colour contrasts; and (iii) a photograph of the actual product without branding"[110].

4.3.2 Protection of AI-generated designs

As mentioned before, in general, the design law does not impose any requirement of originality, but of novelty and individual character of a design. So, in relation to the creation of fashion designs through AI, we need to address what a generative design is. Therefore, a generative design is considered an "*exploration process in which designers select specific goals to add to the generative design software, along with selected parameters including performance requirements, materials, manufacturing methods. AI in generative design can produce a large number of concepts that are adapted to the project's requirements.*"[111] Briefly, in generative design, design parameters are established, and the AI then generates a model based on them. Thus, a design can be produced with the assistance of AI or may be entirely generated by an AI tool. So, in principle, designs created with the assistance of AI tools can make the object of protection through a registered design, but the applicants should bear in mind the two conditions for accepting the registration as a design.

4.3.3 Authorship of AI-generated designs and collections

Once more, the question of who will have authorship in designs created with the assistance of AI systems arises, because most of the design legislation refers to a human being as the author of a design. It should be noted that the concept of authorship in design law, differently from copyright law, does not represent a central character. This is to say that, as mentioned, in copyright law a work and an author are complementary and dependent on each other. On the contrary, in design law, the central role is on the design itself and not on the author/ designer, knowing that the design results from human effort. Nevertheless, the figure of a designer is important for the attribution of the respective design rights. The concept of the designer is not defined in the CDR, nevertheless, we can draw from different articles[112] of the CDR that a designer is a person who develops the design. In this sense, authorship of a design right will be recognised to the designer or if more than one person collaborated in the creation process, we will have a joint authorship. Consequently, it seems that nowadays the design

[110] See *supra* note 67, Pg. 41.
[111] See *supra* note 5, Pg. 12.
[112] Articles 6(2), 10(2), 14(2) and 14(3) of the CDR.

regime within EU law is constructed under a theory of human centrality. Hence, admitting AI authorship of a design right is not, at least for now, a reality, because the law is not intended to grant the authorship and ownership to a machine. Additionally, the law does not make clear who should be the designer and, in consequence, the owner of the design right. But, by applying the same considerations of authorship of AI-generated designs in copyright law, we can consider that the user of the AI, i.e., the designer, should be seen as the author of AI-generated designs because he/she is only using AI systems as assistants for the creation of designs. This means that designers are currently using the assistance of AI devices as a tool or an assistant and not as the main author of the designs[113]. Moreover, currently, AI systems are dependent on data that the programmer (the designer) inputs, and therefore, although they can self-learn and create through that data, they still need human involvement[114]. In this sense, a design can be sought by the developers of the AI tool but also by the designer of those AI tools, i.e., by the human behind the AI-generated designs.

4.3.4 Infringements of AI-generated designs

The second issue that we will tackle is the liability in cases of design infringement caused by AI-generated designs because, as we saw, AI systems can create a range of designs by learning with the data that was introduced previously in the machine. In this sense, AI-generated designs are created by the input of large amounts of data leaving designers with little control over the outputs. In this view, YILMAZTEKIN[115] mentioned that AI systems used to create fashion designs are likely to infringe design right in three ways, specifically by "*(i) gathering a digital corpus of training data, where a selection of fashion designs (or copyright works) is digitised and/or reproduced in preparation phase for training; (ii) making authorised intermediate copies of images during training in neutral networks*[116]*; (iii) generating a derivative work that reproduces elements of an original design*".

So, under EU law there is a case of design infringement when the design does not create a different overall impression[117] on the informed user. Moreover, we have infringement of

[113] DENNIS, C.A., *AI-Generated Fashion Designs: Who or What Owns the Goods?*, Fordham Intellectual Property Media & Entertainment Law Journal (2020). Pg. 636. Available at: <https://ir.lawnet.fordham.edu/iplj/vol30/iss2/6/>. Accessed on 20/02/2023.
HÄRKÖNEN, H. (2021). *Fashion and Copyright – Protection as a Tool to Foster Sustainable Development*. University of Lapland, 2021. [163-172]. Pg. 167. Available at: <https://www.researchgate.net/publication/355904325_Harkonen_H_2021_-_Fashion_and_Copyright_-_Protection_as_a_Tool_to_Foster_Sustainable_Development>. Accessed on 16/02/2023.
[114] Ibid, Pg. 611 and 642.
[115] See *supra* note 67, pg. 57.
[116] See *supra* note 12.
[117] Article 10 of the CDR.

RCDs[118] when there is any use of the design without the consent of the right holder and of UCDs[119] when the use of the design results from copying. From this framework on the one hand, the first two previously mentioned potential cases of infringement by AI systems are not considered infringing acts as they are not uses of a design on a product, i.e., they are pure digitisation without any commercial use of the design itself. On the other hand, the third case can lead to design infringement under EU law if the AI-generated design uses protected designs and if it produces an overall impression on the informed user.

4.4 AI and Trademarks

Trademarks, like other IP rights, create exclusive rights for their holders and prevents others from using them by protecting their brand name, logo, patterns, etc. As mentioned, AI systems can be used by fashion brands in different ways, but they are also present in our daily lives, namely in online shopping. Many brands are using AI tools for assisting their online businesses, such as AI chatbots, search engines, and product recommendations to consumers based on past purchases, preferences, and trends. Therefore, AI tools can assist those brands by providing a more accurate and personalised service to customers which, in consequence, impacts purchase decisions, influence consumer behaviours, and, therefore, the role of trademarks. So, according to WIPO, in relation to trademarks, questions arise respecting registration, infringement, and unfair competition[120].

4.4.1 Legal Framework

A trademark is a sign that can indicate the commercial origin of goods and services, this is to say a sign that possesses a distinctive character. Under the EUTMR and EUTMD, a trademark consists of "*any signs, in particular words, including personal names, or designs, letters, numerals, colours, the shape of goods or of the packaging of goods, or sounds*"[121].

The rationale for trademark protection is to safeguard trades in the marketplace, i.e., preserve the distinctiveness of signs and protect consumers against the risk that they might be confused as regards the commercial origin of goods and services. So, according to article 4 of

[118] Article 19(1) of the CDR.
[119] Article 19(2) of the CDR.
[120] See *supra* note 6, Pg. 12.
[121] REGULATION (EU) 2017/1001 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 14 June 2017 on the European Union trade mark. Article 4. Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32017R1001>. Accessed on 17/02/2023.
DIRECTIVE (EU) 2015/2436 OF EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 December 2015 to approximate the laws of the Member States relating to trade marks. Article 3. Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32015L2436>. Accessed on 17/02/2023.

the EUTMR[122] and article 3 of the EUTMD[123] to be registered the signs must be capable of *(i)* distinguishing the goods or services of one undertaking from those of other undertakings and *(ii)* being represented on the Register in a manner that enables the competent authorities and the public to determine the clear and precise subject manner of the protection afforded to its proprietor. Moreover, the protection of a sign as a trademark depends on the required level of protection which is intended. Finally, the concept of average consumer is relevant for trademarks as it allows us to determine the distinctiveness and lack of confusion of a sign. So, the legal term 'average consumer' is defined as the relevant consumer/public[124]. So, to determine the relevant public we need to consider two factors, such as "*the territory defined by the earlier mark* and *the goods and services that have been found identical or similar"*[125].

4.4.2 AI and Trademark authorship and infringement

One question that we need an answer to, is whether AI tools should be considered the owner of a EUTM. The EUTMR says that the proprietors of a EUTM can only be a natural or legal person, including a public authority[126]. Therefore, at least in the EU trademark system, AI technologies cannot be the owners of a trademark, leaving that role to the human being who applied for protection. As mentioned, AI systems can influence consumer behaviours, i.e., when an AI system suggests products based on the consumer's online behaviour, preferences, market trends, and offline information, it might cause some temporary confusion due to the fact that the consumers depend on what is stored in their mind and barely compare trademarks. So, in general, when using AI systems for the online marketplace, as those tools can suggest several products based on different information, they can end up redirecting consumers to the website of the brand and suggest not only the product of that brand but also similar products of similar or other brands, which might lead to an act of trademark infringement, as those similar products can be counterfeit or of competitors. However, brands can turn this around by using AI tools for their benefit, this is using AI technologies to detect the likelihood of confusion and to identify infringement for reducing the counterfeiting of products.

Regarding the liability of trademark infringement situations that involve AI systems, courts have dealt in some cases with AI trademark infringements, namely regarding keyword

[122] Ibid.
[123] Ibid.
[124] EUIPO, *Guidelines for Examination of European Union Trade Marks*. Part C Opposition, Section 2, Double identity and likelihood of confusion. Version 1. February 1, 2020. Pg. 805. Available at: <https://guidelines.euipo.europa.eu/binary/1803468/2000170000>. Accessed on 20/02/2023.
[125] Ibid. Pg. 806.
[126] Article 5 of the EUTMR.

advertising. In the CJEU L'Oréal v. eBay[127], Google France[128] and Lush v. Amazon[129] cases, the court argued that the service providers eBay, Google, and Amazon would only be liable for trademark infringement if they were actively aware of the infringing activity. Therefore, in all those cases, the infringing party will be the one who has selected the displayed advertisement or search results. Thus, analogically, if an AI system provider has procedures to take down infringe activities and was not warned of infringing activities, they will not be liable for those activities. Moreover, according to ENGELS when AI is used within a business, the effective way to protect against liability is through contractual arrangements addressing liability distribution[130].

4.5 AI and Trade Secrets

Generally, trade secret law is seen as a special area of intellectual property law[131] that protects undisclosed know-how and business information against unlawful acquisition. The importance of trade secrets comes, in general, from two reasons. Firstly, the increasing value of trade secret information. Our current information-based economy is grounded in modern industries that rely extensively on intellectual property for their value. Secondly, "*trade secrets have gained importance because in many fields technology is changing so rapidly that it is outstripping the existing laws intended to encourage and protect inventions and innovations"*[132]. It is an additional advantage that trade secrets can enjoy indefinite protection, i.e., it lasts for as long as the information is secret.

Trade secrets may interact with patents in three situations, namely in a prior phase to patenting, as complements, or/and as alternatives. However, we should note that patent law and trade secret law have different protection purposes, i.e., while patent law promotes innovation and disclosure, trade secret law promotes secrecy and the maintenance of commercial duties.

The underlying protection afforded by trade secret law, in practice, translates into the protection of an intangible asset which allows the trade secret holder to profit from the

[127] Case C-324/09 – L'Óreal and Others. ECLI:EU:C:2011:474. Par. 88, 94, 107, and 145(6).
[128] Case C-236/08 – Google France and Google. ECLI:EU:C:2010:159. Par. 114, 116, and 120.
[129] Cosmetic Warriors Ltd and Lush Ltd v. Amazon.co.uk Ltd.
[130] ENGELS, G. *Liability for trademark infringement involving artificial intelligence*. In The Trademark Lawyer Magazine – A generation of counterfeit consumers: an interview with the EUIPO. CTC Legal Media. Issue 5 2022. Pg. 22. Available at: <https://www.4ipcouncil.com/research/generation-counterfeit-consumers-interview-euipo>. Accessed on 20/02/2023.
[131] MATULIONYTE, R., ARANOVICH, T. '*Trade secrets versus the AI explainability principle'*, Chapter 22 [405-422]. In Research Handbook on Intellectual Property and Artificial Intelligence. Edited by Ryan Abbott. Published by Edward Elgar Publishing Limited. 2022. Pg. 405.
[132] ALMELING, D. S. *Seven Reasons Why Trade Secrets Are Increasingly Important*. Berkeley Technology Law Journal, vol. 27, no 2, [University of California, Berkeley, School of Law], 2012, [1091-1118]. Available at: <https://btlj.org/data/articles2015/vol27/27_2/27-berkeley-tech-l-j-1091-1118.pdf>. Accessed on 20/02/2023

confidentiality. "*In the case of algorithmically driven products, disclosure of how the product works not only undermines its protection, it can destroy the creator's ability to exploit their intellectual property and can even render the product ineffective"*[133].

As we saw previously, for AI to be protected by patent or copyright law it needs to fulfil certain requirements, their protection is limited, and "[g]*iven that data plays a crucial role in the development and application of AI* (…)*, the fast evolution of the AI field which may not warrant payment of IP registration fees and the fact that AI is a technology that is generally difficult to reverse engineer, trade secrets are increasingly relied on to protect investment in collecting and curating data and innovation in the AI field."*[134]

As such, "*the flexibility afforded by trade secrets´ minimal substantive requirements and lack of a formal application process makes it a favored form of protection for innovators, start-ups, and companies seeking to protect proprietary software"*[135].

4.5.1 Legal Framework

With this initial introduction we have already an overview of the relationship between trade secrets and AI, but it is important to assess its legal framework. So, according to the Trade Secrets Directive[136] (TS Directive), "*trade secrets protect their holder from competitors who seek to use the protected innovation, if that competitor has obtained the protected information by an improper means or through misappropriation*"[137]. In accordance with article 2(1) of the TS Directive, "*trade secret means information which meets*" certain requirements *(i)* is secret[138]; *(ii)* is commercially valuable[139] and *(iii)* which the owner maintains reasonable steps[140] under the circumstances to keep it secret.

Thus, any type of undisclosed know-how can object to a trade secret, as Recital 2 of the TS Directive clarifies, trade secrets can relate to a "*diverse range of information that extends beyond technological knowledge to commercial data such as information on customers and*

[133] MOORE, T., *Trade Secrets and Algorithms as Barriers to Social Justice*. Centre for Democracy and Technology. Free Expression Fellow. August 2017. Available at: <https://cdt.org/wp-content/uploads/2017/08/2017-07-31-Trade-Secret-Algorithms-as-Barriers-to-Social-Justice.pdf>. Accessed on 20/02/2023.
[134] See *supra* note 6, Pg. 13.
[135] See *supra* note 131.
[136] DIRECTIVE (EU) 2016/943 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 8 June 2016 on the protection of undisclosed know-how and business information (trade secrets) against their unlawful acquisition, use and disclosure. Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32016L0943>. Accessed on 20/02/2023.
[137] Article 2(1) of the TS Directive
[138] Article 2(1)(a) of the TS Directive
[139] Article 2(1)(b) of the TS Directive
[140] Article 2(1)(c) of the TS Directive

suppliers, business plans, and market research and strategies". However, the developers of AI systems need to engage in reasonable efforts to maintain the secrecy of their AI-related information.

4.5.2 Protection of AI applications as trade secrets

As noted in the previous sections, given the challenges of companies to protect their AI systems under patent law, "[t]*rade secret laws appear to be an especially useful tool since they can be used to protect different parts of an AI technology, including the algorithm and its parameters, training datasets, source code, and the entire trained module (which includes all above mentioned elements)"*[141]. Therefore, information that is not patentable but is essential for the development of an AI application or an AI-generated output, namely, AI training data[142] and raw data, may be the object of trade secrets protection. So, we can say that with respect to the AI systems themselves in opposition to their outputs, different aspects of AI systems can be protected by trade secret law. However, not all AI-related information will qualify for trade secret protection, which is why companies that claim trade secret protection need to identify the parts of the AI systems that might be a trade secret. In the fashion industry what companies may want to protect are the software tools used for fashion design, the list of key buyers, or even logistics management of the entire value chain.

Apart from the advantages of the protection under trade secret law that were mentioned before, the use of trade secrets to protect AI technologies gives rise to a different issue: the balance between trade secrecy and transparency. As AI technologies are usually described as functioning as a 'black box', that is they make decisions without human supervision, and then it is not possible to identify exactly what factors contributed in what way to a specific output. As mentioned above, being commercially valuable is one of the requirements for trade secret protection. Nevertheless, the determination of this requirement might be a challenge when we are faced with 'black box' algorithms because the more time passes, the more data is processed, which makes it difficult to explain precisely what they do.

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[141] See *supra* note 129, Pg. 406.

[142] "Data can be any character, text, word, number, and, if not put into context, means little or nothing to a human". – See NORDBERG, A. *Trade Secrets, Big Data and Artificial Intelligence Innovation: a Legal Oxymoron?* in Jens Schovsbo, Timo Minssen, Thomas Riis (eds.) The Harmonization and Protection of Trade Secrets in the EU: An Appraisal of the EU Directive (Edward Elgar, 2020). Available at: <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3565866>. Accessed on 22/02/2023.

According to the EU Report[143], *"transparency is one of 7 key requirements to the realization of trustworthy AI"*. Other include human agency and oversight, technical robustness, and safety, privacy and data governance, diversity, fairness, and accountability[144]. The principle of transparency, (which also finds a seat in relation to data collection, in the General Data Protection Regulation, and in other important instruments) relates, as regards AI systems, to the data, the system itself, and the business model. But the need for transparency conflicts with the purpose of trade secrets as the increase in transparency implies more human involvement on the company´s side which results in a higher risk of leakage of their trade secret. In turn, explainability means that the user can understand why a specific decision was taken in relation to a specific set of facts. Explainability might be harder to achieve in some systems than others, especially in AI systems as they are complex and opaque. Thus, transparency and explainability are necessary, but "*the degree to which they are needed is highly dependent on the context and the severity of the consequences if that output is erroneous or otherwise inaccurate"*[145]. So, transparency and explainability need to be balanced with other interests – in this case, those of the fashion companies, and their stakeholders. Therefore, the balance between the demands of transparency and trade secrets may thus be reached by the inclusion of a neutral third party in the relationship.

Hence in the fashion industry, the use of AI systems allowed companies to collect and analyse an unthinkable quantity of data that "*reveals, on a massive scale, what products are selling, the key features of those products worth imitating in a competing fashion line, where they are selling, at what price points, and following trends"*[146]. For instance, AI "*permits competitors to draw on this data and numerous other public information sources to provide detailed estimates of manufacturing costs and methods, product sale strategies, and sales performance"*[147]. In consequence, with the growth of AI tools, companies in the fashion industry must now more than ever protect these kinds of information from their competitors, by using trade secret laws.

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[143] *European Commission Report on Ethics Guidelines for Trustworthy AI*. April 8, 2019. Pg.8 Available at: <https://op.europa.eu/en/publication-detail/-/publication/d3988569-0434-11ea-8c1f-01aa75ed71a1>. Accessed on 17/02/2023.
[144] Ibid, Pg. 8.
[145] Ibid, Pg. 13.
[146] FORNI, W., QUARMBY, B., MICHAELI, D. *AI Creates Legal Challenges For The Fashion Industry*. Law 360. April 25, 2018. Available at:< https://www.mololamken.com/assets/htmldocuments/AI-Creates-Legal-Challenges-For-The-Fashion-Industry.pdf>. Accessed on 23/02/2023.
[147] Ibid.

5 Conclusion

From the different ways that AI is being used by fashion brands we were able to identify the current applications of AI in the fashion industry and acknowledge that they can make the work easier and optimise time, especially for the invention and creation processes. As mentioned, it is expected that companies continue to invest in AI technologies to enhance their businesses and be one step ahead of their competitors. Therefore, the future of AI in the fashion industry seems exciting. A variety of benefits are brought to companies, for example, the big quantities of data that these tools can analyse, the personalised design recommendations given to customers and designers, which can enhance not only designers' creativity but also customer experiences, and the capacity to help companies to reduce waste, be more efficient and sustainable. Although the future of AI can transform the fashion industry, it also poses various legal and intellectual property issues that need to be addressed and taken into consideration by the users of AI systems, by the developers of those systems, and by lawmakers.

By addressing the IP right issues raised in this thesis, we were able to analyse and have an overview of the most concerning questions regarding copyright, patents, designs, trademarks, and trade secrets and understand until what point the current EU legal IP right frameworks are suitable to be applied for the outputs generated by AI.

Going forward with some main conclusions from the analyses made in this thesis regarding each IP right, there are some points that need attention from lawmakers, users, and developers of AI systems. As explained in sub-chapters 4.1, 4.2 and 4.3, AI systems need to be trained to generate works, inventions, or designs. Therefore, as currently these technologies still need the contribution from the users or the developers to the production of those outputs, it seems accurate to grant protection of these creations under the current IP laws, as long as the main requirements are met, and thereby consider the users as authors, inventors or designers for this purpose. However, empirical research is lacking in terms of ownership allocation in relation to AI-generated outputs. In sub-chapters 4.4 and 4.5, it was mentioned that trade mark and trade secret protections of AI-generated outputs may also be available if they meet the legal requirements for registration and protection. However, in regard to trade marks infringing activities that might occur by the AI-generated outputs and in terms of trade secrets, it might be difficult to enforce if these outputs are leaked or misappropriated. In summary, the eligibility of AI-generated outputs for IP protection depends on the specific circumstances of each case, therefore a case-by-case analysis should be carried on.

This thesis has demonstrated that while current EU IP laws provide some protection of AI-generated creations, there are still some gaps that need to be fulfilled with the improvement and harmonisation between jurisdiction' systems. In terms of the legal systems for copyright and patents they appear to be broadly suitable to address the challenges raised by AI-generated creations and inventions. As for designs protection, the European Commission recently published two proposals for revisions of the Design Directive and of the Community Design Regulation[148], which indicate to us that policymakers are starting to look to the future of designs rights and trying to adapt the regime to the developments of technology to fit the legal system in the digital age. Moreover, now that the use of AI tools is in expansion, it is time for lawmakers and policymakers to look at these issues in a careful way because as society continues to face new developments of technology, there will be a demand for a legal framework that protects human beings' creativity and, in consequence, that incentivises innovation.

To conclude, like in any business, the implementation of AI technologies in companies should also be done in a strategic way, i.e., fashion companies need to be aware and consider all the eventual results and issues that may arise from the use of AI tools. In this sense, although fashion companies look at AI technologies as generating opportunities and competitive advantages, they should also bear in mind that they also come with challenges, namely regarding IP rights. This is to say that it is essential that the users of AI technologies consider if the generated works, creations, inventions, and designs, can be protected by IP rights or not, and who will be the owner of such output.

To sum up, the use of AI systems in the fashion industry seems to be very promising and is here to stay. However, challenges regarding IP rights are expected to arise and we will surely have case laws addressing these issues in the future and we will hear about upcoming changes in EU IP laws.

[148] See *supra* notes 92 and 93; European Parliament. *REVISION OF THE DESIGN DIRECTIVE AND OF THE COMMUNITY DESGIN REGULATION – In "A Europe Fit for the Digital Age"*. Available at: https://www.europarl.europa.eu/legislative-train/theme-a-europe-fit-for-the-digital-age/file-revision-of-the-design-directive-and-of-the-community-design-regulation>. Accessed on 02/03/2023.

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