Electronic Commerce in the Gaming Industry. Legal Challenges and European Perspective on Contracts through Electronic Means in Video Games and Decentralized Applications

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The present paper explains the need in the application of electronic commerce regulations to the so-called in-game purchasing activity in video games, particularly, purchase of intangible items, where such game is commoditized, focusing on the legislation of the European Union. It examines in detail the various applications of European regulations to the issues connected to the gaming industry in the European Union - gambling regulations, geo-blocking, data protection, smart contracts validity and enforcement, virtual currencies regulation in the scope of contractual law, and shows a possible way to adapt the national legislation of the Member States and European legislation in order to secure electronic commerce in the gaming industry. The present paper analyses gaps in existing legal procedures, stresses the necessity of new legal models in order to regulate the purchase of intangible items in video games and decentralized applications and underlines the importance of amendments to current European legislation with particular focus on new developments of Create, Retrieve, Append, Burn technology and commoditized video games in order to protect consumer rights and the free movement of digital goods and to accomplish the Digital Single Market Strategy of the European Union.

Keywords: video games, Blockchain, smart contract, electronic commerce, decentralized applications

1. Introduction

Since 1961, when MIT student Steven Russel created the first-ever video game "Spacewar", which inspired the creation of such popular video games as "Asteroids" and "Pong",[1] technology went much further. Nowadays almost every electronic device has access to the Internet and both online and offline video games. Moreover, with the development of Create, Retrieve, Append, Burn technology (hereinafter - CRAB) many platforms such as NEO,[2] Ethereum[3] or Zilliqua became available,[4] allowing users to create crypto assets and operate them by smart contracts. Together with the creation of CRAB platforms, a new kind of business was born – decentralized applications (or dapps)[5] and decentralized organizations (or DAO)[6], which allow users to conclude different kind

[1] Ramos, A. López, L. et al., *The Legal Status of Video Games: Comparative Analysis in National Approaches*, World Intellectual Property Organization, p.7, available at: http://www.wipo.int/export/sites/www/copyright/en/activities/pdf/comparative_analysis_on_video_games.pdf (24 October 2018).
[2] Official description of NEO platform, available at: https://neo.org/, (4 October 2018).
[3] Official description of Ethereum platform, available at: https://www.ethereum.org/, (4 October 2018).
[4] Official description of Zilliqua platform, available at: https://zilliqa.com/, (4 October 2018).
[5] Ranking of dapps, available at: https://www.stateofthedapps.com/rankings, (4 October 2018).
[6] Ethereum White Paper, available at: http://blockchainlab.com/pdf/Ethereum_white_paper-a_next_generation_smart_contract_and_decentralized_application_platform-vitalik-buterin.pdf, (10 October 2018).

of B2C and B2B contracts through electronic means from distributed exchange, as with the IDEX dapp,[7] or fact-checking platforms such as the Decentralized News Network dapp,[8] to breeding crypto pets as collection items or for sale, like in the Crypto Kitties dapp,[9] or creating your own universe to trade planets and spaceships like in the 0xUniverse dapp.[10]

Together with the technological development and the new ways of concluding the contract being available, electronic commerce (here and after - "e-commerce") in gaming industry became more sophisticated involving smart contracts, digital assets and a purchase of intangible virtual items. However, there is no common regulation and even a common view in the European Union on the status of so-called crypto currency, smart contracts and CRAB platform. At the same time, most of European e-commerce regulations are focused only on traditional online shopping. Therefore, the present paper will focus on legal challenges arising with the application of existing e-commerce regulations to the gaming industry.

E-commerce transactions in gaming industry can involve significant amounts of money. For example, in the Entropia Universe video game, "Club Neverdie" - an item costed 635,000 U.S. dollars, in "Second life" game, a virtual city of Amsterdam - an item costing 50,000 U.S. dollars was sold to the consumers[11]; in the Dota 2 video game, a player spent 38,000 U.S. dollars for an "Ethereal Flames Pink War Dog" item.[12] In 2011 the most expensive video game item ever – virtual planet Calypso – was sold for 6 million U.S. dollars in the Entropia Universe video game[13]. A digital photo of a red rose created in a CRAB platform was sold for 1 million U.S. dollars on Valentine's Day.[14] In the CryptoKitties dapp players have spent around 6 million U.S. dollars for collectible items.[15]

E-commerce in the gaming industry shows significant turnover, however, there are no specific e-commerce rules which can be adopted to CRAB gaming applications and intangible items purchase in video games. At the same time, most of the existing e-commerce regulations cannot be applied due to the specific features of certain games, as will be shown further. Therefore, considering the significance of transactions in the video game industry as regards the purchase of intangible items, there is an urgent need to adopt existing rules in order to protect consumer rights in the gaming industry and to secure the Digital Single Market policy of the EU. Present paper will analyze some legal challenges arising in connection with current e-commerce rules and will show possible ways to amend the rules regulating e-commerce in connection to video games and decentralized applications.

2. Electronic Commerce: European Legal Framework as regards the Gaming Industry

E-commerce can be defined as electronic business activity[16], which is based on the exchange of tangible and intangible goods and services through electronic communication and can take various shapes – from the online delivery of digital content to public procurement.[17] The notion of e-com-

[7] Official description of IDEX dapp, available at: https://idex.market/eth/aura, (4 October 2018).
[8] Official description of DNN dapp, available at: https://dnn.media/, (4 October 2018).
[9] Official description of CryptoKitties dapp, available at: https://www.cryptokitties.co/, (4 October 2018).
[10] Official description of 0xUniverse dapp, available at: https://0xuniverse.com, (4 October.2018).
[11] News Report, *Top 10 Most Expensive Virtual Items In Game Ever Sold*, GadgetRoyal, 2018, available at: https://www.gadgetroyal.com/top-10-most-expensive-virtual-items-in-game-ever-sold/, (24 October 2018).
[12] News Report, *Top 10 Most Expensive Virtual Items In Game Ever Sold*., n. 11
[13] News Report, *Top 10 Most Expensive Virtual Items In Game Ever Sold*., n. 11.
[14] Yurieff, K., *Crypto-artwork of a rose sells for $1 million*, CNN, 2018, available at: https://money.cnn.com/2018/02/14/technology/crypto-art-valentines-day/index.html, (24 October 2018).
[15] Cheng, E., *Meet CryptoKitties, the $100,000 digital beanie babies epitomizing the cryptocurrency mania*, CNBC, 2017, available at: https://www.cnbc.com/2017/12/06/meet-cryptokitties-the-new-digital-beanie-babies-selling-for-100k.html, (24 October 2018).
[16] Kalinauskaite, A., *E-commerce and Privacy in the EU and the USA*, LL.M. Paper, Ghent University, Master of Advanced Studies in European Law Ghent, 2012, p.5, available at: https://lib.ugent.be/fulltxt/RUG01/001/892/218/RUG01-001892218_2012_0001_AC.pdf, (24 October 2018).
[17] Communication from the Commission to the Council, the European Parliament, the Economic and Social Committee and the Committee of the Regions, COM (97) 157 final, 1997, p. 8.

merce changes over time in connection with technological development and spreads both for B2B and B2C transactions[18]. In fast changing world of technologies, unfortunately, legal norms are not able to change so fast. Therefore, nowadays not all existing e-commerce rules can fit to the conclusion of the contracts through code with automatically execution (CRAB platforms' based smart contracts) or to purchase of intangible virtual items in exchange for virtual money, for example.

Information society services are considered the main subject of e-commerce activity and defined as services provided at a distance (without the actual presence of the representatives of the parties in the same place, if the contact is direct, or even with actual presence in the same place of the consumer and supplier, if the contract is made through intermediary platform[19]) through electronic means (with the usage of any application, software, Internet of Things[20]) for remuneration (not only directly, but also indirectly with the income a seller receives from advertisement[21] or shared personal data[22]) and at the request of the recipient[23].

From the first sight it can seem that in video games after receiving access to the audiovisual software (on tangible medium or through online streaming) the relationship between the consumer and supplier are limited to the "Terms of Service" or "End User License Agreement", and every other transaction inside the video game is not regulated by e-commerce rules, however, this is only partially true, such approach is possible only to not commoditized video games.

Firstly, let us have a look at the definition of information society services adopted in the EU. In video games, the user has to log in to create an account, thus demand a service, the video game is a software, thus, it fits the condition of electronic means, the services are given at distance without the actual presence of parties, only their avatars) and remuneration for services are paid by electronic transfer of money in a standard sense or by virtual tokens, exchanged for money in advance. Therefore, operations inside the video game, including the purchase of intangible items fall under the definition of information society services under the E-Commerce Directive[24].

In decentralized applications, the user has to create a virtual identity to receive an encrypted personal key and to request a service already offered to the general public (all virtual users of a specific CRAB community or Blockchain) through CRAB platform, thus, using electronic means, without the actual presence for a remuneration in virtual tokens. Therefore, transactions made through a CRAB platform fall under the scope of information society services under the E-Commerce Directive.

E-commerce transactions are operated through electronic communication (direct and via intermediaries) with the usage of online platforms or specific software. However, there is no official legal definition of online platform in the prism of e-commerce activity, but some authors stress that it is necessary to adopt one, which will cover marketplace online platforms, online shopping mall, online intermediaries, search engines and comparison tools[25]. Current suggested classification of online platforms cannot fit all possible technological innovation and does not include gaming platforms, as talking about e-commerce most of the people (and, as will be shown further, the European legislator) think about online shopping of tangible goods, however, fast technological development

[18] Kalinauskaite, p.5., n.16.
[19] Lodder, A.R., *European Union E-Commerce Directive - Article by Article Comments*, Guide to European Union Law on E-Commerce, Vol. 4. Update from 2016 of the 2001 version, published in EU Regulation of E-Commerce. A Commentary Elgar Commentaries series, 2017, p. 24, available at: https://ssrn.com/abstract=1009945, (26 October 2018).
[20] Lodder, p.24., n.19.
[21] Sotiris Papasavvas v Fileleftheros Dimosia Etaireia Ltd and Others, Case C-291/13, CJEU, 11 September 2014.
[22] Lodder, p. 24., n.19.
[23] Directive 98/48/EC of the European Parliament and of the Council of 20 July 1998 amending Directive 98/34/EC laying down a procedure for the provision of information in the field of technical standards and regulations, OJ L 217, 1998, Art. 1.
[24] Directive 2000/31/EC of the European Parliament and of the Council of 8 June 2000 on certain legal aspects of information society services, in particular electronic commerce, in the Internal Market, OJ L 178, 17.7.2000, p. 1–16, Art. 2.
[25] Policy recommendations on the role of online platforms in the e-commerce sector, Ecommerce Europe, 2016, p.4, available at: https://www.ecommerce-europe.eu/app/uploads/2016/04/Ecommerce-Europe-Online-platforms-Position-Paper-April-2016.pdf, (24 October 2018).

makes available a variety of different online platforms not only for online shopping of tangible goods but also intangible goods and digital services, including the video game industry and smart contracts in decentralized applications.

At the current stage, there is a lack of respective legislation and doctrine in order to protect consumer rights, to prevent unfair competition, to determine liable persons, to secure internet transactions and to maintain European standards concerning the free movement of capital and goods in the area of digital content supply, especially in gaming industry.

2.1. Electronic Commerce in Video Games. Legal Challenges and European Perspective

Generally, video game providers bind their users with so-called "Terms of Service" or "End User License Agreement", which regulates not only the behavior of the user in the game, but in many cases as well grants transfer of intellectual property rights for items created by the user in the game and all property rights outside of the game for virtual objects purchased in the game by the user.[26]

Some authors argue that virtual reality issues should not be governed by the law at all, as players use video games to escape from reality[27], or that they have to be governed solely by contract law (by the "End User License Agreement"), not by the property law, because property law in the virtual world can only lead to confusions, as some activities which are considered illegal in the "real world" are allowed in the virtual world (e.g. robbery or the destruction of virtual property).[28] Even following a contract law view, the legal regulations governing the contract law, including ones on unfair terms and consumer protection, should be applied both to "End User License Agreements" and to agreements where the virtual world interacts with the "real world" (i.e. virtual items purchased for money in the traditional sense). On the other hand, following property law logic, the player can claim remuneration for the damages to the player's virtual property only in case where such damages occurred not by virtual events in the game but by "real life" events, for example an error in the code or breach in security of the video game.

Nowadays virtual property rights are managed within the framework of intellectual property rights protection[29], however, in some countries video game players can protect rights relating to virtual property in "real world" courts. For example, in China a player whose virtual property was stolen by a hacker obtained remedies from the respective video game company in an amount equal to 1,210 U.S. dollars as a result of a court decision[30] and a Chinese insurance company launched an insurance program in order to protect virtual property in video games.[31] In the EU such practice is absent and the player can claim damages only on the base of the contract (if prescribed in the End User License Agreement) to its intellectual property.

On conditions usually prescribed in the "Terms of Service" agreement, the developers can by their own consideration delete purchased property or exclude players from the game.[32] In a case where a player spends 6 million U.S. dollars for a virtual item (as in the example discussed above), facing

[26] Volanis, N., *Legal and policy issues of virtual property*, Katholieke Universiteit Leuven, Int. J. Web Based Communities, Vol. 3, No. 3, 2007, p.334, available at: https://www.law.kuleuven.be/citip/en/archive/copy_of_publications/91206-volanis2f90.pdf, (28 October 2018).

[27] Nelson, J.W., *The Virtual Property Problem: What Property Rights in Virtual Resources Might Look Like, How They Might Work, and Why They Are a Bad Idea*, McGeorge Law Review, Vol. 41, 2010, p.309, available at: https://www.mcgeorge.edu/documents/publications/MLR4104_Nelson_ver_09_FINAL.pdf, (2 November 2018).

[28] Cifrino, C.J., *Virtual Property, Virtual Rights: Why Contract Law, Not Property Law, Must be the Governing Paradigm in the Law of Virtual Worlds*, Boston College Law Review, Vol. 55, Issue 1, 2014, p. 264, available at: https://lawdigitalcommons.bc.edu/cgi/viewcontent.cgi?article=3354&context=bclr, (28 October 2018).

[29] Fairfield, J., *Virtual Property*, Boston University Law Review, Vol. 85, Indiana Legal Studies Research Paper No. 35, 2005, p. 1050, available at: https://ssrn.com/abstract=807966, (02.11.2018); Gong, J. Z., *Defining and Addressing Virtual Property in International Treaties*, Boston University J. SCI. & TECH. L., Vol. 17, 2015, p.20, available at: https://www.bu.edu/jostl/files/2015/02/Gong_Web_171.pdf, (02 November 2018); Simon Stein, J., *The Legal Nature of Video Games – Adapting Copyright Law to Multimedia*, Press Start, Vol 2, No 1, 2015, p.44, available at: https://press-start.gla.ac.uk/index.php/press-start/article/view/25/11, (03 November 2018).

[30] News Report, *Online gamer in China wins virtual theft suit*, CNN, 2003, available at: http://edition.cnn.com/2003/TECH/fun.games/12/19/china.gamer.reut/, (2 November 2018).

[31] News Report, *China's first 'virtual property' insurance launched*, China Daily, 2011, available at: https://kotaku.com/5818906/china-launches-virtual-property-insurance, (2 November 2018).

[32] News Report, *China's first 'virtual property' insurance launched*, n. 31.

the risk of being deleted from the game, the risk of non-delivery of the item or the destruction of the item due to events in the game can be considered as a violation of consumer rights and e-commerce regulations. For example, in the Eve Online video game, one virtual space battle caused by the delay of the payment in "real worl" money by one player required to protect his spaceship resulted in an estimated loss of 300,000 U.S. dollars for different consumers.[33]

Therefore, in order to protect consumer rights, those video games, which do not allow commoditization of virtual items should be governed solely by the "Terms of Service" agreement, with the possibility to test such agreement on the subject of the unfairness of the standard terms. However, for the video games, which allow the purchase of virtual intangible items for the "real life" money, relevant e-commerce, consumer protection and property law rules should be applied in cases where the virtual world interacts with the "real world".

At the same time, to apply e-commerce rules to the mentioned transactions, legislation should be amended, considering the specific nature of virtual agreements. Nowadays there is no relevant specific regulation in the European Union considering the purchase of intangible digital content, however, there are some movements in that direction. For example, the new Digital Content Directive, regulates issues connected with the supply of digital content, which is not represented on a tangible medium, by the traders to the consumers[34] and provides the maximum level of harmonization.[35]

Considering the issues in the gaming industry, the Digital Content Directive can influence the sale of intangible items in video games. Generally, the main sellers of virtual items in video games are companies operating in the video games industry, however, players can also sell their own "second hand" items, including loot boxes, to other players at their own price (for example, in the video game Counterstrike Global Offensive this option is possible[36]) or to bet on inside game monster races (like in the Lineage II video game[37]) and there is no regulation (except gambling regulation discussed further, which does not regulate all gambling issues in video games) of such digital content operations.

Separately from the abovementioned draft directive, some Member states already have specific regulation on the supply of digital content (the UK[38]), as well as regulations on particular issues arising in the gaming industry. One of such regulated areas is the issue connected to the gambling regulation on the sale of loot boxes, which attracted the attention of many legislators in the EU. According to a decision by the Belgium Gaming Commission, loot boxes, which are boxes in video games with random content purchased by a player for "real life" money, are considered as a violations of gambling legislation.[39] The Netherlands Gaming Authority considers transferable loot boxes, which can be sold by players to other players, as illegal and as falling under the gambling regulation.[40] The UK Gambling Commission stated, that loot boxes, which are not allowing the player to receive a "real life" money outside of the game for such loot box, do not fall under

[33] News Report, *Eve Online virtual war 'costs $300,000' in damage*, BBC News, 2014, available at: https://www.bbc.com/news/technology-25944837, (28 October 2018).
[34] Briefing EU Legislation in Progress on Proposal for a Directive of the European Parliament and of the Council on certain aspects concerning contracts for the supply of digital content, 2015/0287(COD), 2016, p.2, available at: http://www.europarl.europa.eu/RegData/etudes/BRIE/2016/581980/EPRS_BRI%282016%29581980_EN.pdf, (28 October 2018).
[35] Directive (EU) 2019/770 of the European Parliament and of the Council of 20 May 2019 on certain aspects concerning contracts for the supply of digital content and digital services, PE/26/2019/REV/1, OJ L 136, 2019, art. 2.
[36] New Report, *Valve Disables Item Trading for Dutch 'Counter-Strike' Players, Making Their Expensive Gun Skins Worthless*, Motherboard, 2018, available at: https://motherboard.vice.com/en_us/article/3k4wk3/valve-disables-item-trading-for-dutch-counter-strike-players-making-their-expensive-gun-skins-worthless, (28 October 2018).
[37] Methenitis, M., *Internet Gambling Regulation Present and Future: Technology Outpaces Legislation as the MMORPG Problem Emerges*, 2005, p.16, available at: https://ssrn.com/abstract=987056, (2 November 2018).
[38] Consumer Rights Act, 2015, Art. 16, available at: http://www.legislation.gov.uk/ukpga/2015/15/contents/enacted, (26.10.2018); Briefing EU Legislation in Progress, p.1; Mac Sithigh, D., *Multiplayer Games: Tax, Copyright, Consumers and the Video Game Industries*, European Journal of Law and Technology, Vol. 5(3), (2014, p.10, available at: https://ssrn.com/abstract=2545887, (3 November 2018).
[39] News report, *Video game loot boxes declared illegal under Belgium gambling laws*, BBC News, 26 April 2018, available at: https://www.bbc.com/news/technology-43906306, (28 October 2018).
[40] Press release, *A Study by the Netherlands Gaming Authority Has Shown: Certain Loot Boxes Contravene Gaming Laws*, The netherlands Gaming Authority, 2018, available at: https://dutchgamesassociation.nl/wp-content/uploads/2018/04/Press-release-Certain-loot-boxes-contravene-gaming-laws.pdf, (28 October 2018).

the gambling regulation[41]. Therefore, the commoditization of video games leads to the necessity to adopt certain norms, including norms on B2B transactions inside video games and video game specific gambling regulations.

Another issue which will be addressed by the Digital Content Directive is the conformity of the digital content to the contract.[42] Considering current legislation, according to the Consumer Rights Directive, the consumer who expressed prior consent to the supply of online digital content loses his right of withdrawal from the contract if the performance has begun.[43] Therefore, current legislation does not protect the consumer in cases where the digital content (i.e. an intangible item in a video game) does not meet the expectation of the consumer, or in cases where the item is damaged due to an error in the code, in case such a virtual item was transferred to the player or to the player's avatar.

According European Commission research, European consumers have suffered the loss in the range of 9-11 billion Euros as a result of not being able to receive the remedies following digital content supply transactions.[44] To solve this issue, the new Digital Content Directive introduces some requirements for digital content conformity, for example, the supplied digital content's quality is supposed to be in conformity with the most recent version of that content[45]. However, such a requirement is practically not possible to be applied to the purchases of a specific "skin", an intangible weapon or a virtual planet in a video game. In this case, the operator of the video game has to obtain the player's consent for every such purchase where it is hard to determine whether the content can be considered in conformity with the most recent version or not.

At the same time, some EU Member States have already regulated digital content supply and the rules on the conformity of such digital content. For example, in the UK (the only Member state which regulated digital content area with the respect to consumer protection[46]) the consumer has the right to withdraw from digital content supply contract, right to demand replacement or repair, if such content does not fit a purpose, is not in a satisfactory quality or is not relevant to the previous description[47]. The abovementioned Digital Content Directive follows up the UK regulation. With the new directive, the consumer will have the right to withdraw from the contract of a digital content supply in the case of non-conformity of digital content, if such non-conformity influence main performance features of the digital content, particularly, its accessibility, continuity and security[48].

Geo-blocking regulation is another issue which is relevant for the gaming industry. Most of the video games both online and offline host the significant number of international uses, purchasing intangible items cross-border. In the EU, Germany has the biggest gaming market[49], however, there are no specific regulations to protect video games' users. In this case, the geo-blocking issue becomes important for all players. Recently new Regulation addressing geo-blocking was adopted in the EU, however, the rules regulating equal access to digital services and forbidding geo-blocking in EU do not apply to audiovisual and copyrighted content[50], which leaves video games and any

[41] News Report, *Loot boxes within video games*, the UK Gambling Commission, 2017, available at: https://www.gamblingcommission.gov.uk/news-action-and-statistics/news/2017/Loot-boxes-within-video-games.aspx, (28 October 2018).
[42] Briefing EU Legislation in Progress, p.5., n. 34.
[43] Directive 2011/83/EU of the European Parliament and of the Council of 25 October 2011 on consumer rights, OJ L 304, 22 November 2011, Art. 16, available at: https://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A32011L0083, (26 October 2018).
[44] Digital Contract Rules. Proposals Aiming to Harmonise Rules for the Sale of Digital Content and Online Purchases for all 28 EU countries, Facts and Figures, available at: https://ec.europa.eu/info/business-economy-euro/doing-business-eu/contract-rules/digital-contracts/digital-contract-rules_en, (28 October 2018).
[45] Directive (EU) 2019/770 of the European Parliament and of the Council of 20 May 2019 on certain aspects concerning contracts for the supply of digital content and digital services, PE/26/2019/REV/1, OJ L 136, 2019, art. 6.
[46] Briefing EU Legislation in Progress, p.1. n. 34.
[47] Consumer Rights Act, 2015, Art. 16, 19., n. 38.
[48] Directive (EU) 2019/770 of the European Parliament and of the Council of 20 May 2019 on certain aspects concerning contracts for the supply of digital content and digital services, PE/26/2019/REV/1, OJ L 136, 2019, Art. 12.
[49] The gaming Industry in Germany. Fact Sheet, GTAI, Iss. 2016/2017, p.1, available at: http://www.gtai.de/GTAI/Content/EN/Invest/_SharedDocs/Downloads/GTAI/Fact-sheets/Business-services-ict/fact-sheet-gaming-industry-en.pdf, (28 October 2018).
[50] Regulation (EU) 2018/302 of the European Parliament and of the Council of 28 February 2018 on addressing unjustified geo-blocking and other forms of discrimination based on customers' nationality, place of residence or place of establishment within the internal market and amending Regulations (EC) No 2006/2004 and (EU) 2017/2394 and Directive 2009/22/EC, OJ L 60I, 02 March 2018, p. 1–15, 2018, Art. 1.

online streaming services behind the scope of the mentioned directive.

Considering the abovementioned, the new Digital Content Directive cannot solve all problems arising during intangible items purchase in video games, therefore, there is an urgent need to adopt current European legislation with the respect to gaming industry (non-conformity of virtual goods, unfair terms, geo-blocking, gambling rules) and, particularly, to specify the area of influence of e-commerce rules on inside video game transactions, if such video game is commoditized.

2.2. Electronic Commerce in Decentralized Applications. Legal Challenges and European Perspective

Differently from video games, where the main purpose is still gaming and e-commerce is a side benefit, in decentralized applications, e-commerce based on smart contracts is the main activity and gaming is a side benefit for users. Therefore, there is an urgent need to adopt European legislation in order to secure legal enforceability of smart contract, determine the status of virtual currency in the EU and to provide actual possibility for the free movement of digital goods in the EU.

Considering the e-commerce regulation applicable to decentralized applications, there are several specifications which need to be considered by the legislator. To operate on the CRAB technology based decentralized applications the user has to create a digital identity (anonymous digital identity with personal encrypted key) and digital assets (crypto tokens).[51] Therefore, the main weak point considering e-commerce in decentralized application is the absence of any regulations on digital currency and smart contracts.

Considering virtual currencies' regulations, in the EU still no common legal rules to determine the legal status of virtual currencies exist – as money, as property or as financial instrument. However, there are some movements in this direction. According to the Virtual Currency Schemes published by the European Central Bank, Bitcoin (or other analogical CRAB technology-based tokens) cannot be defined as "electronic money" in the scope of the Electronic Money Directive[52], because in this context electronic money is just a different form of traditional money, but with Bitcoin system traditional money are exchanged for Bitcoins[53], therefore, the European Central Bank considers Bitcoins as a digital representation of a monetary value, which can be used as an alternative to established money variations .[54]

The most innovative step in this field at the EU level was taken in the Anti Money Laundering Directive by adopting the definition of digital currency. According to the mentioned directive the digital currency is "a digital representation of value that is not issued or guaranteed by a central bank or a public authority, is not necessarily attached to a legally established currency and does not possess a legal status of currency or money, but is accepted by natural or legal persons as a means of exchange and which can be transferred, stored and traded electronically".[55] However, with such definition it is still unclear in which legal frames can be put digital currencies and transactions with such currencies from the contract law perspective - barter agreement (if to consider Blockchain currencies as a property), purchase agreement (if money) or investment activity (if defined as financial instrument). At the same time, some currencies, such as NEO, are not used as the means of

[51] Official description of NEO platform, n. 2.
[52] Directive 2009/110/EC of the European Parliament and of the Council of 16 September 2009 on the taking up, pursuit and prudential supervision of the business of electronic money institutions amending Directives 2005/60/EC and 2006/48/EC and repealing Directive 2000/46/EC, OJ L 267, 10 October 2009, Art. 2.
[53] Virtual Currency Schemes, European Central Bank 2012, available e at: http://www.ecb.europa.eu/pub/pdf/other/ virtualcurrencyschemes201210en.pdf, (24 October 2018).
[54] Virtual currency schemes – a further analysis, European Central Bank, 2015, p.4, available at: https://www.ecb.europa.eu/pub/pdf/other/virtualcurrencyschemesen.pdf, (30 October 2018).
[55] Directive (EU) 2018/843 of the European Parliament and of the Council of 30 May 2018 amending Directive (EU) 2015/849 on the prevention of the use of the financial system for the purposes of money laundering or terrorist financing, and amending Directives 2009/138/EC and 2013/36/EU, OJ L 156, 19 June 2018, Art. 1.

exchange now, but the situation might change in the future,[56] therefore, the definition adopted by the Anti Money Laundering Directive is not sufficient to solve all legal challenges arising with the digital currencies widespread.

The Member states also are trying to regulate this issue, however, the approaches are very different. According to the Norwegian Tax Authority, Bitcoins are treated as a capital property for tax-related purposes[57]. The Norwegian Director General of Taxation stated that Bitcoin does not fall under the usual money or currency definition.[58] In the same way, authorities of Denmark underlined that Bitcoin cannot be considered an official currency for tax and VAT purposes, as Bitcoin is not regulated by an authorized authority in the global market, nor by any central bank and cannot be withdrawn from circulation.[59] In the Netherlands, according to case-law, Bitcoin is considered as "transferable value"[60], which is a very innovative step which common European regulations on Bitcoin and other crypto currencies could consider.

Therefore, in the EU there is no concrete legislation on the legal definition of CRAB based virtual currencies from the contract law perspective, however, some European institutions follow the opinion that CRAB based currencies are not money in a traditional sense and do not fall under the electronic money definition. However, considering that CRAB based currencies are exchanged for "real life" money, they should be defined as a commodity, property or transferable value for legal purposes.

Considering smart contracts' regulations, according to the E-Commerce Directive, Member states have to ensure that their legal system allows the contracts concluded by electronic means[61]. However, there is no subsequent regulation on smart contracts and there are still issues with legal validity and legal enforceability of CRAB based smart contracts. Such situation, basically, violates the relevant provision of the mentioned Directive.

Some countries have already started to amend legislation to ensure legal validity and legal enforcement of smart contracts. In Arizona law (USA), the definition of smart contract, which describes smart contract as an event-driving program, was adopted[62], moreover, the law prescribes that a smart contract cannot be denied in legal effect only because it is not realized in traditional contract form.[63] In the EU, France is one of the most progressive state considering CRAB relevant legislation, which defines CRAB (or Blockchain) as shared electronic registration technology.[64] The UK government also provides legal research on possible amendments in legislation to regulate CRAB based smart contracts[65] and develops a new strategy to use CRAB technology to store and analyze digital evidence during court proceedings in the UK.[66]

[56] Houben R. and Snyers A., *Cryptocurrencies and blockchain. Legal context and implications for financial crime, money laundering and tax evasion*, Study Requested by the TAX3 committee, 2018, p. 74, available at: http://www.europarl.europa.eu/cmsdata/150761/TAX3%20Study%20on%20cryptocurrencies%20and%20blockchain.pdf, (30 October 2018).

[57] News report, available at: http://www.skatteetaten.no/no/Radgiver/Rettskilder/Uttalelser/ Prinsipputtalelser/Bruk-av-bitcoins--skatte--og-avgiftsmessige-konsekvenser/, (23 October 2018).

[58] Webb, S., *'Bitcoin isn't real money': Norwegian government refuses to recognize digital currency*, Dailymail, 16 December 2013, available at: http://www.dailymail.co.uk/sciencetech/article-2524672/Bitcoin-isnt-real-money-Norwe gian-government-refuses-recognise-digital-currency.html, (23 October 2018).

[59] Skatterådet #SKM2014.226.SR, 25 March 2014, available at: http://www.skat.dk/ skat.aspx?oId=2156173&vId=0, (20 October 2018).

[60] ECLI:NL:RBAMS:2018:869, C/13/642655 FT RK 18.196, 14 February 2018, available at: https://uitspraken.rechtspraak.nl/inziendocument?id=ECLI:NL:RBAMS:2018:869, (24 September 2018).

[61] Directive on Electronic Commerce, Art. 9, n. 24.

[62] Blemus, S., *Law and Blockchain: A Legal Perspective on Current Regulatory Trends Worldwide*, Revue Trimestrielle de Droit Financier, 2017, p.13, available at: https://ssrn.com/abstract=3080639, (09 October 2018).

[63] Jaccard, Gabriel, *Smart Contracts and the Role of Law*, 2018, p.20, available at: https://ssrn.com/abstract=3099885, (09 October 2018).

[64] Blemus, S, p.12., n. 62.

[65] UK Law Commission, Annual report 2017-18, no. 379, 2018, p.10, available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/727386/6.4475_LC_Annual_Report_Accounts_201718_WEB.PDF, (04 October 2018).

[66] Balaji A., *How we're investigating Digital Ledger Technologies to secure digital evidence*, Her Majesty's Courts and Tribunals Service, 2018, available at: https://insidehmcts.blog.gov.uk/2018/08/23/how-were-investigating-digital-ledger-technologies-to-secure-digital-evidence/, (10 October 2018).

The Maltese regulatory authority is one of the most innovative ones in the area of CRAB based contracts. According to the Maltese Virtual Financial Assets Act, smart contract is defined as "*means a form of technology arrangement consisting of -(a) a computer protocol; or (b) an agreement concluded wholly or partly in an electronic form, which is automatable and enforceable by computer code, although some parts may require human input and control and which may be also enforceable by ordinary legal methods or by a mixture of both*".[67] Moreover, Maltese legal framework leave a room for flexibility towards new emerging technologies and provides legal regulation to possible innovative digital solutions in the Innovative Technology Arrangements and Services Act[68].

Therefore, Malta is the most innovative jurisdiction towards adapting legal framework to new technological possibilities and there is an urgent need for adopting legal regulations to ensure legal validity and legal enforceability of CRAB based smart contracts in all other Member states of the European Union.

It is not only the legal enforceability of valid smart contracts can be an open question considering decentralized applications, but also the performance of a legally not valid contract. For example, the issue of legal capacity can arise during the transaction based on CRAB smart contracts, as smart contracts have no means to test the legal capacity of the parties - most of the transactions are anonymous and operated with a usage of a personal crypto key[69]. Therefore, the weak point of the legal validity, possible nullity and legal enforceability of a CRAB based smart contract can be the legal incapacity of a party.[70]

Moreover, as in smart contracts the execution is done automatically, there is no possibility for a party to breach the contract[71] and there is no possibility to undo an executed smart contract[72], thus, any dispute (possible only post factum[73]) cannot restore the rights to the same condition, as it was before the execution. Therefore, invalidity of a contract with a legally incapable person can only be proven post factum after the contract performance, which leaves room – a need – for the development a legal mechanism of restitution and dispute resolution regulations.

Considering the absence of regulation of smart contracts, not only the enforceability of CRAB based smart contracts, but also certain specific legal issues should raise the attention of the international community, for example, consumer protection issues in smart contracts from the perspective of a standard form contract. According to EU law, the standard term is described as a terms which was not individually negotiated by the parties, drafted in advance by a trader for several transactions involving different parties and the weaker party did not, therefore, had a chance to influence such term and its consequences, particularly in the context of a pre-formulated standard contract[74]. CRAB based smart contracts are basically unilateral acts – one party places an offer on a CRAB platform and another party accepts this offer or not.[75] Such unilateral acts can raise a question on the unfairness of the terms, however, the mechanism to protect consumer rights and enforce such rights in smart contracts is still to be developed, as there are no contract terms in the traditional sense, only an offer and a code to execute such offer.

[67] The Virtual Financial Assets Act, 2018, available at: http://justiceservices.gov.mt/DownloadDocument.aspx?app=lp&itemid=29079&l=1, (30 October 2019).
[68] Innovative Technology Arrangements and Services Act, 2018, available at: http://www.justiceservices.gov.mt/DownloadDocument.aspx?app=lom&itemid=12874&l=1, (30 October 2019).
[69] Werbach K. and Cornell N., *Contract Ex Machina*, Duke Law Journal, Vol.67, 2017, p.371, available at: https://scholarship.law.duke.edu/cgi/viewcontent.cgi?article=3913&context=dlj, (4 October 2018).
[70] Jaccard, G., p.23, n. 63.
[71] Werbach K. and Cornell N, p.332, n. 67.
[72] Werbach K. and Cornell N, p.333, n. 67; Grundmann, S. and Hacker, P., *Digital Technology as a Challenge to European Contract Law – From the Existing to the Future Architecture*, European Review of Contract Law, 2017, p.22, available at: https://ssrn.com/abstract=3003885, (9 October 2018).
[73] Raskin, M., *The Law and Legality of Smart Contracts*, Georgetown Law Technology Review 304/2017, 22 September 2016, p. 322, available at: https://ssrn.com/abstract=2959166, (4 October 2018).
[74] Council Directive 93/13/EEC on unfair terms in consumer contracts, OJ L 95, 05 April 1993, art. 3; Proposal for a Regulation of the European Parliament and of the Council on a Common European Sales Law, COM/2011/0635, 11 October 2011, art. 2; Principles, Definitions and Model Rules of European Private Law, Draft Common Frame of Reference (DCFR), 08 February 2007, article I:109; UNIDROIT Principles on International Commercial Contracts, 2016, article 2.1.19.
[75] Werbach K. and Cornell N., p.343, n. 67.

Another issue, which can arise in connection with CRAB based gaming platforms, is its relation to data protection legislation. According to CRAB technology characteristics, operating on a Blockchain platform the new users are joining a Blockchain network and in order to proceed with a Blockchain transaction, it should be verified by all previous blocks in the chain, so by previous owners or certain token or data.[76] At the same time, due to its technical characteristics, Ethereum Blockchain (where most of the decentralized gaming applications are operating) is always on, it is impossible to turn it off or to remove any block.[77] On the other hand, according to the General Data Protection Regulation (GDPR) the data subject has to have the right to restrict or erase personal data[78], however, considering the mentioned characteristics of CRAB platforms, it is impossible for decentralized application based on CRAB technology to comply with the GDPR. Compliance is possible only if personal data on Blockchain will be stored off chain or via the usage of hashing[79] – however this technology is still in development.

Considering the foregoing, there is an urgent need to amend already existing European regulations (for example the GDPR), to develop national legislation, which will establish legal enforceability to smart contracts, as prescribed in the E-Commerce Directive, and to adopt common European rules on virtual currencies and smart contracts legal framework in order to protect consumer rights and to secure Digital Single Market in gaming industry in the EU.

3. Conclusions

As can be understood from the European regulations connected to e-commerce and digital content, the legislator focuses more on traditional means of e-commerce, such buying tangible things online (online shopping platforms) and the supply of intangible content which can be distributed on tangible medium (software, e-books, music), however, other means of e-commerce connected to the purchase of intangible items, particularly in the gaming industry, concluding smart contracts on CRAB platforms, transaction based on virtual currency, Internet of Things or cloud data are left beyond the scope of any existing regulations. Therefore, there is an urgent need in adopting European regulations to the technological progress in order to protect consumer rights, to secure the free movement of digital goods and Digital Single Market strategy in the EU.

Considering the issues connected to video games, such games which do not allow commoditization of virtual items should be governed solely by the "Terms of Service" agreement, but with the possible assessment of such agreements on the subject of standard unfair terms. However, for video games where the purchase of virtual intangible items for money in a traditional sense is permitted by the code, the e-commerce rules, consumer protection rules, geo-blocking regulations and other relevant "real world" legislation should be applied.

Considering the issues connected to decentralized applications, there is an urgent need to regulate the status of virtual currencies from the perspective of contract law, to provide legal enforceability to smart contracts on the national and the EU level and to amend the GDPR in order to secure the existence of CRAB platforms in the EU, to protect consumer rights and to maintain free movements of digital goods in the gaming industry in the EU.

[76] Houben R. and Snyers A., p. 33, n. 56.
[77] Houben R. and Snyers A., p. 33, n. 56.
[78] Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation), OJ L 127, 2016, Art. 15, 17.
[79] GDPR & blockchain. Blockchain solution to General Data Protection Regulation, GrantThornton, p. 6, available at: https://www.grantthornton.global/globalassets/___spain___/links-ciegos/otros/gdpr--blockchain.pdf, (30 October 2018).

More specifically, the following issues need to be addressed by lawmakers:

- Customer protection during the purchase of intangible virtual items in exchange for "real world" money in video games and for virtual tokens in decentralized applications – regulation is needed regarding the right of withdrawal from the contract in case of non-conformity and errors in the code;
- Regulation on B2B contracts on the resell of purchased goods and loot boxes, where the game platform acts as an intermediary platform;
- Adaptation of the rules of the GDPR to secure the existence of CRAB based platforms in the EU;
- Implementation of geo-blocking prohibition rules as regards the video game industry;
- Rules on the legal status of virtual property purchased in a gaming platform for a "real life" money;
- Determination of a legal framework for transactions with virtual currencies (i.e.: Bitcoin, Ether): barter, purchase or investment activity;
- Disputes resolution regarding issues arising connected with smart contracts on CRAB platforms.