e-ISSN 2281-6100

Ricerche giuridiche
Vol. 8 – Num. 2 – Dicembre 2019

3D Printing, a Bridge Between the World of "Bit and Atoms"

Mirco Caeran
Dottorando di ricerca in Diritto, mercato e persona nell'Università Ca' Foscari Venezia, Italia

Abstract This article examines the 3D printing (or AM technology), a groundbreaking technology which has been object of growing interest in the last decades, capable of creating goods and objects from nowhere thanks to a particular process that will be explained in the following paragraphs. The purpose of this essay is to draw the attention to the significant legal consequences that AM technology might produce, as far as production and consumption methods are concerned. And besides, other legal issues will be taken into consideration, as the impact of this technology on the subjects involved in the process and their juridical position.

Keywords 3D printing.AM Technology.Law & Technology.Civil liability.Product liability

Edizioni Ca'Foscari

Citation Caeran, M. (2019). "3D Printing, a Bridge Between the World of 'Bit and Atoms'". *Ricerche giuridiche*, 8(2), 65-88.

DOI 10.30687/Rg/2281-6100/2019/02/004

1 Introduction

The 3D printer firstly appeared more than three decades ago. Its operating principle is very easy: independently of the model in use, a 3D printer can create objects from nothing, through the overlapping of several layers of different materials, according to the instructions given by a digital project called CAD file.

There seem to be endless possibilities: from the realization of small plastic objects to the creation of human organs.

AM technology has the potential to become a disruptive technology capable of modifying the way in which consumer goods are designed, produced, distributed[1].

The most groundbreaking and complicated aspect to accept is the transformation of the bit that becomes atom, and the computer data that become material. By accepting this, it becomes analogously necessary to reassess the traditional legal categories dealing with the individuals involved in the production and consumption chain.

This paper lays the groundwork for further reflections on other legal issues related to AM technology, especially those related to civil liability[2] and the protection of intellectual property[3].

Indeed, interpreters and scholars must be acquainted with the phenomenon and understand how and to what extent the existing law can already provide the solutions needed.

However, this process needs the intervention of the European legislator. The creation of common definitions and standards will give to the operators of all European countries the freedom to move within a defined legal area, in order to experiment and evolve progressively, for the benefit of the whole community.

2 Preliminary Concepts

According to ASTM[4]: the "Additive manufacturing (AM), also known as 3D printing, uses computer-aided design to build objects layer

1 See C. Galli, A. Zama, *Stampa 3D. Una rivoluzione che cambierà il mondo?*, Bologna, 2014.

2 See E. Lindenfeld, J.L. Tran, *Strict Liability and 3D-Printed Medical Devices*, in *Yale Journal of Law & Technology*, 2015, vol. 17, pp. 1-4; A. Parziale, G. Comandé, *Stampa 3D e fab-lab tra quarta rivoluzione industrial e rischi di danno: il ruolo della responsabilità civile*, in *Opinio Juris in Comparatione, Studies in Comparative and National Law*, 2018, vol. 1, n. 1, p. 1 ss.

3 For further readings see C. Galli, A. Contini, *Stampanti 3D e proprietà intellettuale: Opportunità e problemi*, in *Riv. dir. ind.*, 2015, vol. 3, p. 115 ss.

4 ASTM International, known as American Society for Testing and Materials, is globally recognised as a leader in the development and exchange of technical standards for

by layer. This contrasts with traditional manufacturing, which cuts, drills, and grinds away unwanted excess from a solid piece of material, often metal"[5].

In other words: while traditional manufacturing methods are based on the realization of an object through drilling and cutting operations on a block of starting material, the AM is based on the overlapping of material in layers[6].

The 3D printer starts from bits to create atoms[7]. As a matter of fact this technology is based on the production of objects starting from a computer design file, named CAD file, which transfers the needed information to the printer[8]. Everyone can create a CAD file from scratch by using a software[9] or otherwise scanning an object through a 3D scanner while a software converts it all into a special format file that can be read by the 3D printer[10].

The 3D printer is currently used in several sectors. Those which seem to be the more profitable areas are: aerospace industry, biomedicine and consumer market[11].

The 3D printer, whether for personal or industrial use, offers an amount of benefits that are foreclosed to the traditional production

materials, products, systems and services.

For a general background of the subject of this paper see also Chui Ki Venus Ma, *3D Printing and the Law*, in *Intersect*, 2017, vol. 11, n. 1, pp. 1-23; A. Moir, A. Dempster, R. Montagnon, D. Bennett, R. Woods, *Focus: The legal implications of an emerging new technology*, in *PLC Magazine, Practical Law*, 2016, June, pp. 1-3; C. Anderson, *Makers: The New Industrial Revolution*, New York, 2012; M. Hatch, *The Maker Movement Manifesto: Rules for Innovation in the New World of Crafters, Hackers, and Tinkerers*, New York, 2013; M. Hatch, *The Maker Revolution, Building a Future on Creativity and Innovation in an Exponential World*, New York, 2018.

5 T. Wohlers, *Wohlers Report 2011: Additive Manufacturing and 3D Printing, State of the Industry*, 2011. *https://www.wohlersassociates.com/2011report.htm?*.

See also European Parliament, Committee on Legal Affairs, "*Working Document: Three-Dimensional Printing, a Challenge in the fields of Intellectual Property Rights and Civil Liability* (2017), *http://www.europarl.europa.eu/sides/getDoc.do?type=COMPARL&reference=PE612.302&format=PDF&language=EE&secondRef=01*.

6 R. Tacconi, *Economia, produzione, responsabilità civile: una nuova frontiera, le stampanti 3D - prima parte*, 2014, p. 5, *https://www.assinews.it/06/2014/economia-produzione-responsabilita-civile-una-nuova-frontiera-le-stampanti-3d-prima-parte/550023887/*.

7 L.S. Osborn, *Regulating Three-Dimensional Printing: The Converging Worlds O Bits And Atoms*, in *51 San Diego Law Review*, 2014, vol. 51, p. 553 s.

8 H. Lipson; M. Kurman, *Fabricated: The New World of 3D Printing*, New York, 2013, p. 85.

9 H. Lipson; M. Kurman, cit., p. 87.

10 See D. Mendis, *In Pursuit of Clarity: The Conundrum of CAD Software and Copyright – Seeking Direction Through Case Law*, in *European Intellectual Property Review*, 2018, vol. 40, n. 11, p. 694.

11 See F. Menghini, *Industria 4.0. Imprese e distretti nella web economy*, Firenze, 2018.

method[12].

AM technology sounds promising in terms of "local manufacturing model", in which products are made on demand in the place where they are needed, eliminating the massive inventories and the logistic costs aimed at transporting large volumes of products all over the world. The production lines and logistic chains can be delocalized, eliminated or reduced, through the realization of the final product or its components[13]. On the other hand, this new technology shows a few limits as well. The main ones are slowness (an object can be realised in few minutes to some hours, if not even days); solidity of the final product; the still quite high costs of machines and materials; reduced efficiency for mass production and poor resolution. However, it is to believe that technological progress and time will solve

12 *The Free Beginner's guide to 3d printing* (2014). *http://3dprintingindustry.com/3d-printing-basics-free-beginners-guide/*; Accenture Technology, *3D printing's disruptive potential*, 2014, *https://www.accenture.com/t20150523T041952__w__/us-en/_acnmedia/Accenture/Conversion-Assets/DotCom/Documents/Global/PDF/Industries_14/Accenture-Disruptive-Potential-3D-Printing.pdf*; B. Berman, *3-D printing: The new industrial revolution*, in *Business Horizons*, 2012, vol. 55, n. 2, p. 155; Deloitte llp, B. Grynol, *Disruptive manufacturing: The effects of 3D printing*, 2013, *https://www2.deloitte.com/content/dam/Deloitte/ca/Documents/insights-and-issues/ca-en-insights-issues-disruptive-manufacturing.pdf*; A. Sisson, S. Thompson, *Three Dimensional Policy: Why Britain needs a policy framework for 3D printing*, in *Big Innovation Centre*, 2012, p. 13, *https://www.biginnovationcentre.com/wp-content/uploads/2019/07/BIC_THREE-DIMENSIONAL-POLICY_16.10.2012.pdf*; S. Zhang, *Location Analysis of 3D Printer Manufacturing Industry*, Master Thesis, 2014, Columbia University, p. 12, *https://academiccommons.columbia.edu/download/fedora_content/download/ac:175484/content/ZhangShichen_GSAPPUP_2014_Thesis.pdf*.

The main advantage over the traditional industrial production method is that, thanks to a layered production process, it is possible to obtain easy access to the internal parts of the object and to reach the desired shape through a careful computer programming[7]. The application of this method allows to attain shapes that are more complex and intricate than those achievable with subtractive production.

See C. Klahn, B. Leutenecker, M. Meboldt, *Design for Additive Manufacturing - Supporting the Substitution of Components in Series Products*, in *Procedia CIRP*, 2014, vol. 21, p. 138 ss.; S. Hällgrena, L. Pejrydb, J. Ekengren, *(Re)Design for Additive Manufacturing*, in *Procedia CIRP*, 2016, vol. 50, p. 246 ss.; P.C. Priarone, G. Ingarao, V. Lunetto, R. Di Lorenzo, L. Settineri, *The role of re-design for Additive Manufacturing on the process environmental performance*, in *Procedia CIRP*, 2018, vol. 69, p. 124 ss.

A further advantage consists on the "mass personalization", intended as the ability of personalizing products in accordance with the subjective necessities. As far as the manufacturing industry is concerned, as the production volumes are medium-low, AM technology can eliminate the need for production-functional tools (as moulds). In this way, costs, time and work can be reduced, since the process is "single tool" and does not require moulds, instrumentation replacement and parts assembly. The 3D Printer is standing out as an efficient technology also from the environmental point of view. Firstly because it is possible to process the used materials in almost all (up to 90%), thus reducing industrial waste. Secondly, because a significant reduction of climate-altering gases can be achieved, such as CO_2 and CH_4. For further critical details see also: R. Olson, *3-D Printing: A Boon or a Bane?*, in *The Environmental FORUM*, 2013, vol. 30, n. 6, p. 34.

13 M. Koch, *3D Printing: The Revolution in Personalized Manufacturing*, Minneapolis, 2017, p. 83.

these problems[14].

3 An evolving economic paradigm

Early as February 2011 "The Economist" observed some features of the 3D printer, including that of making it cheap to print thousands of objects, so that economies of scale would be undermined[15].

From the manufacturing point of view this technology has the potential to modify the entire economic paradigm existing: both means and production sites may be altered by this new technology. The level of complexity of a product will no longer affect its cost. Customization will become a standard and any product could be comfortably made at home.

A breakthrough technology as the 3D printer will probably, in a few decades, change forever the way consumers and manufacturers buy and sell goods[16].

At present, in literature, there are three possible scenarios[17]:

- In-home 3d printing: model for which everyone could own a 3D printer similar to today's 2D printer, very common in our homes. People would have the possibility to print anything anywhere. The products would be tailored, individually designed and available at low prices. Files may be available in open-source or paid platforms.
- Print Shops: sophisticated 3D printers could be provided by local distributors as a paid service. Consumers could send their files to the shop or choose among the products available in the shop itself. Another possibility would be to supply 3D scanners to scan products in order to digitalize and print them: after all this is what we currently call "photocopy".
- Factories: the final product could be produced in a single process using high-tech and specialized 3D printers. The assembly, transport and distribution chains would be significantly reduced, not to mention the strong possibility of customization.

The industrial revolution has begun: manufacturing will go back from

14 For further reading see A. Council, M. Petch, *3D printing, The rise of the 3rd industrial revolution*, 2013, Giges 3D.

15 *Print me a Stradivarius, The manufacturing technology that will change the world*, in *The Economist*, 2011, vol. 2, p. 12. See also *The Third Industrial Revolution, The digitisation of manufacturing will transform the way goods are made - and change the politics of jobs too*, in *The Economist*, 2012, p. 4.

16 *Print me a Stradivarius*, *ibid*.

17 *Print me a Stradivarius*, *ibid*.; A. Sisson, S. Thompson, *Three Dimensional Policy: Why Britain needs a policy framework for 3D printing*, *op. ult. cit*.

large production volumes to individualized custom-made units. Production will be in local sites, reducing the need for expensive transport or ensuring savings on processing[18]. According to D'Aveni: "Economic operators through the entire retail, production and distribution chain will have to reconsider their strategies and operations[19]". Production will enter the private space, creating a new perception of the workplace and staff[20].

Today the traditional distribution chain requires the presence of a designer, a manufacturer and a retailer[21]. Each role of the chain influences the next stage: the designer provides the project to the manufacturer, who makes the product for the distributor, who eventually sells it to the consumer. Each depends on the other to meet the consumer's demand and at each step some resources are needed to enable the fulfilment of its purpose: the producer not only has to realize the product, but he must also have all the necessary tools and materials. Furthermore, he must have the means of production and produce goods to meet industrial standards: he is fully aware that he may be responsible for the losses and damages caused by a defective product, and for this reason (he carries out) periodic tests are carried out.

The "In-home printing" inserts the consumer in the distribution chain, leading specifically to the fusion of two elements of it. Two are the feasible scenarios to consider in relation to this issue:

Scenario 1: The consumer designs and prints his project. In this case, the consumer becomes designer, builder, consumer, merging in himself all the subjects of the distribution chain. The role of the distributor is instead expunged.

An ambiguous hypothesis happens when the subject downloads from internet the CAD (for example from an online community), then it is personalized and printed. All this makes the role of the designer complex: it is not clear what level of customization is required to transform the one who downloads in the designer of that particular project[22].

Scenario 2: the consumer downloads the CAD file and prints the product at home. This model has three core components: the first is

18 A. Council, M. Petch, *3D printing, The rise of the 3rd industrial revolution*, *op. ult. cit.*

19 R. D'Aveni, *3D printing will change the world*, in *Harward Business Review*, 2013, vol. 91, n. 3, p. 34.

20 K. Pierrakakis, M. Kandias, C.D. Gritzali, D. Gritzalis, *3D Printing and its Regulation Dynamics: The World in Front of a Paradigm Shift*, 2014, vol. 5, *https://www.infosec.aueb.gr/Publications/ICIL-2014%203D%20Printing.pdf.*

21 I. Stewart, T.T. Wohlers, *Rewriting the Rules: Additive Manufacturing Creates New Rules for Product Liability*, 2011, Litigation Management.

22 I. Stewart, T.T. Wohlers, cit.

the designer providing the project; the second is the website hosting the project, which acts as a retailer; the third is the consumer who is merged with the figure of the producer[23].

In both scenarios, the distribution chain turns out to be simplified.

The existence of open-source CAD communities makes product traceability more difficult. As Frandsen describes: "An open source software is a model of production and development of a product that is characterized by free access and distribution of the design and implementation details"[24]. This lack of traceability represents a significant risk to the quality control of goods. However, for the moment, no standard or norm for in-home 3D printing has been established[25].

The maker market has in fact generated a real distribution chain[26]. This new production model has developed from hobbyists who upload and share CAD files in websites, allowing others to download and modify projects. Once on the internet, the CAD can be distributed worldwide[27], for a fee or free depending on the website[28]. However, in spite of companies, which focus on safety and carry out tests for this purpose, home-made objects do not suffer the same fate: the consumer who decides to take on the role of the producer bears the risk of the lack of control over the product.

Obviously, the 3D printer could also remain only within the industrial world. Let us think about subcontracting: an entrepreneur could sell a cad file to another entrepreneur, in order to make the latter print the product, defining by contract the details of this activity, from the number of copies to the material to use.

23 I. Stewart, T.T. Wohlers, cit.

24 H.J. Frandsen, *A Commercial Perspective on Open Source Hardware - An Interdisciplinary Law and Management Investigation of the Personal 3D Printing Industry*, in *SSRN Electronic Journal*, 2012, *https://dx.doi.org/10.2139/ssrn.2285055*.

25 A. Harris, *The Effects of In-home 3D Printing on Product Liability Law*, in *Journal of Science Policy & Governance*, 2015, vol. 6, n. 1.

26 T. Wohlers, T. Caffrey, *How Additive Manufacturing Can Change Industry As We Know It*, 2013.

27 M. Weinberg, *It Will be Awesome If They Don't Screw it Up: 3D Printing, Intellectual Property, and the Fight Over the Next Great Disruptive Technology*, 2010, Public Knowledge.

28 D.R. Desai, G.N. Magliocca, *Patents, Meet Napster: 3D Printing and the Digitization of things*, in *Geo. LJ*, 2013, vol. 102, p. 1691. *https://ssrn.com/abstract=2338067*.

4 New subjects and new categories or modification of the existing ones?

Since law has born in order to give answers to social matters, it is first of all necessary to identify the kind of problem, so that it is then possible to understand if the novelties can be approached with the legal instruments already in use and, just after this, starting to think of a system innovation. The main problem with the standardization of technological phenomena is the legal instruments currently in possession were not designed to regulate phenomena so innovative, they couldn't even be foreseen or imagined.

AM technology challenges at least three areas of law: contractual relationships between the parties; intellectual property and defective product liability.

Each of these, therefore, deserves a specific analysis.

Nevertheless, before concentrating on the above-mentioned issues, it seems fair to wonder whether the categories of product/producer/buyer/consumer, as we know them, can still be applied.

In fact, the first question that emerges is that of understanding how to characterize in a juridical level what is realized through the 3D printer. Just as it is fundamental to frame the type of relationships between the subjects involved and the role they assume. In absence of these answers, it becomes extremely difficult to try to provide possible solutions.

5 The right between atoms and bits

The case of the Penrose Triangle might come in useful to our analysis.

The Penrose Triangle consists of the image of a triangle that looks three-dimensional due to an optical illusion. The image appeared for the first time in 1958 in the British Journal of Psychology. In 2010, it was uploaded to the Shapeaways website: at the cost of $70 it would be possible to get the CAD file of the famous triangle. Shortly afterwards a man, whose name was Tchoukanov, uploaded a similar model to an open source site (Thinginverse). The reaction was immediate: Shapeaways commanded the removal of the project for copyright infringement. The incident ended after a few months: the company withdrew the complaint letting it known that Thinginverse had deleted the file[29].

The case is important because it raises the question related to the protection of the object represented in the CAD file and to what

29 M. Maggi, *Utilizzo delle stampanti 3D: implicazioni legali*, 2015, *https://www.ilprogettistaindustriale.it/utilizzo-delle-stampanti-3d-implicazioni-legali/*.

can materially derive from it. In fact, the 3D printed object cannot be separated from the CAD file in any way.

The world of bits and atoms has never been so close before.

If up to this moment the idea was a sort of forerunner and antecedent to the object itself, now the idea becomes matter.

The purpose of this script is to insinuate a thought in the reader and provoke his intellect. As revolutionary as it may seem (and indeed, it really is) the CAD file, a numerical string, is an object and as such must also be considered juridically, with all the consequences that such an assertion entails.

With the rise of the 3D printer, the manufacturers will sell drawings and no longer physical objects. This means that the CAD file can already be considered the real object or product.

As a matter of fact, to make this technology works a designer uses a particular software (called Computer Aided Design) to realize the model. Once done it, the CAD file need to be converted in.stl format (Standard Triangulation Language). In this way, the draw is codified in "graphic triangles" which represent the surface of the solid. After that, the.stl file needs to be converted again throughout another software (the so-called "slicer") in G-Code, a new machine code which is necessary to dialogue with the 3d printer itself[30].

Scholars have tried to understand the nature of each of these 3 different kinds of files[31].

In Great Britain, for example, there is the belief that all of them can be considered software. By consequence, facing questions in the field of intellectual property law, it has been said that the directive 2009/24/EC can be applied. In fact, in spite of the lack of definition of the word "software", the 10th considerandum states: "The function of a computer program is to communicate and work together with other components of a computer system and with users". Given that the file CAD contains information enabling to make a hardware in function, as any other software it can communicate and operate with other components of a computer[32].

This conclusion, nevertheless, cannot be fully accepted.

30 See, L.S. Osborn, *The Limits Of Creativity In Copyright: Digital Manufacturing Files And Lockout Codes*, in *Tex. A&M J. Prop. L.*, 2017, p. 25 ss.

31 See R. Rivaro, *Stampa tridimensionale e diritti di proprietà intellettuale, riflessioni sulla proteggibilità del disegno CAD 3D*, in *Rivista di Diritto Industriale*, 2019, vol. 3, p. 226 ss.

32 S. Bradshaw, A. Bowyer, P. Haufe, *The Intellectual Property Implications Of Low-Cost 3d Printing*, in *ScriptEd*, 2010, vol. 7, n. 1, p. 1 ss.; D. Mendis, D. Secchi, *A Legal and Empirical Study of 3D Printing Online Platforms and an Analysis of User Behaviour*, London, 2015, p. 7 ss.; I. Silverman, *Optimising Protection: IP Rights in 3D Printing*, in *EIPR*, 2016, vol. 38, p. 5 ss.; A. Daly, *Socio-legal aspects of the 3D printing revolution*, London, 2016, p. 24.

The World Intellectual Property Organization in its "Model Provisions on the Protection of Computer Programs" defines computer programs as "a set of instructions capable, when incorporated in a machine – readable medium, of causing a machine having information-processing capabilities to indicate, perform or achieve a particular function, task or result".

If this is the worldwide most accepted definition of software than the CAD file cannot be considered properly a software. As a matter of fact, a software is a sequence of commands which enables a hardware to accomplish a certain task. On the contrary, CAD files do not contain any kind of this commands and they do not control at all the operativity of the 3d printer. They simply represent the printing projects which have been obtained by using the CAD software. [33]

It is the G-code which contains a sequence of commands necessary for the 3d printer to make physically the object. Thus, the G-code could be properly defined as a software.

For these reasons the CAD file has been metaphorically compared with a piece of digital paper on which it is possible to draw using a software instead of a pencil[34].

The last metaphor can be useful as starting point for whom trying to propose solutions to defend the intellectual property behind the printed objected, but it is not sufficient to solve the problems related to the loss and damages caused by printed products, i.e. in the field of Tort Law.

Thus, it is important make another step towards a clear definition of the CAD files because, as said, they are more than just a software. In the course of the time the legislator has already managed to consider as objects some "entities" that at first glance would seem to escape to this definition, attracting them to consumer goods discipline.

Here are a few examples.

Let us think about electricity.

For quite some time judges around the world have been reluctant to consider electricity as a product, while today it is a well-established question. In the past there was a time in which scholars had to choose how consider electricity. The question was resolved by understanding its nature, function and relation with the human world. This is, at least, what happened overseas. In fact, in 1979, when discussing a case concerning electricity, the American judges stated

33 See B. Rideout, *Printing The Impossible Triangle: The Copyright Implications Of Three-Dimensional Printing*, in *J. Bus. Entrepreneurship & L.*, 2011, vol. 1, p. 161 ss.; M.J. Antikainen, D.J.W. Jongsma, *The Art of CAD: Copyrightability of Digital Design Files*, in *3D Printing, Intellectual Property and Innovation, Insights from Law and Technology*, edited by R. Ballardini et al., Alphen aan den Rijn, 2017, p. 257 ss.

34 R. Rivaro, *Stampa tridimensionale e diritti di proprietà intellettuale, riflessio- ni sulla proteggibilità del disegno CAD 3D*, *op. ult. cit.*, p. 226 ss.

that it should have been regarded as a product because: "it is produced by man, confined, controlled, transmitted and distributed... in the flow of trade"[35].

The same reasoning should be conducted while thinking about 3d printers. We should be able to go beyond the mere technical aspects and defining a new reality in relation to the social and economic aspect, in a functional way which can create a dialogue between the "astract" world of the "source code" and the concrete world in which this code operates and interacts.

This is way it is possible to say that like electricity, a CAD file has all the above-mentioned characteristics.

Electricity was considered as having its own physicality, beyond the supply aspect. Despite its volatility and lack of the typical features of the matter, as man and law were accustomed to treat, it was classified as good, then as commodity, and today as product as well.

According to the Court of Justice of the European Union: "[...] *In Community law, and indeed in the national laws of the Member States, it is accepted that electricity constitutes a good within the meaning of Article 30 of the Treaty. Electricity is thus regarded as a good under the Community's tariff nomenclature (code CN 27.16). Furthermore, in its judgment in Case 6/64 Costa v ENEL [1964] ECR 1141 the Court accepted that electricity may fall within the scope of Article 37 of the Treaty*[36].

"It must be remembered, however, that in its judgment in Case C-393/92 Almelo and Others v Energiebedrijf IJsselmij [1994] ECR 1-1477, paragraph 28, the Court noted that it is accepted in Community law, and indeed in the national laws of the Member States, that electricity constitutes a good within the meaning of Article 30 of the Treaty. It noted in particular that electricity is regarded as a good under the Community's tariff nomenclature (Code C N 27.16) and that it had already been accepted, in Case 6/64 Costa v ENEL [1964] ECR 585, that electricity may fall within the scope of Article 37 of the Treaty".[37]

To conclude our *excursus* whose aim was to show how law evolves, managing to decline and catalogue in a new and original way the goods resulting from technological development, it is to emphasize that the European legislator himself has qualified electricity as a product in the Directive 1999/44/EC Of The European Parliament And Of The Council of 25 May 1999 on certain aspects of the sale of consumer goods and associated guarantees. See art. 2 let. C.

The analysis of the software can conduce to another more direct

35 Ransome v. Wis. Elec. Power Co. [1970], 87 Wis. 2d 605.

36 Case C-393/92, Gemeente Almelo v. Energiebedrijf IJsselmij NV. [1964] ECR 585, para 28. ECLI:EU:C:1994:171.

37 Case C-158/94, Commission of the European Communities v. Italian Republic [1997] ECR I-5789. ECLI:EU:C:1997:500.

analogy.

It is questionable whether they have to be considered as products or services. The major doctrine[38], in line with the European Commission, distinguishes between: a) Individual Software: intended as customized programs with the function of solving a client's particular problem. The conformation to the necessities of the customer is such that it is possible to consider it as an immaterial work of the intellect.

b) Standard Programs: industrially realized products and generally contained in media such as CDs. Since they are not in possession of the requirements of novelty and creativity, they are considered as products[39].

CAD files can be distinguished in the same way, considering as products only those of mass consumer goods.

Regarding the discussion on the software, a third category of them has been forgotten: software granted free or for sums of money in a restricted market, directly by individuals or small commercial companies. For years these software have been rare, but in the age of smartphones and apps, they are very common. The creators of these apps can be individuals without a sophisticated market system in their background and who do not place emphasis on marketing their program. The same happens to many CAD file creators. The diversity of actors in the CAD file economy should suggest to the judges to pay a particular attention to the way in which they approach and treat the aforementioned files[40].

Trying to define from a juridical point of view a CAD file is a difficult task because we are used to reason in a binary way: product or service. In the past, all the laws have been thought around these two categories. Even in the Treaty on the Functioning of the European Union, product and service are seen as two different entities, (starting with art. 34 and 56 TFEU). However, the arise of new technologies is challenging this binomial[41]. When trying to solve new problematic questions, in its oldest decisions, the CJEU drove its attention on the nature of things. However, this behavior leaded to uncertain and unpredictable decisions soon. In the famous Sacchi judgement, for example, (C-155/73) the Court of Justice defined as "services" the

38 P.G. Monateri, *Le fonti delle obbligazioni, La responsabilità civile*, Milano, 1a ed., 1998, p. 70.

39 R. Tacconi, *Economia, produzione, responsabilità civile: una nuova frontiera, le stampanti 3D - terza parte*, 2014, *https://www.assinews.it/06/2014/economia-produzione-responsabilita-civile-una-nuova-frontiera-le-stampanti-3d-%C2%96-terza-parte/550023934/.*

40 L.S. Osborn, *Regulating Three-Dimensional Printing: The Converging Worlds O Bits And Atoms*, *op. ult. cit.*, p. 570.

41 A. Quarta, *La dicotomia bene-servizio alla prova del supporto digitale*, in *Contratto e Impr.*, 2019, vol. 3, p. 1013 ss.

transmission of television signals and "goods" the physical medium for the signals. Conversely, in 2008, the CJEU has assumed a functional point of view, stressing the importance of the service over the good. In fact, the importance of the nature of decoder boxes and cards have been underestimated while the television broadcasting service have absorbed all the questions. The service has prevailed over the good because without the former the latter would have no reason to be at all. Thus, the Court focused its attention on the free movement of services instead of the goods one.

Facing the problems of the digitalization, in its recent decisions the CJEU seems to have left the traditional dichotomy product-service in favor of a concrete analysis of the circulation and the relation between technology and regulation's purpose[42].

The European legislator tried itself to clarify the situation by stating in Directive 2011/83/EU that: "digital content means data which are produced and supplied in digital form, such as computer programs, applications, games, music, videos or texts, irrespective of whether they are accessed through downloading or streaming, from a tangible medium or through any other means. Contracts for the supply of digital content should fall within the scope of this Directive. If digital content is supplied on a tangible medium, such as a CD or a DVD, it should be considered as goods within the meaning of this Directive. Similarly to contracts for the supply of water, gas or electricity, where they are not put up for sale in a limited volume or set quantity, or of district heating, contracts for digital content which is not supplied on a tangible medium should be classified, for the purpose of this Directive, neither as sales contracts nor as service contracts".

Moreover, in the Directive 2019/770/UE (see art. 2, par. 1, n.3), the legislator has introduced a more precise classification, defining the 'digital content' as "data which are produced and supplied in digital form"; the 'digital service' as "a) a service that allows the consumer to create, process, store or access data in digital form; or b) a service that allows the sharing of or any other interaction with data in digital form uploaded or created by the consumer or other users of that service"; and finally introducing a new category called 'goods with digital elements' which have been defined as "any tangible movable items that incorporate, or are inter-connected with, digital content or a digital service in such a way that the absence of that digital content or digital service would prevent the goods from performing their functions".

All these definitions and, more in general, the attempts of the European Courts and Legislator to be updated are doomed to fail since the technical innovations run faster than the law.

42 A. Quarta, cit.

A possible way to overcome the *impasse* caused by the lack of a clear definition is to abandon the strict definitions of "product" and "service" and embracing a more functional approach.

It has been suggested by many scholars, as a matter of fact, that the new economic relations between parties which involves digital aspects are more focused on the contracts which is the base of the entire relation. In other words, the contract and the good become part of the same transaction and there is no one without the other. [43] Thus, when people buy a digital content, both in a physical way (e.g. in a CD) or in a digital one (e.g. downloading it) they accept to receive a "contractualized product". That is particularly revolutionary since it involves also the relation between the party and its right of ownership which cannot be unlimited as we are used to image[44].

Every time we face "digital goods or products or services" we cannot imagine them as just a string of code (even if this is their nature actually) but as something more. All of them are somehow related to human creativity or actions and this relation is crystallized by a formal or an implicit contract which determine the relation between that code and the third party who will get in touch with them.

This consideration leads to interpret and apply the different fields of law bearing in mind this characteristic and suggest to see the string of informatic code as a "digital product".

Coming back from where we started, it is likely that, soon, the jurisprudence or the legislator will embrace the argument that even a CAD file presents the characteristics of an actual product, and indeed, that it will be thought as "the potential physical product", according to a distinction between act and power already proposed by Aristotle in past centuries. However, in order to apply the IP law or the Tort Law, the analysis of the relation between this "digital product" and all the parties involved will be necessary in order to understand the characteristics of the contract which bases these relations.

6 Producer and consumer, seller and buyer

Considering the CAD file as a digital product, it is possible to derive some consequences from the legal point of view. First of all, it is possible to define the parties involved as producers, sellers, buyers and consumers.

43 See, L. Nogler, U. Reifner, *The New Dimension of Life Time in the law of Contracts and Obligations*, in *Life Time Contracts, Social Long-Term Contracts in Labour, Tenacy and Consumer Credit Law*, The Hague, 2014, 1-73. More in general, see I.R. Macneil, *A Review of The New Social Contract: An Inquiry into Modern Contractual Relations* New Haven and London, 1980.

44 See *ibid*.

Limiting itself to a superficial phenomenal analysis of the 3D printing, it could be argued that whoever prints the object using AM technology is the producer of the good. In fact, "to produce" is synonymous with "to create". Hence, the possible application of that new category called "prosumer"[45]. In fact it is often said of a subject that merges the characteristics of the consumer and the producer, in so far as the latter is not limited to the realization of the product but finalizes the operation to its consumption too.

I personally believe that this category can only find a limited space in the world of AM technology. "Prosumer" will be in fact who independently draws (or scans) a good, thus digitizing it, and then providing to its printing for personal purposes.

The same cannot nonetheless be said for all the subjects that print CAD files.

Keeping in mind the different scenarios mentioned above, as well as the definitions contained in Directive 1999/44/EC, I do not think the person who buys the design from a third party and then prints it should be understood as the manufacturer for the mere fact of having operated the 3D printer. This subject, in fact, seems to take more the characteristics of the actual consumer, or the purchaser, in case of an industrial activity with a possible non-application of the regulation of consumer goods.

I think it is appropriate, however, to refer to the person who designed that good as its producer. And here emerges the effort to picture a string of numbers as the physical product.

But if not thus, certain rules should necessarily be applied, like those concerning the strict liability for defective products, to a person such as the individual citizen, who certainly cannot be burdened with the same responsibility as an undertaking, not possessing the same knowledge, economic possibilities of forecasting and internalization of risk.

Once again, the terms and conditions governing the relation between the prosumer, the designer and other parties plays a decisive role in defining things such as liability or patent infringement.

7 The supplier

As for the supplier, instead, he is definable as the: "responsible for the sale, rental, leasing or other forms of marketing of the product,

45 See J. Rifkin, *La società a costo marginale zero*, Milano, 2014, p. 123 ss.; P. De Filippi, P. Troxler, *From Material Scarcitiy to Artificial Abundance: The Case of FabLabs and 3D Printing Technologies*, in *3D Printing. Legal, Philosophical and Economic Dimensions*, edited by B. van den Berg, S. van der Hof and E. Kosta, The Hague, 2016, p. 65 ss.

that is to say, the person who anyway makes the passage of the goods from the producer to the consumer"[46].

In the world of 3D printing, this figure seems to be similar to that of the so called "3D printing Services", that is those who print CAD files with their 3D printers requesting for a certain amount of money for the service: this can happen "from afar", by asking specialized subjects to print the product and send it to the purchaser's home; or by offering locations where 3D printers are made available to the customers. Some say, these subjects could be seen more as "providers of services" then "producers"[47]. Pursuant to a further and different interpretation, they could be considered as "distributors or suppliers". I believe that this last hypothesis could only come true if the "printing houses" put to disposition the CAD files present in the own servers. In this case, in fact, continuing to consider the CAD file as an actual product, then they would behave in the same manner as suppliers of products, just like in a supermarket. By contrast, in case these "printing houses" provided only the place and the 3D printers for printing the customers' personal CAD files, the analogy with the distributors would be more difficult, if not impossible. In such a situation, rather than supplying a product, they would provide a service.

8 The seller

AM technology will allow everyone to draw and distribute CAD files. But is this enough to consider all these subjects as sellers with all the legal consequences?

One solution could be thinking about new categories of subject, as it has been done in the past overseas. In fact, many American Courts make use of the category of the so called "occasional sellers", managing to subtract these subjects from the application of strict liability. These individuals are those "whose sale of a product is totally incidental compared to the regular activity of the seller"[48].

However, if instead we consider them as "occasional sellers", could be really considered as such those who upload a CAD file that is then downloaded by millions of people in a few hours? The difference in legal treatment between industrial and occasional sellers is justified on the basis of their lower economic, structural and information abilities. Internet sales and sharing, however, seem to question the va-

46 See V. Carfì, *Commento sub artt. 114-127 cod. cons.*, in *Codice del consumo*, Milano, 2012, p. 612.

47 L.S. Osborn, *Regulating Three-Dimensional Printing: The Converging Worlds O Bits And Atoms*, *op. ult. cit.*, p. 570

48 Jaramillo v. Wayerhaeuser Co. (2009), 07-0507-cv (2d Cir. 2009).

lidity of this distinction.

A possible solution to this complex situation could be to clarify and expand the concept of "occasional seller", becoming able to include those sellers who do not base their survival on the sale of products, but who just make occasional sales. By legislating the boundary between occasional and industrial producers, it would be possible to apply the strict liability only to those who are really able to absorb the losses and prevent the risk.

Anyway, each line of demarcation between the two types of producer would be arbitrary: it would be unfair not to attribute the same benefits of the occasional sellers also to the small sellers: who sells 10 products is considered an "occasional salesman"? And who sells 50? Why then the first should have a huge advantage over the second?[49]. Marking a clear line is always difficult [50].

The American lawyer Nicole Berkowitz, on the other hand, suggests a further approach: to introduce the category, and legal standard, of "micro-sellers", deriving from the category of "occasional sellers", but more flexible and less arbitrary. This category would include sellers who overrun the category of "occasional sellers", but who do not either reach the extent of industrial sellers. These subjects are not in the best position to absorb or distribute losses and at the same time do not have major contractual power than buyers. Instead of the application of strict liability for defective products, Dr. Berkowitz suggests an equitable defence[51].

Nonetheless, once again, a solution would be a *de facto* analysis of the concrete situation involving each party and the "contractualized product" which has been sold, deciding to apply the law which suits the best accordingly the scope and the nature which had been driven the legislator at the time of its draw.

9 The hobbyst

A further legislative intervention could concern the figure of the hobbyist. In countries like Italy, for instance, there is no national legislation governing this phenomenon, which is regulated at regional level. In order to summarize the different regional norms in this regard, it is possible to define the hobbyist as one who sells, barters, propos-

49 N.D. Berkowitz, *Strict Liability for Individuals? The Impact of 3-D Printing on Products Liability Law*, Washington University in Saint Louis - School of Law, 2015, p. 34.

50 This concept is debated, among others, by: L.A. Shoebotham, *The (Inevitably Arbitrary) Placement of Bright Lines: Belton and Its Progeny*, in *Tulane Law Review*, 2014, vol. 73, n. 365. *https://ssrn.com/abstract=2185123*.

51 N.D. Berkowitz, *Strict Liability for Individuals? The Impact of 3-D Printing on Products Liability Law, op. ult. cit.*, p. 35.

es or exposes, sporadically and occasionally, goods of moderate value, also included in works of his own creativity and talent. In some regions, the unit price of the good must not exceed 250 € and in any case the total annual revenue must be lower than 5000 €.

This new reality leads to wonder if it is not the case to take on this role at national level and to define it better. In this way, it would be possible to distinguish the actual hobbyist from the professional seller, with its responsibilities. AM technology, in fact, gives a subject the chance to see his or her status change quickly: using the internet, who draws CAD files and places them in host sites, can make modest sales at first, which could even become huge if the product were to depopulate.

A clear definition in legislation, with the related communications, perhaps in the same host sites, of when a person should be considered a hobbyist and when a professional seller, could be useful in order to increase the certainty in a still confused and uncertain field.

The legislator could also go further by requiring hobbyists with certain requirements to have a compulsory insurance.

The question remains, nevertheless, whether it is appropriate to deepen this issue or not, especially since this technology allows the practice of hobbies that can potentially be very harmful to third parties.

10 Regulation

The 3D printer has the potential to generate a series of important transformations in both the social and economic fabric. Experts have already highlighted how this technology could change our lives, wondering whether or not it is necessary to regulate this phenomenon[52].

Likewise any innovation, it is expected that the legislators' interventions will have a strong impact on its development and future[53]. The 3D printer involves an overlap between the world of atoms and the world of bits: for several products, the CAD file will become equivalent to its relative physical object. The mother challenge for any legal system that tries to adapt to the 3D world will be to regulate

52 Commission, "Reflection Paper on Harnessing Globalisation" COM (2017) 240 final .

53 K. Pierrakakis, M. Kandias, C.D. Gritzali, D. Gritzalis, *3D Printing and its Regulation Dynamics: The World in Front of a Paradigm Shift*, *op. ult. cit.*, p. 13.

See OECD, *The Next Production Revolution: Implications for Governments and Businesses*, 2017, *https://www.oecd-ilibrary.org/docserver/9789264271036-en.pdf?expires=1569575619&id=id&accname=ocid194685&checksum=8CDFE1523DCC0BA57BC4B090F1070E33*.

See also D. Mendis, M. Lemley, M. Rimmer, *3D Printing and Beyond: Intellectual Property and Regulation*, Cheltenham and Northampton, 2019.

these files[54].

Legislation could take place through standards or mandatory regulations. Generally, the legislator creates standard rules to achieve certain objectives, such as defining the terms in which the parties have to comply. Such standards could have an important effect on the 3D ecosystem by tracing a profile whose around the parties are expected to base their expectations. As to AM technology, a regulation carried out through standards could have a positive impact. In fact, they would allow subjects to have more flexibility and to grow and mature without excessively restrictive constraints.

However, the legislator may introduce mandatory rules in order to protect contractors and third parties.Nowadays, the legislator is required to specify which existing standards also apply to the 3D printer and whether or not new standards should be created. This determination will certainly have an impact on the future development of this technology. Indeed some of the rules are already applicable without major interpretative efforts. Let's think, for example, about the duty to fulfill the contract in good faith. There would be no reason to change this rule. In other cases, conversely, this process might not be adequate.

A legislation at European level would be highly desirable because the resulting harmonization could give a propulsive thrust to the large-scale adoption of this technology for the benefit of the whole community and throughout the European Union, thus taking on a pioneering and leading role towards the other countries in the world[55].

A workshop coordinated by the European Commission took place in Brussels on the 18th of June 2014[56], concerning the analysis of the current state and future developments of AM technology within the EU. The entire session 5 was dedicated to regulatory measures and how to implement them. In general, the EU has recognized future developments in this technology and considered it necessary to accompany them with initiatives or measures at European level, capable of increasing competitiveness in the AM sector, and the economic well-being of the region.

Experts of this workshop have proven that they fully understood the challenges and possible solutions that AM technology would

54 L.S. Osborn, *Regulating Three-Dimensional Printing: The Converging Worlds O Bits And Atoms*, *op. ult. cit.*, p. 620.

55 See A. Nordberg, J. Schovsbo, *EU Design Law and 3d Printing: Finding the Right Balance in a New e-Ecosystem*, University of Copenhagen Faculty of Law Research Paper No. 2017-30, 2017, *https://dx.doi.org/10.2139/ssrn.2888426*; T. Margoni, *Not for Designers – On the Inadequacies of EU Design Law and How to fix it*, 2013, 3 JIPITEC 225

56 Commission, *Additive Manufacturing in FP7 and Horizon 2020, Report from the EC Workshop on Additive Manufacturing held on 18 June 2014*, p. 35, *http://www.rm-platform.com/linkdoc/EC%20AM%20Workshop%20Report%202014.pdf*.

bring. In their concluding part, the over 100 participating experts have worked "recommendations" for the European Commission, showing them briefly and in points. They are divided into: technological challenges; standardization, regulation, qualification and certification; education and training; European initiatives and legislative measures.

On the regulatory side, they advised the EU to:

- Draw up guidelines and rules for CE marking and for the conformity of components produced by AM technology;
- Improve legislation on product certification;
- Focus the forces of the production process on quality control (testing, measuring, quality assurance) as well as on post-process;
- Focus on the quality of the optimal and process-appropriate material;
- Increase commitment by aligning with the US;
- Consider regulations and standardizations that may hinder innovation;
- Deal with the problem of IP
- address, copyright, patent protection and customer liability;
- Safety and health related to the production of materials and to the process;
- Centrally clarify what are the approaches to the 3D printer;
- Develop a system of taxation and data-related border charges and data protection;
- Improve existing IP standards and develop guidelines for patents and copyright protection;
- Direct the responsibility for the use of 3D technology in such a way that the consumer always appears to be protected;
- Promote the access to the benefits of AM technology for small and medium-sized enterprises: reducing machine costs and creating more opportunities and greater accessibility to technology. Develop a dedicated research program devoted to the relationship between AM and small and medium-sized enterprises;
- Support entrepreneurship at personal and professional level;
- Encourage the activity and support small and medium-sized enterprises;
- Lay down regulations for the certification of materials, finished products, with the CE mark;
- Other possible areas of legislative action may be: to finance scientific research on materials, on environmental aspects, on low-cost machinery, on new production models and standardization.

Discussions on the regulation of AM technology, however, are still

at an embryonic stage. As reported by EMA's Annual Report 2017[57], the EU Innovation Offices Network has begun to take an interest in the 3D printer by including it among those innovations that will have a greater impact in the economy of the European Union area and that will require the introduction of additional rules or common standards.

Most recently, finally, The European Parliament adopted on 3rd July 2018 a report[58] containing legislative and regulatory recommendations in the field of 3D printing, at the level of Tort Law and IP rights protection. The report will be now forwarded to the European Commission for consideration.

This Report highlights the fact that although the liability rules contained in the e-commerce directive can already be applied to the 3D printer, it is necessary to consider a specific regulation that can, among other things, allow the correct identification of the subject responsible in the event of a defect in the product. Moreover, it is emphasized how the European legislator is called to focus on intellectual property rights and on the fight against counterfeiting.

The introduction of voluntary or mandatory product standards could have a powerful impact on AM technology and on product quality. An example could be the CE certification, which is the declaration that the product meets the requirements of the existing directives (for example, the Toy Safety Directive). But at the same time, the diversity and the large number of producible objects prevents adequate controls. Another problem that arises is: would it be suitable to be labeled (as is the case with the eco-label flower) the home-printed product or the CAD file of the object?[59]

The certification scheme collides with a major cost problem that should be borne by individual governments, by the companies applying for certification, or shifted above consumers. None of these results is however desirable: as far as governments are concerned, they are constantly in debt; adding further costs would lead to negative effects, such as stopping the research into the technology itself. As regards the cost transfer on economic activity, it would counteract the cost-saving effect: since certification has as its primary purpose the reduction of costs for the prevention of defective products,

57 See European Medicine Agency, *Annual Report 2017 The European Medicines Agency's contribution to science, medicines and health in 2017*, 2017, *https://www.ema.europa.eu/en/documents/annual-report/2017-annual-report-european-medicines-agency_en.pdf*.

58 See European Parliament, Committee on Legal Affairs, "Report on three-dimensional printing, a challenge in the fields of intellectual property rights and civil liability (2018), A8-0223/2018, *http://www.europarl.europa.eu/doceo/document/A-8-2018-0223_EN.pdf?redirect*.

59 H. Stahl, *3D Printing - Risks and Opportunities*, Öko-Institut e.V, Institute for Applied Ecology, 2013.

if companies were required to pay for them, the maintenance of profit would pass for the reduction of costs elsewhere, as for example on materials, and even this is not desirable. Finally, transferring the cost on consumers would mean a reduction in demand, as the economic principles of supply and demand demonstrate[60]. Moreover, it would be very expensive to enforce certification: all sites hosting CAD files and all printed products should be monitored, even those produced at home by manufacturers. It would be difficult, if not impossible, asking every hobbyist to certify his products, also because, as said before, he could not even perceive his position as a "commercial seller" and therefore not considering such regulation applicable to his personal situation[61]. These and others are problems that require to be answered as soon as possible by the European Union, especially if it wants to assume an important role in this new industrial revolution.

11 Conclusions

3D printers will soon enter our world predominantly. At the moment it is impossible to predict which one of the foreseeable scenarios will effectively come true. Nonetheless, the interpreters and the European legislator are already expected to pay constant attention to a phenomenon, potentially revolutionary, in order not to be caught unprepared. It is important to understand immediately what challenges this new technology brings with it and to understand whether the law already has the means to regulate and/or accompany it in order to ensure maximum well-being for all citizens and economic operators of the European Union.

Everything starts from a revolution in the way of thinking before that of producing.

AM Technology can be considered a bridge between the world of "Bit and atoms". When each individual will be able to build a physical object starting from a computer file, then the latter will be the actual main product. The key concept is the birth of a new paradigm for which, as Magnaghi supports: "*The most important thing is data, not possessed things. Data are the value and they materialize in physical objects when needed. Objects are mere transitory instances that can be used or not and can be recycled*"[62].

60 A.J. Senagore, *The Benefits of Limiting Strict Liability for Used-Product Sellers*, in *Northern Illinois University Law Review*, 2010, vol. 30, n. 349, p. 358.

61 N.D. Berkowitz, *Strict Liability for Individuals? The Impact of 3-D Printing on Products Liability Law, op. ult. cit.*, pp. 31-32.

62 G. Magnaghi, *Stampa 3D. Applicazioni Di Un'idea Innovativa Principi, Utilizzi E Opportunità Di Business*, Milano, 2015.

Designs will move around the world and not products. The Internet has first abolished distances as a means of disclosure of information, while today it also lends itself to eliminating the distances of physical matter. In the same way as a written document can be sent by email in PDF and then 2D printed, a CAD file can be sent via internet to a different part of the globe and 3D printed[63]. Being the design the essential element of this technology, information for a product will be found in computers. As a consequence of this, arises the need for a network containing drawings and software, a public network that every small or large enterprise and individual will use, thus generating a huge public digital space[64].

The first step we are asked to take to be prepared to this new Era is being willing to go beyond the categories we were used to know. "Product" and "service" are not the binomial able to solve all the conflicts of law rules anymore. As we are asked live a life in an evanescent world of internet and information technology, scholars must try to adapt the already existing laws trough a "functional interpretation", meaning following the purpose and the scope of the laws. Beside this, rethinking the already existing categories could be useful for the legal certainty, but not sufficient if we are not willing to tolerate a case by case method for solving all the new conflicts which the technology will raise.

Beside this general question, in this article it has been brought to mind the idea supported by several scholars that in the digital world we are experiencing relations with products that is not the same as in the past. It could be said that these relations are in some way determined by the under existing contract conditions. This is why I suggested to refer to these products as "contractualized products": goods which can be enjoyed temporary and with limitations stated by a contract.

In conclusion, I think the proper way to intend the CAD files is to see them as "digital contractualized products", where the implicit or explicit contractual relations behind them determine the nature of the operation between different parties and require the application of a certain IP or Tort rule instead of anther in conformity with the scope of that particular law.

63 T. Campbell, C. Williams, O. Ivanova, B. Garrett, *Could 3D Printing Change the World?, Technologies, Potential, and Implications of Additive Manufacturing*, in *Strategic Foresight Report, Atlantic Council*, October, 2011, pp. 1-16.

64 K. Pierrakakis, M. Kandias, C.D. Gritzali, D. Gritzalis, *3D Printing and its Regulation Dynamics: The World, op. ult. cit.*, p. 13 ss