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INTERNATIONAL TIMBER TRADING UNDER SANCTIONING REGIMES: THE ROLE OF TECHNOLOGICAL INNOVATION

Abstract

This paper examines how the forest sector is affected by the sanctioning regimes created by governments to deal with ongoing international emergencies and which role innovation and technology could play in implementing restrictive measures. Particularly referred to as international trading, one of the sectors affected by restrictive measures is the forest industry, specifically importing and exporting timber. The first part focuses on the current legislative framework of the European Union to pinpoint the critical regulatory issues under consideration and, given the information mentioned above, the flaws in the sanctioning regimes. The second part, more in-depth, introduces innovation and technology (e.g., blockchain) as a tool that can be used to implement the regulatory design of economic sanctions. By analysing the current use of blockchain in the forest industry, this paper tries to identify its potential and any problematic issues that could arise to hypothesise future research activities.

JEL CLASSIFICATION: K23, K33, K39

SUMMARY

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1 Foreword

As emerged with the pandemic, the global economy is strictly connected. As withCovid-19 new events address how alternative measures could be taken to promote political action. The existence of restrictive government sanctions implies the analysis of their design and effectiveness. I have chosen to investigate the forest industry to see if the sanctions applied from the Russian-Ukrainian crisis are currently being respected,

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considering some sanctioning packages in force and being the wood one of the raw materials prohibited from import.[1]

This decision has impacted the organisation of markets. It has again been emphasised how governments are (willingly or unwillingly) linked to one another in many ways. While these connections undoubtedly bring advantages, the complexity of managing trade flows has become apparent, especially when it is necessary to interrupt some of them. From this point, it becomes clear the need of a better understanding of the existing laws and regulations about timber trading to focus on how the new restrictive economic measures could be applied.

It has been reported that significant violations of the legislative frameworks are currently in force, not only regarding the restrictive measures recently enacted but even with regards to the sector-specific rules. From this perspective, it is even more crucial to study the possibility of new technologies that can be used as innovative tools to ensure the respect of the regulations. Considering that blockchain is already used and studied in the forest industry it will be examined here with specific reference to the transparency and traceability of the timber supply chain.

2 The timber industry: an emblematic sector

Some of the economic provisions under consideration concern the retrieving of raw materials which are fundamental to productive processes. It affects the economies of those governments, which are pointed out as the illegal triggers of a conflict. This means that not only is their industry affected but also their arsenal and limiting their finances doomed to subsidize the conflict.

The European Union deemed it necessary to draw several sanctions that would weaken Russia's economic basis by depriving it of crucial technologies and markets and significantly reducing its ability to run the conflict through restrictions on import and export.[2] Later, in light of its involvement in Russia's military invasion of Ukraine, the

[1] On 24th February 2022, following a decision by President Vladimir Putin, Russia militarily attacked Ukraine and invaded the border territories, subsequently declaring the annexation of the Ukrainian regions of Donetsk, Luhansk, Zaporizhzhia and Kherson to its nation. This resulted in a conflict that, to date (February 2023), has unfortunately not found a solution yet. The Russian-Ukrainian conflict immediately brought to the attention of international diplomacy the thorny question of the most effective ways to react. Not being able - or willing - to act militarily, the choice turned to economic sanctions. However, some countries abstained in the March 2022 UN vote and have not adopted sanctions against Russia, just as others have declared themselves opposed to this course of action. See: United Nations, 'Ukraine: General Assembly Passes Resolution Demanding Aid Access by Large Majority' (24 March 2022) UN News <https://news.un.org/en/story/2022/03/1114632> accessed 10 October 2022; Filippo Mastroianni, 'Dalla Prima Risoluzione ONU alle Sanzioni. Quattro Mappe per Aiutarci a Capire la Percezione dell'invasione Russa in Europa' (3 June 2022*)* Il Sole 24 Ore Info Data <www.infodata.ilsole24ore.com/2022/06/03/dalla-prima-risoluzione-onu-alle-sanzioni-quattro-mappe-per-aiutarci-a-capire-la-percezione-dellinvasione-russa-in-europa/> accessed 10 October 2022.

[2] To have a comprehensive view of restrictions imposed by European Union, see: European Council, 'Timeline - EU Restrictive Measures against Russia over Ukraine' <www.consilium.europa.eu/en/policies/sanctions/restrictive-measures-against-russia-over-ukraine/history-restrictive-measures-against-russia-over-ukraine/>, accessed 18 February 2023.

European Union decided to draw sanctions now against Belarus.[3] We must wonder if sanctions have been complied with after issuance, and if not, what can be done to ensure compliance. Furthermore, the above is necessary not only to penalize those who deliberately decide to act in violation of the imposed bans but also to ensure that there is correct information on market operators in compliance, and, above all, if it is desirable to reward those who, conversely, act following the regulations. Firstly, this analysis aims to identify the characteristics that distinguish a specific sector and then outline a scheme of action that can be applied to other realities.[4]

Emblematic in our research is the timber sector. To make a better comprehension of the highlighted phenomenon a brief overview on the regulation in force within the European Union could be useful. In 2005, the member States of the European Union agreed on establishing a licensing system for timber import to oppose the illegal logging and associated trade, named Forest Law Enforcement, Governance and Trade (from now on referred to as FLEGT).[5]

The FLEGT establishes a licensing system for timber imports within the European Union market, with documents that certify the conformity of a timber shipment with the regulatory requirements in force in the country of origin. The verifiability and non-falsifiability of these documents are to be guaranteed.[6]

In its path and to strengthen its aim, the EU Member States agreed to issue the EU Timber Regulation No. 995/2010 (from now on EUTR), which came into force in 2013, aimed at reducing the devastating effects of the illegal timber trade.[7] The EUTR underlines that the operators who place timber for the first time in the EU market must be under due diligence (while a trader in the supply chain should only be required to provide basic information) to enable the traceability of timber and timber products. Based on article 6 of EUTR, due diligence means that operators must fulfil three elements such

[3] See European Council, 'EU Restrictive Measures against Belarus' <www.consilium.europa.eu/en/policies/sanctions/restrictive-measures-against-belarus/> accessed 8 October 2022.

[4] Sanctions can be divided into three macro-sectors: those affecting people - consisting of a travel ban on them and freezing their assets - and those affecting trade, in the dual direction of imports and exports. Therefore, European natural and legal persons are not allowed to sell certain products to Russia (export restrictions) or purchase them from Russia (import restrictions).

[5] Council Regulation (EC) 2173/2005 of 20 December 2005 on the establishment of a FLEGT licensing scheme for imports of timber into the European Union [2005] OJ L347/1.

[6] This system is based on Voluntary Partnership Agreements (VPAs) between European countries and timber-producing third countries that want to eliminate illegal logging and trade and facilitate access to their timber products to the European Union. Interested Parties are in fact required to register on an EU portal, from which it is possible to check the conformity with the legislative framework of the European regulations. Conformity is intended as completeness of the information required to obtain and to maintain the license to import products, its expiry date and the information needed to verify the cargo. See: Ministero dell'agricoltura della Sovranità Alimentare e delle Foreste, Regolamento FLEGT <www.politicheagricole.it/flex/cm/pages/ServeBLOB.php/L/IT/IDPagina/17201> accessed 10 October 2022.

[7] It prohibits illegally harvested timber, or products derived from such timber, from being placed on the market in the European Union, laying down the obligations of operators as well of traders. European Parliament and Council Regulation (EU) 995/2010 of the of 20 October 2010 laying down the obligations of operators who place timber and timber products on the market, Text with EEA relevance [2010] OJ L295/23.

as access to information, risk assessment and risk mitigation.[8] As to the access to information, the two main elements that must be proved are the country of harvest (where applicable also the concession of harvest) and all the necessary documents supporting the compliance of timber with applicable legislation.[9] Specifically stated by the aforementioned article, risk assessment procedures shall enable the operators to evaluate the risk of illegally harvested timber or timber products derived from such timber. For the purpose of this analysis, two of the listed criteria are undoubtedly relevant. Indeed, at the same time of the compliance of the products with the country of harvest applicable legislation, it must be considered also of the prevalence of armed conflict and the presence of sanctions imposed by the UN Security Council or the Council of the EU on timber import and export.[10] Both the FLEGT and the EUTR underline the importance of a continuous monitoring activity set by each Member State, which should interrupt the import of products if there is a lack of the mentioned prerequisites.

In light of the above, it is essential to recall Article 215 TFEU, where it is stated that it is possible to interrupt or reduce, in part or entirely, economic and financial relations with one or more third countries.[11] More in-depth, the Council of the European Union should adopt restrictive measures against natural or legal persons and groups or non-State entities.[12] In this sense, several timber-producing countries' institutional and management deficiencies in the Forestry Sector are of international concern: this has social, political, and economic implications. For instance, the latest Food and Agriculture Organization of the United Nations (FAO) report refers to 2019, when Europe imported forest products

[8] The trading under the EUTR required to act with due diligence, which can be identified in three key elements: 1) Information: this relates to the fact that economic operators must be able to have availability and access to information describing the type of timber or wood component of the product, the country where harvesting takes place, the species, the quantity, the details needed to identify the supplier and information relating to the National Legislation of the country of origin of the product; 2) Risk assessment: the trader must be responsible for the risk management of the product's entry into the market, for which easy access to the already mentioned information on the product's chain of custody is required, so that it is possible to verify its compliance with the criteria imposed by the legislation in force; 3) Risk mitigation: when, as a result of the above comparative assessment, it becomes apparent that timber may be among those for which an import ban applies, this risk must be assessed by requesting further verification, with the supplier providing additional information and documentation. Based on the above, the importance of transparency of the chain of custody and product traceability during the process of supply chain is evident. See: European Commission, 'Timber regulation' <https://ec.europa.eu/environment/forests/timber_regulation.htm> accessed 12 October 2022.

[9] Acting with due diligence requires the operator to ensure that timber purchases and related payments do not fall into the hands of one or more sanctioned parties or entities directly or indirectly. Indeed, the primary intent of economic sanctions is to weaken the State subject to restrictions, preventing it from having the materials and money to continue its aggressive policies. This applies to public entities as well as to companies and individuals who own or control a company or corporation as this is considered as a mode of indirect financing. In doing so, operators can use all the already good known practices and certification of third-party verification schemes as well, including those who include verification of compliance with applicable legislation. See: European Commission, 'Eighth Meeting of the "Multi-Stakeholder Platform on Protecting and Restoring the World's Forests, including the EUTR/FLEGT" With a focus on the implementation of the EUTR and FLEGT Regulation' (16 March 2022) <https://ec.europa.eu/transparency/expert-groups-register/screen/meetings?lang=en> accessed 14 October 2022.

[10] European Parliament and Council, Regulation (EU) 995/2010, art 6 (1) letter b).

[11] European Union, Consolidated Version of The Treaty on The Functioning of The European Union [2012] OJ C326/47.

[12] At the same time, article 29 of the Treaty of the European Union needs to be recalled. See: European Union, Consolidated Version of the Treaty on European Union [2008] OJ C115/13.

totalling USD 107.656,890. The Russian Federation was the world's leading exporter of softwood timber.[13]

Therefore, it is not surprising that the EU has also identified timber as one of the production sectors to which the abovementioned import restrictions should be applied. The armed conflict between Russia and Ukraine creates a complex scenario which needs to be dealt according to the European legislative framework. This is why several acts have been issued.

2.1 The sanctioning regimes in force

In summary, it is possible to confirm that, given the current disposition, it is not now possible to import timber or timber products harvested in some regions of the EU into the market, one of which is Russia. These restrictions stem from the first decisions of the EU, dating back to 2014 when Russia illegally annexed the Crimean territories.[14] This first approach to the sanctioning regime prohibited selling, supplying, transferring, or exporting, directly or indirectly, dual-use goods and technology. In contrast, those items were or may be intended, in their entirety or part, for military use or a military end-user.

After the military invasion of the Ukrainian territories occurred on 24th February 2022, the EU confirmed its sanction measures in meetings on 2nd March 2022 and 8th April 2022, which included a ban on the import of all timber and timber products from the territories of Russian and Belarus in the light of the continuation of the conflict. The sale, supply, transfer, or export of goods which could contribute to the enhancement of Russian industrial capacities to any natural or legal person, entity or body in Russia or for use in Russia is now prohibited based on article 3k of the Council Regulation 2022/576, amending the restriction issued in 2014. This includes goods such as wood according to the Combined Nomenclature, which is listed in annex XXIII.[15]

[13] Forest products in this case must be considered as all Roundwood felled or otherwise harvested and removed. It comprises all wood obtained from removals, i.e., the quantities removed from forests and from trees outside the forest, including wood recovered from natural, felling and logging losses during the period, calendar year or forest year. It includes all wood removed with or without bark, including wood removed in its round form, or split, roughly squared or in another form (e.g., branches, roots, stumps, and burls (where these are harvested) and wood that is roughly shaped or pointed. In the removal statistics, it represents the sum of wood fuel; saw logs and veneer logs; pulpwood, round and split; and another industrial Roundwood. The trade statistics represent the sum of industrial Roundwood, and wood fuel. See FAO, 'Yearbook of Forest Products' (2021) <www.fao.org/forestry/statistics/80570/en/> accessed 11 October 2022. The FAO Yearbook of Forest Products is a compilation of statistical data on basic forest products for all countries and territories of the world. It contains series of annual data on the volume of production and the volume and value of trade in forest products. It includes tables showing direction of trade and average unit values of trade for certain products.

[14] Even if this approach initially didn't focus on timber and timber products, it is therefore important to pinpoint the timeline of the current measures in force. See: Council Regulation (EU), No 833/2014 of 31 July 2014 concerning restrictive measures in view of Russia's actions destabilising the situation in Ukraine [2014] OJ L229/1.

[15] The Combined Nomenclature (CN) is a tool for classifying goods, set up to meet the requirements both of the Common Customs Tariff and of the EU's external trade statistics. See: Council Regulation (EU) 2022/576 of 8 April 2022 amending Regulation (EU) No 833/2014 concerning restrictive measures in view of Russia's actions destabilising the situation in Ukraine [2022] OJ L111/1.

As mentioned, some restrictive measures also concerned Belarus.[16] Regarding the Council Regulation 2022/355, it is prohibited to import, directly or indirectly, wood products which originated or were exported in Belarus, to purchase, directly or indirectly, wood products and transport wood products.[17] Confirming the commonality of intent that emerged following the start of the war conflict, the EU Member States confirmed that restrictive measures, or sanctions, are essential to the European Union's Common Foreign and Security Policy. They are used by the institutions when it is necessary to respond to an event that could destabilise European interests and the values of its internal and international policy.

This statement is supported by the fact that Russia is not the only one to have been subjected to such proceedings. Actually, EU has also subjected Iran, North Korea, and Myanmar to sanction procedures.[18] The last mentioned is of particular importance for this analysis, as discussed below, in order to examine how technology could be used to follow international timber trading. As an exporter of valuable timber (teak and others) explicitly used in shipbuilding, Myanmar has been affected by European sanctions - and not only European - following the military coup d'état perpetrated in February 2021.[19] In this case, the European Union has also introduced a progressive number of sanctions that – to date have reached the fifth cycle - due to the prolonged state of human rights violations.

Having regard to Council Regulation 401/2013, with the Council Implementing Regulation 2021/998, the EU decided to amend the list of entities addressed by the restrictive measures.[20] In synthesis, we note economic restrictions based on the timber trade and the legal entities operating in the production sector. The abovementioned is extremely important as it is possible to think of the multiple geographical and commercial

[16] Council Regulation (EU) 2022/355 of 2 March 2022 amending Regulation (EC) No 765/2006 concerning restrictive measures in view of the situation in Belarus [2022] OJ L 67/1.

[17] The most recent consolidation of the imposed sanctions was ordered at the Council Meeting dated 6th October 2022, confirming the ban on importing all types of wood products from the territories of Russia and Belarus. See: Council Regulation (EU) 2022/1903 of 6 October 2022 amending Regulation (EU) 2022/263 concerning restrictive measures in response to the recognition of the non-government controlled areas of the Donetsk and Luhansk oblasts of Ukraine and the ordering of Russian armed forces into those areas [2022] OJ L259/65, 1; Council Regulation (EU) 2022/1904 of 6 October 2022 amending Regulation (EU) No 833/2014 concerning restrictive measures in view of Russia's actions destabilising the situation in Ukraine [2022] OJ L259/65, 3; Council Regulation (EU) 2022/1905 of 6 October 2022 amending Regulation (EU) No 269/2014 concerning restrictive measures in respect of actions undermining or threatening the territorial integrity, sovereignty and independence of Ukraine [2022] OJ L259/65, 76; Council Implementing Regulation (EU) 2022/1906 of 6 October 2022 implementing Regulation (EU) No 269/2014 concerning restrictive measures in respect of actions undermining or threatening the territorial integrity, sovereignty and independence of Ukraine [2022] OJ L259/65, 79.

[18] European Council, 'Iran: EU restrictive measures' (2022) <www.consilium.europa.eu/en/policies/sanctions/iran/> accessed 10 November 2022; European Council, 'EU restrictive measures against North Korea' (2022) <www.consilium.europa.eu/en/policies/sanctions/history-north-korea/> accessed 10 November 2022.

[19] For an overview of multilateral and unilateral economic and financial sanctions, see: Fabio Cozzi, 'Will Blockchain Technologies Strengthen or Undermine the Effectiveness of Global Trade Control Regulations and Financial Sanctions?' (2020) 20(2) Global Jurist <www.degruyter.com/document/doi/10.1515/gj-2019-0047/html> accessed 18 January 2023.

[20] See: Council Implementing Regulation (EU) 2021/998 of 21 June 2021 implementing Regulation (EU) No 401/2013 concerning restrictive measures in view of the situation in Myanmar/Burma [2022] OJ L219 I/45; Council Regulation (EU) No 401/2013 of 2 May 2013 concerning restrictive measures in view of the situation in Myanmar/Burma and repealing Regulation (EC) No 194/2008 [2013] OJ L121/2013.

transfers and products. As mentioned, nowadays, it is correct to discuss the trade of timber – considered a raw material – as for products made of forest materials. In this sense, it may be strengthened as wood products are increasingly subject to certification and inspection procedures.[21]

Since timber from Russia, Belarus and Myanmar is now considered 'conflict timber' and, as such, is subject to restrictions on its use, it is necessary to identify the origin of a timber consignment. If it comes from these countries, not only is its direct import forbidden but also its use. Moreover, for those who contravene these guidelines it is forbidden to certify and market its derivatives.

The abovementioned circumstance must be read in the light of two certification programs, the Forest Stewardship Council (FSC) and the Programme for the Endorsement of Forest Certification (PEFC), deemed necessary to suspend their certification operations in the Russian and Belarusian territories.[22]

Consequently, as of 2nd March 2022, all wood from these territories can no longer be used in certified production.[23] All the certification schemes stressed the importance of the chain of custody, but the issues concerning supply chains involve different aspects.[24] It is evident how the processes affecting the product could become opaque when becomes multistage, involving several geographically dispersed entities in distant locations. As a result, the traceability of the product itself suffers or is wholly undermined. In the same vein, as the wood comes from Russia and Belarus, it is important to consider similar situations which apply the same model.

2.2 International timber trading in light of the sanctioning regimes

In this context, the value of the regulations and the significant impact of the sanctions on the global timber market are clear. However, two logically consecutive and interlinked

[21] Nathan Iben, Christian Pilegaard Hansen and Benjamin Cashore, 'Timber legality verification in practice: Prospects for support and institutionalization' (2014) 48 Forest Policy and Economics.

[22] The Forest Stewardship Council A. C. (FSC) is an international non-profit, multistakeholder organization established in 1993 that promotes responsible management of the world's forests via timber certification and held by forest owners, timber industries, social groups, and environmental organizations to come together to find solutions to improve forest management practices. Its work is carried forward six primary areas, namely forests, chain of custody, social policy, monitoring and evaluation, quality assurance, and ecosystem services, in order to fight against illegal logging, deforestation and global warming. The Programme for the Endorsement of Forest Certification (PEFC) is an international, non-profit, non-governmental organization which promotes sustainable forest management through independent third-party certification. It is considered the certification system of choice for small forest owners. Based in Geneva (Switzerland) and founded in 1999, nowadays it represents more than 299.99 million hectares of certified forests that is about two-thirds of the globally certified forest area. It is correct to underline that mutual recognition of FSC and PEFC certified material in the chain of custody has not yet happened and some non-governmental organization such as Greenpeace does not recognize PEFC as an alternative to FSC.

[23] 'Timber from Russia and Belarus considered conflict timber' (4 March 2022) <https://pefc.org/news/timber-from-russia-and-belarus-considered-conflict-timber> accessed 14 October 2022.

[24] As far as trade is concerned, one of the supply chain central elements is how is possible to check the way in which a X product arrives at point Y, be it a finished product to be placed on the distribution market for the end consumer, or a semi-finished product that passes from one stage of processing to another, or even simply a product that has to be transferred from one point to another.

questions must be raised. The first concerns the effectiveness of the sanctions applied.[25] To date, can we say that they have been respected and, therefore, efficiently implemented?[26] The second, in the case of a negative answer to the first question, is there a technology that can be used to remedy the system's deficiency?

It is necessary to preface that even if EU timber restrictive measures against Russia and Belarus have recently been developed, is still lack of official reports regarding their effectiveness. Nevertheless, thanks to the Environmental Investigative Agency (from now on EIA), one of the organisations working to verify compliance with regulations to protect and safeguard the environment, it is possible to identify some breaches in the system.[27]

The decision to take into account is not only the sanctioning regimes against Russia and Belarus, but also to Myanmar, is based on the necessity to search for a possible plan of action. As analysed below with Myanmar timber trading and then with a report on the American imports, it will be possible to stress a recurring scheme that presupposes using new technological tools.

Regarding the restriction of timber - mainly teak - from Myanmar, the EIA shows how it is still acting in open violation of the sanctions imposed on that State, and not only after the coup d'état in February 2021. It is believed that even before that date, when it had already been established that environmental protection issues meant that the teak produced could not meet the EU entry requirements under the EUTR, some realities acted in violation of the EU Law. [28]

[25] For an interesting reading on the effectiveness of sanctions, their nature, and the purpose of punishment, see: Kim Richard Nossal, 'International Sanctions as International Punishment' (1989) 43(2) International Organization 301.

[26] It is important to stress that on the 25 May 2022 European Commission presented a proposal for a decision to extend the list of these areas of crime to include the violation of restrictive measures adopted by the European Union. The proposal is to consider the violation of Union restrictive measures as an area of crime within the meaning of Article 83(1), second subparagraph, TFEU. In the light of the above, the importance to define the compliance with restrictive measures in specific sectors is undeniable. See: Council of the European Union, Interinstitutional File 2022/0176 (NLE) <https://data.consilium.europa.eu/doc/document/ST-10287-2022-REV-1/en/pdf> accessed 02 December 2022.

[27] The Environmental Investigative Agency is a London-based agency, investigating and campaigning against environmental crime and abuse. See: <https://eia-international.org/>.

[28] See: Environmental Investigation Agency, 'German firm investigated by EIA convicted for breaking EU sanctions by trading illegal Myanmar teak' (EIA 28 April 2021) <https://eia-international.org/news/german-firm-investigated-by-eia-convicted-for-breaking-eu-sanctions-by-trading-illegal-myanmar-teak/> accessed 22 September 2022, in which the agency shows as the District Court of Hamburg at the beginning of 2021 sentenced the company WOB Timber GMBH to pay €3.3 million for violation of the Union law, while the Managing Director received a (suspended) 21-month prison sentence and a €200,000 fine for illegally importing teak from Myanmar between 2008 and 2011. Similarly, in a different briefing note, the EIA shows how the competent Dutch authorities have taken numerous actions against various European importers and traders who were responsible for illegal timber trafficking. In the course of the proceedings against them, it emerged that they had brought more than five hundred cubic meters of teak into the European market, with an estimated value of more than three million dollars. See: Environmental Investigation Agency, 'Dutch traders exposed by EIA are facing legal action for importing illicit teak from Myanmar' (EIA 8 April 2021) <https://eia-international.org/news/dutch-traders-exposed-by-eia-are-facing-legal-action-for-importing-illicit-teak-from-myanmar> accessed 10 October 2022. It should be recalled that the EU Legislation generally prohibits the use of timber harvested in unauthorized areas or war zones and, if timber is found to be harvested, processed, or manufactured in such areas, this affects the legality of the timber and would likely lead to the impossibility to carry out an appropriate Due Diligence Assessment, and thus, incompliance with Article 4(2) in accordance with Article 6(1) of the EUTR. This could also lead to a breach of Article 4(1) of the EUTR which prohibits placing on the EU market of illegally harvested timber or timber products.

In the September 2021 report entitled "The Italian Job", the EIA points out that after the coup d'état and the sanctions enacted, timber still manages to reach the rest of European countries precisely via Italy (which has been the largest importer of wood products from Myanmar since 2013) in violation of EU regulations.

The situation in Myanmar has also been analysed by the World Conservation Monitoring Centre of the United Nations Environment Programme (UNEP-WCMC), which, in its briefing of April 2022, refers to a report in which the military junta claims to have auctioned more than $8 million worth of teak and exported more than $190 million of wood products since the coup d'état.

Importers from the European Union (mainly Italy, but also those from other EU member states) and importers from the United States, the United Kingdom, Switzerland, and Canada, have all been identified as having also imported timber in violation of the sanctions in force since 2021. [29]

An exciting report issued by EIA in the past few days shows even more how even the government of the United States continues to import teak.

Between 1st February 2021 and 10th November 2022, 2.561 tons of teak were imported directly from Myanmar into the United States. [30]

It is undoubtedly due, at least in part, to deliberately illegal activity. Still, we can speculate that greater tracking information functionality could increase adherence to due diligence and make it easier to sanction non-compliance.

Since the restrictive measures regarding Russian and Belarusian timber are – so to speak – new, then we need more time to have official reports discussing their effectiveness.[31]

The EIA published an interesting report on the timber trading between Russia and the United States. The Agency believes that the government of the United States is continuing to import Russian timber in violation of the sanctions imposed. In particular, the findings published by EIA suggest that the United States is failing in its monitoring of imports - and,

[29] Environmental Investigation Agency, 'The Italian Job How Myanmar timber is trafficked through Italy to the rest of Europe despite EUilaws' (EIA 1 September 2021) <https://eia-international.org/wp-content/uploads/The-Italian-Job-2021-SPREADS.pdf> accessed 14 October 2022.

[30] In October 2022, 263.70 tons of teak were imported into the US via 14 shipments. A report written and edited by the Environmental Investigation Agency (which has been produced with the financial assistance of the Norwegian Agency for Development Cooperation (Norad) and the Foreign, Commonwealth and Development Office (FCDO), see: Environmental Investigation Agency, 'How US traders are ignoring sanctions to import conflict teak from Myanmar' (EIA December 2022) <https://eia-international.org/wp-content/uploads/Acts-of-Defiance-2022-SPREADS.pdf> accessed 8 December 2022.

[31] To date, it is possible to read some reports from investigative agencies that assert as the illegal timber is nowadays into the European market. See: Olga Ratmirova, Kseniya Viaznikoutsava and Alexander Yarashevich, 'Bypassing the sanctions Belarusian wood enters the EU under sham papers' 20 December 2022, <https://investigatebel.org/en/investigations/belaruski-les-abyhodzic-sankcyi-pa-falshyvyh-dakumentah> accessed 5 January 2023; Sarunas Cerniauskas, 'Traders Are Sneaking Banned Russian and Belarusian Wood into the EU By Pretending It's from Central Asia', 20 December 2022, <www.occrp.org/en/investigations/traders-are-sneaking-banned-russian-and-belarusian-wood-into-the-eu-by-pretending-its-from-central-asia> accessed 5 January 2023.

in this case, with its compliance with the Lacey Act[32] - concerning the mandatory requirement for importers to declare the country of harvest.[33]

The EIA data show that, besides Russia, the USA imported a considerable amount of timber from Asian countries such as China, Vietnam and Indonesia, which were not subject to the sanctions of the Russian-Ukrainian war.

It should be emphasised that, in the aftermath of the import restrictions from Russia, timber from these Asian countries increased by more than 200%.

Discarding the hypothesis that these States had such availability of indigenous timber, the EIA argues that the products arriving on the US market today are composed of Russian wood, which entered America by exploiting the loopholes in the traceability and transparency system of the supply chain in Asian countries.[34]

As the economy's structure changes, the leading roles, rules, and tools of the transnational exchange of goods cannot fail to change.[35]

Given the increasing complexity of markets, the supply chain is also noticing the emergence of new and different interlinked aspects, which make it more difficult not only to track the transactions performed efficiently but also the chain of custody of the products themselves, as well as the evaluation of this information.[36]

[32] Lacey Act, 16 U.S. Code § 3372. Reference to the Lacey Act is necessary as a result of the amendment passed on 22nd May 2008, which broadened the scope of the original 1900 Statute designed fundamentally for ecological protection purposes that prohibited the importation, exportation, transportation, sale, receipt, acquisition or purchase via interstate or foreign commerce of any animal or plant taken in violation of the laws of the United States or other countries, and now covers a wider range of products and in particular timber from 'illegal logging practices'. The 2008 Amendment to the Lacey Act, as mentioned earlier, was aimed precisely at avoiding this issue by considering - and still finding, given that it is still in force today - that it was necessary to focus on highlighting what had not been considered until then, i.e., that importers should indicate the imported species and the place of harvest.

[33] Environmental Investigation Agency, 'How Russian Conflict Birch Makes its Way to American Consumers' (30 September 2022), <https://us.eia.org/report/20220930-russian-conflit-birch/> accessed 14 October 2022. One of the primary objectives on which governs agreed on to implement policies to safeguard and combat non-legal logging. The Conference of the Parties is the governing body of the Convention on Biological Diversity, signed in 1992 by 150 government leaders and aimed to promote nature and human well-being. Currently the Convention has 196 Parties (all the countries that have either ratified, acceded to, approved, or accepted the Convention are therefore Parties to it). The United Nations Framework Convention on Climate Change is an international environmental treaty established to combat dangerous human interference with the climate system, entered into force on 21 March 1994.

[34] This consideration is supported by the China's current forestry policy, which aims at carbon neutrality and thus expansion and improvement of the forest area, and the fact that the traced supply chain concerns timber that grows in cold climates. In the report, the investigators quote a statement from an exporter who affirms: 'The way we are doing now is importing Russian birch to China first (it used to go from Russia directly to Vietnam), repackaged in China, and then re-exported to Vietnam. In doing this, the products exported to Vietnam cut all ties with Russia. The country of origin will be here [China]'.

[35] Cristina Poncibò, 'Lex Mercatoria ex Machina' (2021) 3 MediaLaws <https://www.medialaws.eu/rivista/lex-mercatoria-ex-machina/> accessed 27 September 2022.

[36] Mahtab Kouhizadeh, Sara Saberi and Joseph Sarkis, 'Blockchain Technology and the Sustainable Supply Chain: Theoretically Exploring Adoption Barriers' (2021) 231 International Journal of Production Economics <www.sciencedirect.com/journal/international-journal-of-production-economics> accessed 10 October 2022. The above is part of a broader debate on the design of so-called Industry 4.0, which relies heavily on the adoption and use of numerous technologies that enable the real-time collection, sharing, and analysis of a large amount of data and that appear capable of connecting cyberspace with the physical environment.

It will therefore be necessary to ask whether it is possible to propose a methodology for implementing the supply chain system with blockchain technology to make the sanctioning tools efficient and controllable.

The terms ‘chain of custody' and 'supply chain' couldn't be overlapped even if they are linked.[37]

Specifically referred to the timber sector, the chain of custody certification refers to the generic process of tracking materials from forest to market.[38]

Seeing forest products at every stage of the supply chain, from when the raw material leaves the forest until the final product reaches the consumer, means talking about the supply chain and chain of custody regarding timber.[39] In this sense, the difference between traceability and transparency is relevant. Although they are interconnected and not infrequently used as synonyms, they actually have two different contents. By transparency, we mean the overall visibility of the entire supply chain that allows stakeholders access to the required information without being dispersed, lost, or distorted. In contrast, traceability relates to the ability to access information at a detailed level on everything that remains part of the supply chain; in other words, it can be defined in terms of 'what, how, where, why and when'. The current tracking methods used for the Chain of Custody certification, mainly based on offline analyses, have limitations in dealing with international timber movements and processes linking multiple parties. This

[37] It is possible to define supply chain as the complete life cycle of a product, from its raw material state to its final sale, involving the supply, production, storage, and distribution processes, and requiring coordination between every link in the chain. Instead, the term chain of custody is the chronological documentation that records the sequence of custody, control, transfer, analysis, and disposition of materials, including physical or electronic evidence. It is important to underline that the term ‘chain of custody’ is not limited to the supply chain management, all the while it is crucial in forensics. In the field of criminal evidence, the chain of custody is defined as “the chronological documentation of the movement, location and possession of evidence” (Scientific Working Group on Digital Evidence, glossary <www.swgde.org/glossary>). Even if in different scenarios and with different methodologies, the aim of the chain of custody is the same, that is firstly, to certify that a certain step of a process was conducted following the guidelines and the applicable laws and, secondly, assuring its integrity and the possibility of an *ex-post* revision. See: Giulio Soana, ‘Catena di Custodia, Prova Digitale e Tecnologia Blockchain’ (2021) 4 Diritto di Internet 792.

[38] This analysis wishes to clarify that the complex structure of international timber trading was taken into consideration. However, it was considered impossible to conduct an exhaustive discussion on the comprehensive matter. To give a glance of its structures, it is possible to recall the role of the bill of landing, a transport document issued by a carrier to a shipper covering the carriage of goods by sea. An aspect of interest, in the light of the present analysis is, beyond its structures, the corresponding right of the controlling party. As far as the mentioned right is concerned, the making of a digital bill of landing running on a blockchain could bring together different requirements, e.g., the easy accessibility to data, their transparency and the related tamper-proof. For a more specified analysis, see: Mark L Shope, ‘The Bill of Lading on the Blockchain: An Analysis of its Compatibility with International Rules on Commercial Transactions’ (2021) 22 Minnesota Journal of Law, Science & Technology 163. A different question can be seen within the documentation required by governments for the timber import from non-EU countries as the phytosanitary certificate as well the CITES certificate if the trade regards protected species, see: Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) [2015] OJ L75/4; Regulation of the Commission ‘Implementing Regulation (EU) 2019/2072 of 28 November 2019 establishing uniform conditions for the implementation of Regulation (EU) 2016/2031 of the European Parliament and the Council, as regards protective measures against pests of plants, and repealing Commission Regulation (EC) No 690/2008 and amending Commission Implementing Regulation (EU) 2018/2019’, [2019] OJ L319/1.

[39] Natalia Vidal, Robert Kozak and David Cohen, ‘Chain of custody certification: an assessment of the North American solid wood sector’ (2005) 7 Forest Policy and Economics 345.

makes it difficult to translate into control on a global scale due to several causes, as explained below.[40]

3 Complexity of the timber supply chain: current use of blockchain in the forest sector

Therefore, it is necessary to find a tool that can allow easy traceability from the acquisition of the raw material to the certification of the final product. This need for product tracking in the supply chain is not only an issue in the timber trade but permeates every known production sector and it is addressed differently in many areas. The question arises as to which of the existing technologies would make it possible to store a series of data in an immutable manner and make it searchable even in geographically distant areas and - consequently - the hypothesis of the use of blockchain technology was put forward.

Regarding blockchain, IT infrastructure is now well known in its essentials - although no detailed description and established standards are still lacking - for which a general definition has been adopted from existing blockchain-based systems. [41] Blockchain is an infrastructure characterised by its peculiar structure within the technology of distributed ledger. [42] In very general terms, Distributed Ledger Technology (DLT) refers to electronic ledgers geographically distributed over a vast network of peers. Secure encrypted information storage is based on consensus algorithms involving all or part of the participants. Therefore, when we refer to the blockchain, we refer to an infrastructure in which the ledger is structured as a chain of blocks containing transactions whose validation is entrusted to a consensus mechanism and, therefore, without the need or control of a central authority.[43]

[40] The need to implement timber tracking activities had already been emphasized in 2021 during the 15th Conference of the Parties to the Convention on Biological Diversity and the 26th Session on the United Nations Framework Convention on Climate Change (namely UNFCC), during which the participating nations agreed on actions to mitigate deforestation. The Conference of the Parties is the governing body of the Convention on Biological Diversity, signed in 1992 by 150 government leaders and aimed to promote nature and human well-being. Currently the Convention has 196 Parties (all the countries that have either ratified, acceded to, approved or accepted the Convention are therefore Parties to it). See: The United Nations Framework Convention on Climate Change is an international environmental treaty established to combat dangerous human interference with the climate system, entered into force on 21 March 1994. See: UN Climate Change Conference 'COP26 The Glasgow Climate Pact' (Report, 2021) <https://ukcop26.org/wp-content/uploads/2021/11/COP26-Presidency-Outcomes-The-Climate-Pact.pdf> accessed 29 October 2022.

[41] An appropriate and exhaustive dissertation of the blockchain technology itself cannot be conducted in the present analysis, whereas only the deemed pertinent features are considered.

[42] Following the European Law Institutes' definition, it is possible to affirm that a blockchain is a sub-category of DLT, while blockchains can be defined as "method of operating a distributed ledger. Data are typically stored in blocks organised in an append-only, sequential chain using cryptographic links to validate the integrity of historical data, with algorithmic validation of transaction logic and confirmation of the records by a defined mechanism for consensus among the nodes that process transactions". See: Sjef Van Erp, Martin Hanzl and Juliette Sénéchal, 'ELI Principles on Blockchain Technology, Smart Contracts and Consumer Protection' (2022) European Law Institute <www.europeanlawinstitute.eu/fileadmin/user_upload/p_eli/Publications/ELI_Principles_on_Blockchain_Technology__Smart_Contracts_and_Consumer_Protection.pdf>, accessed 18 January 2023.

[43] Each blockchain application has its own rules for validating new data blocks added to the chain, and such validation is based on a consensus mechanism. See: Bahareh Lashkari and Petr Musilek, 'A Comprehensive Review of Blockchain

Why speak of blockchain as a functional IT infrastructure for the supply chain?[44] It is possible to argue that thanks to its own characteristics, a blockchain can fulfil the needs of certainty, transparency and traceability, allowing for full awareness of a product's whole life.[45] Some authors show that blockchain has already been studied and utilised around the timber trade.[46] Blockchain-based applications in forestry are mainly developed (or proposed) in forest management, forest fire detection and traceability of forest-based products.[47] As far as the traceability is concerned, blockchain can be decisive from the moment this technology can validate the lawfulness of the timber sector.[48]

As already mentioned this refers to the use of the blockchain together with tools such as sensors, drones, and even the use of radio frequencies (Radio Frequency IDentification, RFID)[49], capable of guaranteeing the acquisition and collection of data, such as the authorised cutting areas and the collection timing.[50] Two key elements, the morphological characteristics of the materials and the limited technical capabilities, generate a demanding number of challenges and problems for this sector.[51] Exciting studies give a

Consensus Mechanisms' (2021) 9 IEEE Access <https://ieeexplore.ieee.org/abstract/document/9376868>, accessed 8 October 2022; Daniel Minoli and Benedict Occhiogrosso, 'Blockchain mechanisms for IoT security' (2018) 1 Internet of Things 1.

[44] See: Nadia di Paola, *Blockchain e supply chain management. Teoria e pratica manageriale nell'era digitale* (Wolters Kluwer CEDAM, Milano 2018).

[45] For instance, the abovementioned decentralised consensus seems to be a crucial step, seeing as the information of a certain good can be aggregated to something that is accepted by the community—and recorded to the blockchain. See: Lin William Cong and Zhiguo He, 'Blockchain Disruption and Smart Contracts' (2018) National Bureau of Economic Research, Working Paper 24399 <www.nber.org/papers/w24399> accessed 18 January 2023. Moreover, being tamper-proof means that all the data inside of the chain cannot be modified and for this reason the blockchain seems to be suitable as certificate for a raw material as well for the whole supply chain. As mentioned, the FLEGT regulation identify the need of a license scheme for the timber trade; it is at least evocative how the 'FLEGT licence' is defined by article 2(6) of the regulation itself, as "a shipment-based or market participant-based document of a standard format which is to be forgery-resistant, tamper-proof, and verifiable, and which refers to a shipment as being in compliance with the requirements of the FLEGT licensing scheme, duly issued and validated by a partner country's licensing authority. Systems for issuing, recording and communicating licences may be paper-based or based on electronic means, as appropriate".

[46] Zhaoyuan He and Paul Turner, 'Blockchain Applications in Forestry: A Systematic Literature Review' (2022) 12 Applied Sciences <www.mdpi.com/2076-3417/12/8/3723> accessed 29 September 2022.

[47] ibid. The proposed study shows that 52% of the blockchain-based application are related to traceability and it is considered that the best benefits of its use can be qualified in terms of transparency, meaning, in this case, that sellers and buyers of forest-based products can quickly gain access to a variety of necessary information. The product's place of origin, the place of harvesting, the timing of transport, they all information that may minimise the risk of illegal timber being harvested in unauthorised ways or place.

[48] In fact, once the lawfulness of the cut has been proven and the Parties agree on the transport route of this material, any deviation from what is agreed upon is recorded in the blockchain and, as a result, any impermissible variations are rendered impossible (or, if they occur, they can be detected and reported).

[49] The RFID (Radio Frequency Identification) technology automatically identifies information contained in a tag using radio waves. An RFID tag contains an antenna and a microchip to transmit and receive. The mentioned technology is characterized by deploying three essential components: a microchip, an antenna, and a reader. See: Hervé Chabanne, Pascal Urien and Jean-Ferdinand Susini, *RFID and the Internet of Things* (John Wiley & Sons Ltd, 2013) 304.

[50] Carla Smith, 'Blockchain Technology Could Improve Traceability of Wood through the Supply Chain' (2019) 527 Science for Environment Policy: European Commission DG Environment News Alert Service, <https://environment.ec.europa.eu/research-and-innovation/science-environment-policy_en> accessed 23 September 2022.

[51] Margherita Molinaro and Guido Orzes, 'From Forest to Finished Products: The contribution of Industry 4.0 technologies to the wood sector' (2022) 138 Computers in Industry <www.sciencedirect.com/science/article/pii/S016636152200032X> accessed 25 September 2022.

glimpse of the potential use of blockchain in the forest sector, especially about certain aspects of considerable interest, such as preventing deforestation and illegal trade and safeguarding the sustainable forest industry.[52]

One of the first studies on using blockchain technology applied to the timber supply chain dates back to 2018.[53] It pointed out that using a decentralised system makes it possible to exploit the characteristic of non-alterability of data once entered. This allows the creation of a method for certain transactions, even in a rogue ecosystem. Keeping this in mind, it is possible to see the application of blockchain in precisely the two hypotheses we have focused on, namely Russia and Myanmar. A recent study concerning the teak trade from Myanmar has been presented, based on using and implementing a Decentralised Application (DApp) for timber tracking to minimise the gap between physical traders and blockchain, to help them maximise the benefits they can obtain through its use. [54]

The traceability system is, as such, relatively innovative. Still, its particularity focuses on the possibility of tracking the product and its transformation process from the origin to the final stage making it possible to guarantee the accuracy of the input of data, especially in case of its integration with the Internet of Things (IoT)[55] and smart contracts.[56]

A similar study was conducted to verify whether blockchain could prevent illegal bond trading between Russia and China. [57] In this analysis, there is plenty of room to take into

[52] Zhaoyuan He and Paul Turner 'Blockchain Applications in Forestry: A Systematic Literature Review' (2022) 12 Applied Sciences <www.mdpi.com/2076-3417/12/8/3723> accessed 29 September 2022.
[53] Simone Figorilli and others, 'A Blockchain Implementation Prototype for the Electronic Open Source Traceability of Wood along the Whole Supply Chain' (2018) 18(9) Sensors <www.mdpi.com/1424-8220/18/9/3133> accessed 10 October 2022.
[54] Studies that have been deemed satisfactory by those who conducted them, although they state that further analysis of this application is needed. The starting point of Sheng and Wicha's investigation relates to the two aspects of product tracking and tracing, where tracking relates to the possibility to know the ongoing location of items during their way through the supply chain, while trancing relates to the ability to know the historical locations, the time spent at each location, record of ownership or farmer, packaging status, processing stages, and warehouse storage conditions for an item. In specific terms, in this case the choice fell on Ethereum. See: Sai Woon Sheng and Santichai Wicha 'The Proposed of a Smart Traceability System for Teak Supply Chain Based on Blockchain Technology' (2021) Joint International Conference on Digital Arts, Media and Technology with ECTI Northern Section Conference on Electrical, Electronics, Computer and Telecommunication Engineering <https://ieeexplore.ieee.org/document/9425780/> accessed 23 September 2022.
[55] Internet of Things (IoT) is an automated system which allows a universal network of interconnected everyday physical objects which are equipped with uniquely addressable devices, embedded with sensors, software, electronics, actuators to connect and exchange data. See: Srabanti Chakraborty and Prasenjit Das Souvik Pal, 'IoT Foundations and Its Application' in Prasant Kumar Pattnaik and others (eds), *IoT and Analytics for Agriculture* (Studies in Big Data 63 Springer, Singapore 2020).
[56] Justin Sunny, Naveen Undralla and V. Madhusudanan Pillai, 'Supply Chain Transparency through Blockchain-based Traceability: An Overview with Demonstration' (2020) 150, Computers & Industrial Engineering, <www.sciencedirect.com/journal/computers-and-industrial-engineering> accessed 18 October 2022.
[57] It concludes by claiming that this technology, thanks to its innovative features, can solve several problems, especially those related to the transparency of information and the unchangeability of the data entered. Therefore, this study believes that blockchain has the potential to be a viable solution to implement and improve upon current approaches. See: A Vilkov and G Tian, 'Blockchain as a Solution to the Problem of Illegal Timber Trade between Russia and China: SWOT Analysis' (2019) 21 International Forestry Review <www.ingentaconnect.com/content/cfa/ifr> accessed 23 September 2022.

account the sector's peculiarities, especially at the level closest to harvesting areas, which suffers from a lack technological infrastructure.[58] Consequently, it is necessary to stress that in the forest sector the use of blockchain technology is a reality that - although not yet widespread - appears to be of exemplary implementation.

Even before we can speak about their dissemination, certain aspects must be carefully analysed and regulated. We must consider how to ensure data entered into the blockchain is genuine, as well as how to protect it and guarantee accuracy in algorithm creation. This will provide tools for resolving conflicts that may arise. The mutual recognition of certificates is one facet of building a complex plan.[59] The advantage of using blockchain to issue certificates of origin would be "limited" to the integrity of the accompanying document of the goods, thus providing proof that they have not been manipulated.

The above relates to the so-called oracles, i.e., all those systems that enable data entry on the blockchain and thus represent the point of contact between the off-chain and on-chain worlds (and vice versa when exporting previously entered data).[60]

However, suppose it was possible to implement the use of this technology to rely on the data entered and stored on the blockchain without thus relying on off-chain certification and control authorities. In this case, there could be more than one benefit, such as reducing customs costs, reducing the risk of fraudulent activities, and increasing the accountability of the supply chain.

The above is easier to realise as far as technology is possible; this issue is obviously not undermined by the European institutions, which design the 'Forest MAP' as a framework within which all new policies concerning the forest sector must be considered.[61]

Eight priority areas have been identified to cover the three pillars of sustainable forest management, which are social, economic, and environmental. For example, those operating in rural and mountain areas in Italy have pointed out how the emergence of technical and economic barriers poses a real risk to the exclusion from the system of small

[58] I.e. we can mention a project established in Brazil and which aims to ensure transparent trade transactions of legal and sustainable forest products that meet the requirements of the EUTR and the Lacey Act. See: BVRio's Responsible Timber Exchange Trading Platform <www.bvrio.com/plataforma/plataforma/madeira.do?language=en-us>.

[59] Jule Giegling 'In Blockchain We Trust? Certificates of Origin as a Case for Distributed Ledger Technologies' (2022) 1 Journal of Law, Market & Innovation 70.

[60] Systems that, can be hardware, and software, but also human in nature, depending on the origin of the data and information transferred. Looking for a brief and not exhaustive exemplification, in the case of a hardware oracle, the data is created in the physical world (the geolocation of a cut) and is detected by technological tools such as GPS. In the case of software oracles, the data are native online, i.e., they are created in the digital world, like data traffic generated by an IP address. Lastly, there is the possibility of human oracles, that enter data, which, can also be the result of the evaluation or interpretation of data generated by software or hardware. See: Laura Vagni, 'Il Problema della Rilevanza Giuridica dell'errore nella Decisione dell'oracolo della Blockchain' (2022) 2 lceonline <www.lceonline.eu/blog/2022/06/28/il-problema-della-rilevanza-giuridica-dellerrore-nella-decisione-delloracolo-della-blockchain> accessed 3 November 2022.

[61] Eight areas of action were pinpointed: 1) supporting our rural and urban communities; (2) promoting the competitiveness and sustainability of forestry, bioenergy, and green economy industries in general; 3) forests in a changing climate; (4) protecting forests and improving ecosystem services; (5) information and monitoring of forests; (6) research and innovation; 7) working together; and 8) forests from a global perspective. See: European Parliament 'The European Union and Forests' (Fact Sheets on the European Union) <www.europarl.europa.eu/factsheets/en> accessed 10 November 2022.

and medium-sized enterprises struggling to integrate digital technologies into their activities.[62] It is clear that these problems, if already present in some areas of Italy, are even more penetrating in other areas of the globe, contributing to the widening of the already existing digital gap. The question remains, therefore, whether blockchain has the necessary features to be used in specific contexts, either to enable or prevent certain actions, or as a tool to verify the product's chain of custody and perhaps directly apply the penalty or reward regime.

The matter about is of the utmost importance because if what the EIA stated in its report titled 'the Italian job' is correct, it is certainly relevant to know that a company that imports in violation of the EUTR can simultaneously continue to benefit from EU development funding.[63]

Another recent study argues that the movement of European funds via a platform that exploits the blockchain plan would achieve three types of benefits: traceability of flows, accessibility of data, and isolation of malicious actors.[64]

In the hypothesis of the timber supply chain, transparency in the chain of custody from the marked timber, from the landing site and up to the finished product would not only create a supply chain of the knowledgeable actor. Still, it would also be able to exclude the financing of non-compliant Parties.[65]

For instance, producers, forestry companies or importers and processors who choose a transparent and verifiable supply chain could be recognised as performing parties.

[62] See: Stefano Ciliberti and others, 'Digitalizzazione e Tracciabilità: I Principali Risultati Del Living Lab Sulla Filiera Legno-Energia in Italia' (2021) 18 Forest@ - Journal of Silviculture and Forest Ecology 79 <https://foresta.sisef.org/contents/?id=efor3982-018> accesses 17 November 2022; Piermaria Corona, Gianfranco Scrinzi 'Security of the Wood Production from the Italian Forests and Innovation for Wood Product Traceability' (Atti del Secondo Congresso Internazionale di Selvicoltura dell'Accademia Italiana di Scienze Forestali, 2015) <https://aisf.it/2cis-pc-sic/> accessed 18 October 2022.

[63] Environmental Investigation Agency, 'The Italian Job How Myanmar timber is trafficked through Italy to the rest of Europe despite EU laws' (2021) <https://eia-international.org/wp-content/uploads/The-Italian-Job-2021-SPREADS.pdf> accessed 14 October 2022.

[64] The fairness of the disbursement and distribution of European funds has always been the subject of careful analysis reinforced following the Covid-19 pandemic that saw numerous economic resources deployed by the European Union to try to stem the devastating consequences brought about by the pandemic emergency. The current problem of the proper allocation of funds, which must be conducted in such a way that they can be received by the Parties legitimately entitled to use them, and which finds elements of serious criticality in the transnational dimension of the transactions and the absence of a central investigative body in the Member States. Following this reflection, according to the writer's opinion, implementing the use of blockchain technology in strategic and specific areas would delineate a new virtuous model, also capable of providing a correction to situations, such as those under consideration, pertaining to compliance with the sanctions imposed, as well as all regulations. See: Marco Letizi, Giulio Soana 'Blockchain e Intelligenza Artificiale a fini Antifrode: Il Caso dei Fondi Europei' (2020) NT+ Diritto <https://ntplusdiritto.ilsole24ore.com/art/blockchain-e-intelligenza-artificiale-fini-antifrode-caso-fondi-europei-ADLd4h7> accessed 14 October 2022.

[65] With specific reference to the teak trade, which sees the ban of exporting entities that have relations with the military regime established in Myanmar, being able to see the country and place of origin (understood as the territory where the timber is felled) in detail, would allow producers who are not affected by the sanctions to be chosen, thus allowing only them to continue their trade flow with foreign countries. Concerning Myanmar, the question is about the distinction between legal and illegal importation depending on who is involved. For what comes from Russia and Belarus, it is necessary to stop the materials at the border and check that the timber has not been moved and processed in other states. Once Russian timber has entered the European market, it is difficult - if not impossible - to distinguish it from wood from other areas, so only with complete traceability can its legality be guaranteed.

Accordingly, blockchain can be seen as a 'certification of merit' that would allow even a small company to participate more easily in calls for tenders.

4 Prospects and concluding remarks

These issues are already a priority for institutions that have begun questioning their possibilities for future development. [66]

The above underlines how the attention of authorities is shifting towards the search for increasingly effective tools, a need that arises from the complexity and mutability of markets and circumstances that have already been extensively marked. We can more generally state that, focusing on the movement of goods, it is possible to identify their passage across borders between States as a control gate. As far as the European Union is concerned, compliance with the regulations of the sector under analysis is guaranteed in the first instance by the customs authorities of the Member States as the competent Bodies to implement the so-called import control.[67] A further matter is the legal relevance of interference by a subject outside of sovereignty governs; the perspective must focus on the topics that are legitimately addressed following the rules.[68] Moreover, another aspect

[66] Some projects of interest relate specifically to certificates of origin, for which the European Commission is questioning how to implement the necessary documentation for the cross-border movement of goods, considering that distributed ledger technologies such as blockchain can support certification and verification procedures for the origin of products. Among the novelties worth mentioning is the DPP (Digital Product Passport), which will see its application - as of 2024 – and described by the European Parliament in the following terms: "a digital document that provides updated product information through the value chain and product life (origin, composition, repair and disposing of)" and for which the European institutions are currently evaluating the pros and cons of its use both on-chain and off-chain. Created specifically with the manufacturing sector and the protection of 'made in' in mind, it is nevertheless a tool that will have to be viewed carefully once the two operating methods have been fine-tuned, whether it can be proposed in different sectors and with partially or different purposes. See: World Customs Organisation, 'Comparative Study on Certification of Origin' <www.wcoomd.org/-/media/wco/public/global/pdf/topics/origin/instruments-and-tools/comparative-study/related-documents/comparative-study-on-certification-of-origin_2020.pdf?db=web> accessed 01 November 2022; European Parliament, 'New technologies and new digital solutions for improved safety of products on the internal market (Study Requested by the IMCO committee), <www.europarl.europa.eu/RegData/etudes/STUD/2022/703348/IPOL_STU(2022)703348_EN.pdf> accessed 2 November 2022.

[67] At this stage, the possible risks are identifiable in several respects. The possibility of circumventing bans in the case of imports from countries that have not joined the sanctions package appears particularly relevant. The easiest method of circumventing sanctions to date is timber trade with countries with no restrictions on trade relations with sanctioned countries, as analysed by the EIA. Given that different practices and laws may be appropriate in individual Member States, it is not out of the question that goods legally permissible for entry could be blocked due to irregularities, even purely formal ones, in the transport documents. This is because we are dealing with international trade.

[68] In the case of the sanctions on Russia, Belarus and Myanmar, the latter did not accept the restrictions imposed, which, of course, were issued unilaterally; therefore, for the sanctioned States, existing relationships (and future ones if created) would continue to be by the National Law. The observance or implementation of sanctions imposed between States cannot fail to come up against issues about the theory of Law, with the intention of understanding whether - and how - authorities external to one or more government can impose themselves in business relationships, between Parties that have not previously adhered to a specific regulation in this sense. For instance, the Belarusian exporter cannot have a contract legitimately concluded before the sanctions were enacted and cancelled by an entity - such as an EU institution - that has no authority over it: the timber imported by the European Union trader becomes illegal because it is contrary to European Union law, while remaining legal for the producer in the country of origin and for all countries that have not implemented the sanctions, and this timber is transported along more or less defined trade routes, which may make it confusing or impossible to sanction even within the European Union itself. Consequently, once the end-

that needs to be considered is how disputes can arise, not only in proposed cases, where a party has to interrupt the execution of a contract due to the introduction of a new regulation, but also in other cases: where a smart contract transaction is not completed, or is only partially completed, or is not entered into the blockchain. In the situations mentioned questions arise concerning the imputation of liability.[69]

Even if the data in the mass memories of each node are physically traceable - at least partially – but fundamentally decentralised, could we assume that the competence for resolving such issues is equally decentralised?[70] Some authors are proposing an alternative approach to the existing exercise of jurisdiction, an approach inherent to blockchain technology itself and responding to the term distributed jurisdiction, which would, in any case, require a governance system within the blockchain technology itself; hence all the difficulties and questions to which it is still not possible to offer an answer to date, as outlined below.[71] Reversing the perspective, we see no interference and control of the blockchain by an authority but a system that allows the chain of custody to be demonstrated.[72] Therefore, a suitable structure should be created for a certified on-chain, for which it is crucial that the underlying institutional framework can provide legal recognition of the information generated therein to enable its use on the market.[73]

The above is part of a context that is still full of questions and requires extensive research and research, whose extent is undoubtedly so broad that it does not allow a thorough comment on state of the art in this paper.[74] In conclusion, using the blockchain

user receives a consignment of timber, or the consumer, the question of its provenance may involve several off-chain entities, ranging from public administration - as Customs authorities and others - to the producer, as well as the transport companies used, but also partly on-chain, such as the validator node of individual transactions, as well as the company developing the apps used, or the technologies used for data collection.

[69] A further issue arises from the fact that, since we are inside a computer system, the questions of who owns the network and its data take work to resolve. See: Adam P Balcerzak and others 'Blockchain Technology and Smart Contracts in Decentralized Governance Systems' (2022) 12(3) Administrative Science <www.mdpi.com/2076-3387/12/3> accessed 31 October 2022.

[70] Matters such as who is responsible for, who has processed what data, where and when, and thus ascertain which jurisdiction should apply in disputes, or who controls the information and is responsible for its security or responsible for its integrity. See: European Union Blockchain Observatory & Forum 'Legal and regulatory framework of blockchains and smart contracts' (Thematic Report 27 September 2019) <www.eublockchainforum.eu> accessed 30 October 2022.

[71] Bronwyn E Howell and Petrus H Potgieter, 'Uncertainty and Dispute Resolution for Blockchain and Smart Contract Institutions' (2021) 17(4) Journal of Institutional Economics <www.cambridge.org/core/journals/journal-of-institutional-economics/article/abs/uncertainty-and-dispute-resolution-for-blockchain-and-smart-contract-institutions/6C06720B46228EA9D95E5E7611E5EFA5> accessed 06 June 2022; Yann Aouidef, Federico Aste and Bruno Deffains, 'Decentralized Justice: A Comparative Analysis of Blockchain Online Dispute Resolution Projects' (16 March 2021) Frontiers <www.frontiersin.org/articles/10.3389/fbloc.2021.564551/full> accessed 06 June 2022.

[72] For example, the execution of a contract in violation of the applicable regulations would have several consequences that would no longer make it convenient to act this way.

[73] It is difficult, at this point, not to think about the possibility that Decentralised Autonomous Organizations (DAOs) could form the parties involved. Decentralised Autonomous Organisations are blockchain-based entities that allow their members to coordinate and regulate themselves via a set of self-executing rules, implemented on a public platform and with decentralized governance. See: Samer Hassan and Primavera De Filippi, 'Decentralized Autonomous Organization' [2021] Internet Policy Review <https://policyreview.info/glossary/DAO> accessed 5 November 2022.

[74] It is possible, however, to mention how among the issues that still awaiting a resolution is the current question of blockchain governance, a terminology that is used in two heterogeneous contexts, namely governance within the blockchain and governance with the use of the blockchain. As for the interest in the present analysis, reference can be

to control and implement sanctioning regimes imposed between communities certainly appears to be a tool of unquestionable usefulness, not only broadly speaking but also referring - as seen - to a specific production sector affected by the enactment of trade restrictions.

Regarding the numerous issues from this analysis, it is equally undeniable that several entities need joint action to become a regulatory landscape that can effectively enable its use.

Although some sanctions have been effective for some time, it is not unwise to assume that it is only in the current events of the Russian-Ukrainian conflict that global awareness has increased to the point of trying to make the restrictions imposed effectively. It will therefore be necessary to see how the authorities of the various countries move to fulfil their commitments and, therefore, analyse how the - possible - violations detected can be stemmed with the use of blockchain technology.

made to what Fischer and Valiente state: "in a broad sense, blockchain governance can be regarded as the integration of norms and culture, the laws and the code, the people and the institutions that facilitate coordination and together determine a given organization. Importantly it refers to the entirety of motivations, rules, and activities that feed into the establishment of choices and subsequently deciding on them, and includes, but is not limited to, any coded on-chain rules that guide these processes". See: Aaron Fischer and Maria-Cruz Valiente, 'Blockchain Governance' (2021) (10) 2 Internet Policy Review <https://policyreview.info/glossary/blockchain-governance> accessed 14 November 2022.