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### The producer, the consumer and the 3D printer

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# The producer, the consumer and the 3D printer

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## Introduction

1. Our economy is driven by principles of mass production and standardisation. According to these standards, industries specialise in the production of goods in large quantities, trying to increase their productivity and to reduce their cost. Simultaneously, they look to supply them on the widest possible market, in order to maximise their income. This has led to the development of a consumer society, divided between two main groups of actors, the industrial producers and the private consumers.

The current legal framework reflects that division. Due to the imbalance between these two groups, most legal systems contain a set of mandatory rules to ensure the protection of consumers against the risk of abuse they face when they acquire or when they use such goods. Among these rules, EU legislation prohibits unfair commercial practices towards consumers, it guarantees that the products they acquire meet acceptable standards and it provides a right for compensation if they are affected by a defect.

This consumer law is based on a strict distinction between consumers and businesses or producers. With 3D printing, the current distribution of roles and responsibilities could be put to test. Indeed, with 3D printing, many individuals can create their own three-dimensional solid objects. Up until now, these products were exclusively manufactured by industrial producers, and then sold to consumers. Consequently, consumers might now become the new producers of a large range of goods. Some of them might be complex, sophisticated, and even dangerous, and the resulting goods could threaten the safety of users.

The purpose of this paper is to evaluate the possible impact of 3D printing technology on the regulations protecting consumers against defective goods, as it applies within the territory of the European Union, and in Belgium in particular.

We will first recall the main features of Book IX of the Code of Economic Law on the framework on general product safety. We will then present the key characteristics of the Product Liability Act, ensuring a regime of liability without fault in case a defective product injures an individual. In a second part, four different 3D printing business models will be identified, and we will assess how the current applicable rules could apply to each economic model.

## A. Presentation of the regulations on the safety of goods and on product liability

### a) The legislation on the safety of goods and services

2. Book IX of the Belgian Code of Economic Law (C.E.L.) sets out the legal framework on general product and service safety. It implements the European directive 2001/95/EC on general product safety<sup>3</sup> and extends it by introducing rules on the safety of services. The aim of this regulation is to define the conditions upon which economic operators may supply services or distribute products, and to define the way public authorities have to act to ensure a consistent, high level of consumer health and safety protection.

Article IX.2 C.E.L. stipulates that producers may only place safe products on the market.

The safety requirement applies to any tangible good which is intended for consumers or likely to be used or delivered to consumers, even if it is not intended for them, and is supplied or made available in the course of a commercial activity.<sup>4</sup> The concept of safety means that the product may not present any risk or only the minimum risks compatible with its use, considering the purpose of a high level of protection for the safety and health of persons, and taking into account in particular the characteristics of the product, the effect on other products, its presentation, and the categories of consumers at risk.<sup>5</sup>

According to article IX.3 C.E.L., a product is deemed safe when it conforms to the harmonised standards laying down the health and safety requirements the product or the service must satisfy. In the absence of harmonised standards, the conformity of a product or a service to the general safety requirement must be assessed by taking into account alternatively the national standards, the European Commission recommendations setting guidelines on product safety assessment, the codes of good practice in force in the sector concerned, the state of the art and technology, the reasonable consumer expectations concerning safety, or the international standards.

In order to ensure a broad control of the market, the legal framework of Book IX C.E.L. targets all the professionals taking part to the placing of a product on the market,<sup>6</sup> namely the manufacturer of the product, and any other person presenting himself as the manufacturer, or the person who reconditions the product, as well as the manufacturer representative or the importer of the product, when the

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2 The author wishes to thank mrs Michèle Ledger for her assistance in preparing this article.

3 Directive 2001/95/EC of the European Parliament and of the Council of 3 December 2001 on general product safety, *OJ L*, n 11, 15 January 2002, 4-17.

4 Directive 2001/95/EC, art. 2, a).

5 Directive 2001/95/EC, art. 2, b).

6 S. van Camp, "Product veiligheid en product recall", *T.B.H.*, 2010, 459.



manufacturer is not established in the European Union, and other professionals in the supply chain, insofar as their activities may affect the safety properties of the product.<sup>7</sup>

Furthermore, article IX.8 C.E.L. extends the application of the safety requirement to distributors, defined as any professional in the supply chain whose activity does not affect the safety properties of a product.<sup>8</sup> These operators should contribute to ensure compliance with the regime. Therefore, they may not supply products which they know (or should have presumed) do not comply with the safety requirements. Moreover, they need to take part in the monitoring the safety of products placed on the market, especially by passing on information on product risks, keeping and providing the documentation necessary for tracing the origin of products, and cooperating in the action taken by producers and competent authorities to avoid the risks.

3. The notion of placement on the market is crucial for the application of Book IX. C.E.L. According to the European Commission, a product is placed on the market when it is supplied for distribution, consumption or use, on the European Union market, for the first time, and in the course of a commercial activity, whether in return for payment or free of charge.<sup>9</sup> Conversely, there is no placing on the market happening where a product is manufactured for one's own use.<sup>10</sup> This is an important restriction that may affect the application of that regulation to the objects created through the 3D printing technology.

A dangerous product, e.g. a product that does not meet the requirement of safety, may not be offered or placed on the market. The authorities could ultimately take appropriate measures, including restrictions or the withdrawal of a dangerous product, in order to protect the health and safety of consumers.<sup>11</sup>

Furthermore, article IX.8 C.E.L. introduces an information duty according to which producers must give relevant information to consumers to help them to assess the risks inherent in a product.

4. In Belgium, the safety requirement also applies to service suppliers. They need to offer services where the products made available to the users are safe and represent no risk for them or only a reduced risk, conform with the service supplied and seen as acceptable with regard to a high level of protection of health and safety.

The other professionals intervening in the chain of service providing are also targeted, if their activity may affect the characteristic of safety of a product<sup>12</sup>.

According to article IX.4 C.E.L., the government may prohibit services that are not safe. It may also impose a duty of information towards the users of unsafe services.

#### b) *The legislation on product liability*

5. Since 1985, the European Union has adopted a specific regulation to compensate damages caused by defective products. The directive 85/374/CEE<sup>13</sup> on liability for defective products sets up a fair apportionment of the risks between industrial producers and private consumers. It lays down the principle of liability without fault of producers. In Belgium, that regulation was implemented by the Act of 25 February 1991 on liability for defective products (PLA). It foresees a compensation regime centred on the liability of the manufacturer, and subsidiary of any other professional taking part to the distribution of the product. The liability results from the defect of the product, notwithstanding the existence of any fault from the professional. Such regime is justified by the fact that the industries benefiting from the imposition of risk should bear the costs of accidents.

The product liability regime is applicable to all movable goods.<sup>14</sup> As a consequence, the objects produced by the 3D printing technology may fall under the scope of that regime, if they are defective and injure persons or damage their property.

However, there is no specific liability regime applying to the supply of defective services. Indeed, although the Court of Justice has ruled that the defect of a product used in the course of providing a service justifies the application of the legislation on product liability, if the action seeks the liability of the producer, there is no regime without fault applying if the defect is linked to the service itself.<sup>15</sup> In the early nineties, the European Commission had presented a proposal directive on the liability of suppliers of services.<sup>16</sup> It sought to establish the principle of subjective liability of the supplier with reversal of the burden of proof in favour of the injured person and providing that the notion of fault had to be interpreted in terms of legitimate expectations. However, that proposal was never adopted. As a result, in Belgium, if the damage affecting the consumer is caused by the defectiveness of the service itself, the consumer has to prove the fault of the service provider to have it repaired according to article 1382 Civil Code. This constitutes a criti-

<sup>7</sup> Art. I.10, 8 C.E.L.

<sup>8</sup> Art. I.10, 9 C.E.L.

<sup>9</sup> European Commission, *The 'Blue Guide' on the implementation of EU products rules 2016*, 17-18, available via <http://ec.europa.eu/DocsRoom/documents/18027/>.

<sup>10</sup> *Ibidem*, 19.

<sup>11</sup> Art. IX.8 C.E.L.

<sup>12</sup> Art. I.10, 8 C.E.L.

<sup>13</sup> Council Directive 85/374/EEC of 25 July 1985 on the approximation of the laws, regulations and administrative provisions of the Member States concerning liability for defective products, OJ L 210, 7.8.1985, 29-33.

<sup>14</sup> Art. 2 PLA.

<sup>15</sup> C.J.E.U., 10 May 2001, C-203/99, *Veefald*, § 12.

<sup>16</sup> Proposal for a Council directive on the liability of suppliers of services, COM(90) 482 final, 20 December 1990, available at <http://aei.pitt.edu/10773/1/10773.pdf>.



cal limit for the protection of consumers, as lots of activities targeting them are now based on the provision of services.

6. The product liability regime was established after weighing up the parts played by the various economic operators involved in the production and distribution chain.<sup>17</sup> It is centred on the concept of producer, targeting the manufacturer of the product, as well as the manufacturer of a component, the producer of any raw material, and any person who acts as an apparent producer by putting a distinguishing feature (e.g. a trade mark) on a product.<sup>18</sup>

Moreover, in certain circumstances, article 4 PLA extends the liability to importers of products in the European Union if they act in the course of an economic activity. Finally, suppliers of the product may also be held liable if the producer or the importer of the product in the EU cannot be identified, and if they fail to indicate to the injured person their identity within a reasonable time.<sup>19</sup> The supplier must be regarded as an intermediary involved in the marketing or distribution chain of the defective product.<sup>20</sup> He continues the activities of the producer<sup>21</sup> as he brings the defective product until the consumer.

The supplier can also escape liability if he informs the injured person, within a reasonable time of the identity of the producer or of the person who supplied him with the product,<sup>22</sup> so that the victim can go up the supply chain until he finds the manufacturer of the good.

7. According to the PLA, the producer is liable for damages caused by his product if it has a defect. The defectiveness is linked to the standard of safety the product should offer: a product must be seen as defective if it does not provide the safety a person is legitimately entitled to expect.<sup>23</sup> This criterion must be assessed from the point of view of the public at large. According to article 5 PLA, all circumstances have to be taken into account, and especially the presentation of the product, the use to which it could reasonably be expected that the product would be put, and the time when it was put into circulation.

The consumer may seek financial compensation for damage to property intended for private use or consumption, as well as for damage caused by death and personal injury,<sup>24</sup> including pain and suffering and other non-material damages. Concerning damages to goods, the compensation the consumer may require is subject to the deduction of a lump

sum of € 500. No compensation may be claimed for the defective product itself.

Even if he does not need to prove that the fault of the producer, the victim of the defect of a product will still have to prove the damage he has suffered, the defect of the product and the causal relationship between both.

8. The producer facing a claim based on the PLA may escape from liability if he meets one of the conditions foreseen in article 8. Among these conditions, the producer will not be liable if he proves that he did not put the product into circulation, or if he proves that the product was neither manufactured by him for sale or any form of distribution for economic purpose, nor manufactured or distributed by him in the course of his business. These exceptions stem directly from article 7 of directive 85/374/EEC. The product liability regime is only intended to apply when the product has left the industrial production channels.<sup>25</sup> This may have a crucial impact in the context of defective goods produced by 3D printing, as this new technology gives individuals the opportunity to create their own goods.

Industrial producers can therefore avoid liability if they demonstrate that they did not put the good into circulation, taking into account that article 8 PLA provides that it assumes the burden of the proof. Unlike directive 85/374/EEC, the Belgian legislation provides a definition to the concept of "putting the product into circulation", which is crucial for the application of the product liability regime. According to article 6 PLA, it means the first act where by the producer's intention is made clear to confer upon the product the use he intends for it, through the transfer of the product to a third party or the use of it for the benefit of that person. This act has two components:<sup>26</sup> a material one consisting in the transfer of the product to a third,<sup>27</sup> and a moral one resulting from the free consent of the producer to put the product into circulation.<sup>28</sup> Furthermore, the definition provided by the Belgian legislation has to be interpreted, so far as possible, in the light of the wording and the purpose of the European directive in order to achieve the result sought by it.<sup>29</sup> In that respect, the European Court of Justice has ruled that the product liability regime does not apply when a person other than the producer has caused the product to leave the process of manufacture, contrary to the producer's intention, for example where the manufacturing process is not yet complete.<sup>30</sup> Conversely, a product must be considered as having been put into circulation when it leaves the production process operated by the producer and enters a

17 C.J.E.U., 10 January 2006, C-402/03, *Skov and Bilka*, § 29.

18 Art. 3 PLA.

19 Art. 4, § 2 PLA.

20 Opinion Advocate General Mengozzi, 27 October 2011, C-495/10, *CHU Besançon and Dutruieux*, § 29.

21 Y. Markovits, *La Directive C.E.E. du 25 juillet 1985 sur la responsabilité du fait des produits défectueux*, Paris, L.G.D.J., 1990, 152.

22 Art. 4 PLA.

23 Art. 5 PLA.

24 Art. 11 PLA.

25 Y. Markovits, *La Directive C.E.E. du 25 juillet 1985 sur la responsabilité du fait des produits défectueux*, Paris, L.G.D.J., 1990, 213.

26 Mons, 7 February 2013, D.C.C.R., 2013, 76.

27 C. Delforge, "Le défaut de sécurité au sens de la loi du 25 février 1991 relative à la responsabilité du fait des produits défectueux", in *Les défauts de la chose*, Limal, Anthemis, 2015, 315.

28 Y. Markovits, *La Directive C.E.E. du 25 juillet 1985 sur la responsabilité du fait des produits défectueux*, Paris, L.G.D.J., 1990, 215.

29 Cass., 6 June 2011, *Pas*, 2011, 1605.

30 C.J.E.U., 10 May 2001, C-203/99, *Veefald and Arhus Amstokommune*, § 16.



marketing process in the form in which it is offered to the public in order to be used or consumed.<sup>31</sup> According to the Court, it is not important in that regard that the product is sold directly by the producer to the user or to the consumer or that that sale is carried out as part of a distribution process involving one or more operators.<sup>32</sup> A product may therefore be put several times into circulation. It happens each time the product is transferred from one operator may be liable to another.<sup>33</sup>

As the product liability regime does not apply when the goods are not put into circulation, it will not allow the compensation of damages caused by goods printed by natural persons for their private use.<sup>34</sup> Furthermore, these kinds of objects also fall under the scope of another exception to the application of the PLA, as article 8 stipulates that the manufacturer may not be held liable when the product was neither manufactured by him for sale or for any form of distribution for economic purpose. Indeed, the purpose of the product liability regime is to provide a fair apportionment of the risks between industrials and consumers to tackle the risk of a lack of safety affecting industrial products. Therefore, the victim of a damage caused by the defectiveness of a good manufactured with private means – such as an object created with a private 3D printer – will have to act on another legal basis.

**B) Application of the legislations on the safety of goods and product liability to several economic models based on the use of the 3D printing**

**a) Presentation of four economic models**

Initially, 3D printing was exclusively used in high-tech industries, such as aeronautics, medicine or aerospace. It is now present in new industrial sectors, and simultaneously it is becoming available for SME's or even individuals. It gives them the opportunity to produce their own objects, either by the use of their own 3D printer, or by getting access to hubs or web platforms providing 3D printing as a service.

The printing of a three-dimensional solid object necessarily combines three distinct components: the computer-aided design (CAD) software that enables the design of the plans to be printed, the raw material with which the good is produced, and the machine used as a printer.

Most generally, these three components originate from different operators:

- The CAD plans may be created by the person running the printing process or downloaded from internet. This file is essential as it provides the necessary instructions for the machine to produce the good.

- The raw material is supplied by a wholesaler and determines the substance of the object.
- The 3D printer is acquired from a professional reseller. It belongs to the person using it or is made available by a business whose activity consists in the provision of 3D printing services.

The printing process is run by a natural or by a legal person. In this paper, we will examine four economic models dealing with the 3D printing:

- Industrial companies producing goods with 3D printing capacities.
- Web platforms accessible online to command the printing of a good.
- Specialised hubs making 3D printers and raw material available to the public to produce their own goods.
- Individuals printing goods at home with a personal 3D printer.

The aim of this paper is to evaluate how the regulations on product safety and product liability might apply to these models, and to evaluate whether it raises new legal issues. For each economic model, we will distinguish whether the defect affecting the object originates from one component specifically, or whether its cause may not be identified.

**b) First scenario: the 3D printing technology is used by an industrial company**

10. The first scenario, where an industrial company prints goods to be sold to consumers, does not raise new issues as to the application of the above-mentioned legal frameworks.

Irrespective of the method used to produce the goods, the industrial company acts as a producer. Therefore, manufactured products need to meet the safety requirement provided by Book IX C.E.L. when they are put on the market.

Furthermore, after they have been put into circulation, the company is liable if the products are defective and injure a natural person, notwithstanding the cause of the defect, unless it can rely on one of the cause of exemption foreseen in art. 8 PLA.

11. If the defect of the product originates from the raw material used to print it, its producer will be liable jointly and severally with the printer of the good.

The same solution applies if the 3D printer was defective and has caused the defect of the product. The producer of the 3D printer will be liable jointly and severally with the producer of the printed product.

Furthermore, in these two situations, the company printing the 3D goods will then have the option of making a civil claim against these operators.

31 C.J.E.U., 9 February 2006, C-127/04, *O'Byrne and Sanofi*, § 27.

32 *Ibidem*, § 28.

33 Explanatory memorandum, *H. Repr.*, 1989-1990, n 1262/1, 14.

34 C.J.E.U., 10 May 2001, C-203/99, *Veefald and Aarhus Amstkomme*, § 16.



12. Therefore, the use of the 3D printing technology by an industrial company as a new method of production will not have any particular effect on the application of the regimes on the safety of goods and on product liability.

- c) *Second scenario: a web platform offers the opportunity to purchase online the printing of an object*

13. The second economic model focuses on the activity of web platforms offering a service to private individuals, where the individuals may upload their own CAD plans or CAD plans they have downloaded, to order their printing. The good is manufactured by the undertaking running the web platform, or by a subcontractor, on the individuals' request.

It is difficult in this scenario to identify the "producer" of the three-dimensional object. At least two actors are involved in the manufacturing process, namely the web platform (and possibly its subcontractor) and the individual who provides the CAD plans and orders the object.

We consider that the web platform acts as a producer as it finally takes in charge and have the capacity to control the printing of the good. If it subcontracts it to another company, then the platform may be seen as an apparent producer if it puts any distinguishing feature on the product, in order to present itself as a producer. Alternatively, the web platform will qualify as a distributor of the product. The subcontractor will then be the producer of the good.

14. If the web platform is the producer of the good, it has to ensure that it meets the safety requirement provided by article XI.2 C.E.L. Furthermore, it is liable in case a defect of the product injures any natural person.

If the web platform only acts as a distributor, it may not supply the product if it knows or should have presumed that it does not comply with the safety requirement. It also has to keep and provide the documentation necessary for tracing the product, and cooperate in any action taken to avoid risks.<sup>35</sup> Moreover, if the good injures any natural person after having been delivered, the platform must be treated as the producer unless it informs the victim, within a reasonable time, of the identity of its subcontractor that has printed it.<sup>36</sup>

15. In the context of a defect affecting the raw material or the 3D printer, the company having supplied them – the web platform, and possibly its subcontractor – will qualify as a distributor. It will have to act with due care to help ensuring compliance with the applicable safety requirements, in particular by not supplying products which it knows or should have presumed do not comply with those requirements. The distributor might also have to participate in

monitoring the safety of these components of the 3D printing process.

On the application of the product liability regime, the web platform, and possibly its subcontractor, will be treated as the producer of the raw material or the 3D printer, unless they inform the injured person, within a reasonable time, of the identity of the producer or of the person who supplied them with it.

16. Finally, the CAD file used to print the object will be treated as the tangible medium on which it is stored. Therefore, it will be seen as a movable good<sup>37</sup> and it will fall under the regulations on the safety of goods and on product liability,<sup>38</sup> unless an exemption applies.

If it is made available for download on a website or if it is sold on a physical device, then it is placed on the market and has to meet the general safety requirement. It may also give rise to the application of the product liability regime.

Conversely, if it is created by the individual himself, for his personal needs, then the regulations on the safety of goods and on product liability will not apply. Once again, this leads to a lack of control on the conformity of such creation.

- d) *Third scenario: the three-dimensional object is printed by an individual who has access to 3D printing facilities within a specialised hub*

17. In the third scenario, 3D printing facilities are made available to the public by specialised hubs, whose facilities are used by private individuals to create their own objects. The individual brings the CAD plans he has personally designed or downloaded, and then he uses the printers and the raw materials provided by the business running the hub. He has to pay a price for the service he gets. This price will usually depend on the quality of the printer and the quantity of raw material needed.

This kind of 3D hub looks like a copy center, where people can reproduce books or print files. In this model, two actors are involved in the production process: the private individual and the 3D hub. In the meaning of article I.1 C.E.L., the first one is a consumer while the second one is an undertaking.

The application of the regulations on the safety of goods and on product liability will vary depending on the identification of the producer.

<sup>35</sup> Art. IX.8, § 3, C.E.L.

<sup>36</sup> Art. 4 P.L.A.

<sup>37</sup> I. Lutte, "La responsabilité du fait des produits de la technologie", in X., *Responsabilités. Traitée théorique et pratique*, Waterloo, Kluwer 2004, 27; G. Gathem, "La responsabilité du fait des produits", in X., *Guide juridique de l'entreprise*, Brussels, Kluwer 2007, 15.

<sup>38</sup> J.-P. Triaille, "L'application de la directive communautaire du 25 juillet 1985 sur la responsabilité du fait des produits défectueux au domaine du logiciel", *R.G.A.R.*, 1990, n 11.617.



First of all, the company running the 3D hub may qualify as an apparent producer if it affixes to the product his name, trade mark or another distinguishing feature. Then, it will have to comply with the regulations on the safety of goods and may be held liable on the grounds of the PLA.

On the contrary, if the 3D hub does not act as an apparent producer, we consider that the individual should be seen as the "producer" of the good. Indeed, even if he uses the resources of the 3D hub, he seems to be the person manufacturing the object, as he decides and controls the printing process. For its part, the 3D hub acts as a service provider.

The provisions of Book IX C.E.L. also apply to service suppliers. They have to ensure the safety of the service they provide, which means that they have to offer services where the products made available to the users are safe and represent no risk for them. The 3D hub has to comply with that obligation. Consequently, it has to take care that the 3D printer and the raw materials the users have at their disposal are safe.

On the contrary, the PLA does not apply to service providers. If it is not seen as the manufacturer of the good, the 3D hub will not be liable if the three-dimensional object appears to be defective. It could be held liable only if the defect affecting the object originates from the 3D printer or from the raw material that were used. The hub is indeed the supplier of these goods and it must be treated as their producer, unless it informs the injured person, within a reasonable time, of the identity of the producer or of the person who supplied it with the product.

18. In our view, most of the people using the facilities of a 3D printing center are private consumers, who want to produce goods for themselves.

The safety requirement does not apply if the object is not manufactured to be placed on the market. This includes situations in which the good is not manufactured for sale or any form of distribution for economic purpose. Consequently, these individuals do not have to deal with the provisions of Book IX C.E.L.

Furthermore, if the good they print is defective and causes harm to them or to a third party, the P.L.A. will not apply, unless if the origin of the defect comes from the printer or from the raw material that were used as mentioned above.

The victim could possibly bring an action against the private producer of the three-dimensional object based on article 1384 Civil Code. That clause provides a liability regime for the damage caused by goods that a person has in his keeping. It introduces a rebuttable presumption of liability according to which the custodian of a thing has to compensate the damage caused to victims affected by the act of that thing, unless he could prove that he did not commit a fault. Nevertheless, the victim will be in a less favourable

position, as the solvability of the custodian will generally be weaker than the one an industrial company may offer.

e) *Fourth scenario: the good is printed by an individual using his own 3D printer*

19. In the last scenario, the good is printed by the individual himself, with his personal 3D printer. Home 3D printers have indeed become affordable in the last few years and they are constantly improving.

Such good is created outside the usual production chain. The owner of the 3D printer is the producer of the object, which he creates for himself. He has to acquire the raw material he will use to print the good. He also has to create the CAD plan or to download it from a website. He will then combine these three elements to produce the sought-after object.

As the production does not take place in the context of an economic activity, leading to the placement of the product on the market, the safety requirement and the product liability regime do not apply towards the manufacturer of the good. This product might therefore suffer from a lack of safety and, if it injures somebody, the victim may not invoke the product liability regime. It could be possible to rely on article 1384 Civil Code and to sue the individual in his capacity as custodian of the three-dimensional object.

The legal framework protecting individuals against the defects of such kind of products is thus extremely weak, as no professional intervenes in the manufacturing process.

20. People might invoke the product liability regime against the producer of the 3D printer or the supplier of the raw material, if they may identify them and prove that these components of the 3D printing process were defective. The creator of the CAD plans may also be liable on the grounds of the PLA, if these plans were created in the context of an economic activity and then sold to the owner of the 3D printer.

However, even if this is an option in theory, people will hardly be able to demonstrate in practice that the CAD plans, the 3D printer or the raw material were already defective at the time they were used to create the object. Consequently, the victims of a damage caused by a defective good printed in a private context will probably find it extremely difficult to seek compensation for any damaged sustained.

## Conclusion

21. 3D printing is a new technique to facilitate the manufacturing of different kinds of products. It is a major step for some industries, as it will help them to improve the quality of the products they develop. In the future, it might also lead to a decrease of the costs of certain products.

The use of this new technology could cause a(n)(r)evolution of the economy of production, as it democratizes the creation of some goods and allows private individuals, who were acting as consumers until now, to become manufacturers of a large set of products, that they will no longer need to buy from industrial producers. Some businesses are already taking advantage of this possibility and are offering new services making 3D printers available, physically or virtually, to private individuals. As a consequence, the 3D printing technology is challenging the traditional barriers between producers and consumers. In the three last hypotheses considered in this analysis, private individuals leave their usual role of passive consumers and acquire an active part in the manufacturing process. This raises new legal issues and challenges the application of the requirements on general product safety, as well as the possibility to claim for compensation on the grounds of the regime of product liability.

The current evolution might lead to a lack of control on the safety of certain products. Simultaneously, the way natural persons may be compensated in case they are injured by a defective product might become more complex. Indeed, this analysis re-emphasises that the laws on the safety of goods and on product liability do not apply when goods are manufactured by consumers for their private purpose, and are not placed on the market or put into circulation.

Therefore, the development of the 3D printing technology and its accessibility to private individuals should generate a reflexion on the need to extend the regulation on product safety to goods manufactured by private individuals. The legislator should also consider the implementation of a specific liability regime for services providers, at least when their services are used by individuals to produce goods by themselves.