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THE EVOLUTION OF SANCTIONS EVASION: HOW CRYPTOCURRENCY IS THE NEW GAME IN EVADING SANCTION AND HOW TO STOP IT

Summer Wright*

Abstract: When one country illegally invades another sovereign country, repeatedly, utilizing the mechanism of sanctions to try and curb the misconduct, has become a favored approach among democratic countries. Russia once again invaded Ukraine in the early part of 2022, defying all international pressure, to refrain from the illegal act. The rapid response from the international community was a litany of sanctions intended to cripple and deter Russia's actions. Sanctions evasions are not a new challenge for sanctioning countries and agencies. A United Nations (UN) report notes that low levels of governmental oversight in the cryptocurrency sector have enabled North Korea to generate income at an alarming rate. The efficacy of financial sanctions in this way is consistently undermined through illicit cryptocurrency transactions. As the cryptocurrency sphere exceeds forty-two million users worldwide, the question on those issuing sanctions remains: If cryptocurrency is left unregulated, will financial sanctions lose their power? This article will outline the use of sanctions as a preferred foreign policy tool and how they work. I look at the various sanctions the United States, European Union, United Nations have levied against the Russian Federation in response to repeated invasions of Ukraine's sovereign territory. I will also analyze cryptocurrency, defining what it is, how it works to lay the groundwork for the analysis of the current cryptocurrency regulations and how this relates to concerns of illicit activity within the cryptocurrency sphere, as a means for sanctions evasion. Several countries including The Russian Federation (Russia), The Bolivarian Republic of Venezuela (Venezuela), The Islamic Republic of Iran (Iran) and The Democratic People's Republic of North Korea (North Korea) are using innovative cybercrimes and other crypto-based efforts to evade economic and financial sanctions. This article will consider the pushback on regulation from the crypto industry as well as illuminating the loopholes that are causing increased concern and current incidences of illicit activity internationally. Finally, I propose a few areas of consideration for creating an international regulatory framework to help combat the evasion of financial sanctions, using cryptocurrencies.

Keywords: Sanctions; Russia; Ukraine; Cryptocurrency

* California Western School of Law, United States.

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INTRODUCTION

When one country illegally invades another sovereign country, repeatedly, utilizing the mechanism of sanctions to try and curb the misconduct, has become a favored approach among democratic countries. Russia once again invaded Ukraine in the early part of 2022, defying all international pressure, to refrain from the illegal act.[1] The rapid response from the international community was a litany of sanctions intended to cripple and deter Russia's actions.

Sanctions evasions are not a new challenge for sanctioning countries and agencies. A United Nations (UN) report notes that low levels of governmental oversight in the cryptocurrency sector have enabled North Korea to generate income at an alarming rate.[2] As of 2019, almost $ 2 billion had been acquired through the evasion of economic sanctions using cryptocurrencies.[3] North Korea is no lone wolf in the evasions of sanctions game. Russia[4] and Venezuela[5] have also leveraged the use of cryptocurrencies to evade international sanctions. The efficacy of financial sanctions in this way is consistently undermined through illicit cryptocurrency transactions.[6] As the cryptocurrency sphere exceeds forty-two million users worldwide,[7] the question on those issuing sanctions remains: If cryptocurrency is left unregulated, will financial sanctions lose their power?

In Part II of this paper, I will outline the use of sanctions as a preferred foreign policy tool and how they work. Part III will look at the various sanctions the United States, European Union, United Nations have levied against the Russian Federation in response to repeated invasions of Ukraine's sovereign territory. In Part IV I will analyze cryptocurrency, defining what it is, how it works to lay the groundwork for Part V. Part V, will consider the current cryptocurrency regulations and how this relates to concerns of illicit activity within the cryptocurrency sphere, as a means for sanctions evasion. I will highlight how several countries including The Russian Federation (Russia), The Bolivarian Republic of Venezuela (Venezuela), The Islamic Republic of Iran (Iran) and The Democratic People's Republic of North Korea (North Korea) are using innovative cybercrimes and other crypto-based efforts to evade economic and financial sanctions. Finally, in Part VI, I address pushback on regulation from the crypto industry as well as illuminating the loopholes that are causing increased concerns and current incidences of illicit activity internationally. I then propose a few areas of consideration for creating an international regulatory framework to help combat the evasion of financial sanctions, using cryptocurrencies.

I. UNDERSTANDING SANCTIONS

State and nonstate actors that threaten a government's interests or violate international norms, are often faced with restraints of their financial freedom by the one or multiple

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[1] *Russian forces launch full-scale invasion of Ukraine*, ALJAZEERA (Feb. 24, 2022), https://www.aljazeera.com/news/2022/2/24/putin-orders-military-operations-in-eastern-ukraine-as-un-meets.
[2] Rep. of the S.C., at 4/142, U.N. Doc. S/2019/691 (2019).
[3] *Id.*
[4] Russian officials state that a primary motivation for the creation of a "crypto rouble" (a new type of cryptocurrency) was to "settle accounts with [Russia's] counterparties all over the world with no regard for sanctions." Cong. Rsch. Serv., IF10825, Digital Currencies: Sanctions Evasion Risks 2 (Feb. 8, 2018).
[5] Alexandra Ulmer & Deisy Buitrago, *Enter the 'Petro': Venezuela to Launch Oil-Backed Cryptocurrency*, REUTERS (Dec. 3, 2017), https://www.reuters.com/article/us-venezuela-economy/enter-the-petro-venezuela-to-launch-oil-backedcryptocurrency-idU.S.KBN1DX0SQ.
[6] *Id.*
[7] Lubomir Tassev, *The Number of Cryptocurrency Wallets is Growing Exponentially*, BITCOIN.COM (Sept. 26, 2019), https://news.bitcoin.com/the-number-of-cryptocurrency-wallets-is-growing-exponentially/.

countries. To strategically alter unwanted behavior, economic sanctions have been a defensive mechanism of choice used by governments and multinational bodies since 1966.[8] The United Nations Security Council (UNSC) established the first sanctions regime on Southern Rhodesia (modern day Zimbabwe) more than fifty years ago.[9] Since then, the global body has enacted over thirty sanctions regimes; of which fourteen of those are still active today. The United States has wielded this tool as a primary weapon of choice since the 1950s, and in recent years, the United States has expanded the use of sanctions applying them against roughly twenty-five countries including The Islamic Republic of Iran, North Korea, The Bolivarian Republic of Venezuela, and Russian Federation.[10] Economic sanctions are typically levied by states and supranational bodies such as the United Nations and the European Union.[11] Targets of sanctions can range from entire countries to individuals.[12]

In general, sanctions regimes aim to prevent escalation of or settle conflicts among countries, counter terrorism, bolster cybersecurity, deter, punish, shame human-rights violators and curtail nuclear proliferation.[13] Individuals and organizations engaging in illegal activities including, money laundering, terrorism or terrorist financing, drug trafficking, violation of international treaties and human-rights violations, can end up on sanctions lists as well.[14] Critics say sanctions are often poorly conceived and rarely successful in changing a target's conduct, while advocates for sanctions contend, they have in recent years become more effective and remained an essential foreign policy tool.[15]

A. The Five Types of Sanctions Available

In today's geopolitical landscape, states, and organizations alike must navigate the complex network of sanctions. Sanctions can impact not just states, banks, and financial institutions. Companies spanning a range of industries have been the target of these enforcement actions as well. Failing to comply with sanctions laws can result in significant legal, financial, and reputational ramifications.

The five categories that most sanctions fall under include: economic sanctions, diplomatic sanctions, military sanctions, sport sanctions and sanctions on individuals. Though some of these types of sanctions are inter-related, for the purpose of this Paper, the focus is on economic sanctions. Economic sanctions are defined as "the withdrawal of customary trade and financial relations for foreign- and security-policy purposes."[16] Sanctions take a variety of forms, to accomplish foreign policy ends. Sanctions can include arms embargoes, travel bans, foreign assistance reductions and cut-offs, export and import limitations, asset freezes, tariff increases, revocation of most favored nation (MFN)[17] trade status, negative votes in international financial institutions, withdrawal of diplomatic relations, visa denials,

[8] United Nations Security Council, Sanctions, https://www.un.org/securitycouncil/sanctions/information (last visited Dec. 10, 2022).
[9] S. C. Res. 232, 1 (Dec. 16, 1966).
[10] U.S. Dept. of Treasury, Sanctions Programs and Country Information (Nov. 16, 2022), https://home.treasury.gov/policy-issues/financial-sanctions/sanctions-programs-and-country-information.
[11] *Id.*
[12] *Id.*
[13] *What is a Sanction?,* LEXISNEXIS https://internationalsales.lexisnexis.com/glossary/compliance/sanctions.
[14] *Id.*
[15] Jonathan Masters, *What are Economic Sanctions?*, COUNCIL OF FOR. RELATIONS (Aug. 12, 2019, 8:00 AM), https://www.cfr.org/backgrounder/what-are-economic-sanctions.
[16] Masters, *supra* note 15 .
[17] UNCTAD Series on International Investment Agreement II: Most-Favoured-Nation Treatment (2010).

cancellation of air links, and prohibitions on credit, financing, and investment.[18] They may be comprehensive, prohibiting commercial activity regarding an entire country, like the long-standing U.S. embargo on of Cuba[19], or they may be more targeted, blocking transactions by and with businesses, groups, or individuals.

B. How do Economic Sanctions Work?

Sanctions, while a form of intervention, are generally viewed as a lower-cost, lower-risk course of action between diplomacy and war. Between military intervention and imposing economic sanctions, often policymakers find the softer form of engagement, by way of sanctions to be more attractive and can even buy time when evaluating more punitive measures.[20] Each country abides by their own laws and regulations regarding how they unilaterally apply sanctions to states and nonstate actors. However, two international bodies, the United Nations and European Union have established methods of imposing and enforcing sanctions, whereby each member state must comply.

The United Nations Security Council (the principal crisis-management body of the Organization)[21] can opt to respond to global threats by imposing economic sanctions. Sanctions resolutions must garner a majority vote with the fifteen-member Council without a veto from any of the Permanent Members (P5): the United States, United Kingdom, China, France, Russia.[22] Any sanctions imposed by the UNSC, typically in the form of travel bans, arms embargoes, and asset freezes, are binding for all Member States.[23] UN sanctions are usually managed by a special committee or monitoring group. INTERPOL assists some of the sanction committees[24], but officially the UN has no independent means of enforcement and relies on member states for enforcement.[25]

The European Union (EU) (made up of twenty-eight member states), imposes sanctions or "restrictive measures" in accordance with its Common Foreign and Security Policy.[26] Unanimous consent from member states in the Council of the European Union,[27] is required for sanctions policies to be enacted. In addition to any UNSC imposed sanctions, along with EU imposed sanctions, individual EU states may also impose harsher sanctions independently within their national jurisdictions.[28]

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[18] Richard N. Haass, Economic Sanctions: Too Much of a Bad Thing, Brookings Institute Report (June 1, 1998), https://www.brookings.edu/research/economic-sanctions-too-much-of-a-bad-thing/.
[19] Fact Sheet, U.S. Dept. of Treasury, Cuba Sanctions, https://home.treasury.gov/policy-issues/financial-sanctions/faqs/topic/1541 (last visited Dec. 8, 2022).
[20] The UN Security Council imposed comprehensive sanctions against Iraq just four days after Saddam Hussein's invasion of Kuwait in August 1990. The Security Council did not authorize the use of military force until months later. *See* S.C. Res. 665 (August 25, 1990).
[21] U.N. Charter art. 7.
[22] *Id.*, at para. 41
[23] *Id.*
[24] Particularly in cases involving al-Qaeda and the Taliban. *See* S. C. Res. 2178 ¶ 12 (Sept. 24, 2014).
[25] Many member states lack the political will or resources to engage in enforcement of UNSC sanctions or prosecute violations. This in effect makes the impact of sanctions weak.
[26] Common Foreign and Security Policy, Eur. Comm'n, https://fpi.ec.europa.eu/what-we-do/common-foreign-and-security-policy_en (last visited Dec. 8, 2022).
[27] Council of the European Union is the body that represents EU leaders. *see,* Council of the Eur. Union, Eur. Union https://european-union.europa.eu/institutions-law-budget/institutions-and-bodies/institutions-and-bodies-profiles/council-european-union_en, (last visited Dec. 8, 2022).
[28] EU council rules on sanctions for member states. *see, id.*

The United States leads the charge when it comes to the frequency and scope of sanctions imposed, more so than any other country. The process to levy sanctions on state and nonstate actors begins with either the executive or legislative branch. The President typically will draft an executive order (EO) that declares a national emergency in response to an "unusual and extraordinary" foreign threat.[29] An EO activates the president's special powers to regulate commerce regarding the identified threat for a period of one year, unless extended by the president or terminated by a joint resolution of Congress.[30]

Congress may pass legislation imposing new sanctions or modifying existing ones, which it has done many times.[31] Regardless, of whether the President or Congress initiates sanctions, US sanctions programs are administered by the Treasury Department's Office of Foreign Assets Control (OFAC), partnering often with other departments such as Homeland Security, Justice, Commerce and State departments for critical support.[32]

II. SANCTIONS AGAINST THE RUSSIAN FEDERATION

In March of 2014, Vladimir Putin invaded Crimea, part of the sovereign state of Ukraine. The West responded by imposing severe economic sanctions designed to force Russia to withdraw and punish the Russian government for breaching Ukraine's sovereignty.[33] In August of 2014, approximately 2,000 Russian troops, violating international law, invaded the Crimean Peninsula. This brazen act was the first European annexation since the Second World War.[34] In response, much of the West again imposed sanctions to provide protection to Ukraine's sovereign rights, prevent a war, and deter further aggression.[35]

A. Sanctions in Response to the 2014 Annexation of Crimea by Russia

The European Union and the United States imposed two types of sanctions on Russia: targeted and sectoral. Targeted sanctions are asset freezes and visa bans focused on individuals and industries with close ties to President Vladimir Putin and powerful Russian institutions such as the European Parliament Think Tank.[36] These individuals and companies were accused of undermining democracy, expropriating or seizing Ukrainian property, and violating human

[29] Exec. Order. 12938, 59 FR 58099 (declaring the proliferation of nuclear, biological, and chemical weapons); Exec. Or. 13661, 79 FR 15,535 (declaring the actions and policies of the Government of the Russian Federation with respect to Ukraine).
[30] *See*, 50 U.S.C. § 1705 (IEEPA "[C]odified presidential national emergency powers to investigate and impose controls on transactions as well as freeze foreign assets under the jurisdiction of the United States.").
[31] H.R. 5271 (Sept. 9, 1988) (A House passes a bill sanctioning Iraq for using chemical weapons to commit genocide against its citizens.).
[32] Masters, *supra* note 15.
[33] Exec. Order 13660, 13660, 13662, 31 C.F.R. part 589 (March 6, 2014). The Ukraine/Russia related sanctions program implemented by Office of Foreign Assets (OFAC) began on March 6, 2014. President Barack Obama initiated these sanctions through a series of Executive Orders, "[D]eclaring a national declared a national emergency to deal with the threat posed by the actions and policies of certain persons who had undermined democratic processes and institutions in Ukraine; threatened the peace, security, stability, sovereignty, and territorial integrity of Ukraine; and contributed to the misappropriation of Ukraine's assets."
[34] Laura Geiger, *2014 Sanctions Against Russia Failed, is the Second Time the Charm?,* COL. POL. REV. (Apr. 7, 2022), http://www.cpreview.org/blog/2022/4/2014-sanctions-against-russia-failed-is-the-second-time-the-charm.
[35] *Id.*
[36] Cong. Res. Serv. (CRS, 2019), U.S. Sanctions on Russia, 11 January, Washington DC.

rights.[37] Gradually both the US and the EU have expanded their sanctions to the people responsible for Russian policy on Crimea and enterprises operating there.[38]

The United States also sanctioned four of Putin's cronies, namely Yuri Kovalchuk, Arkady and Boris Rotenberg, and Gennady Timchenko, as well as their Bank Rossiya.[39]. These sanctions were based on the insight that Russia was a kleptocracy.[40] Similarly, sanctions were imposed on enterprises owned by the Russian state or President Putin's cronies, and only exceptionally on private enterprises.

Economic sanctions were widened by the EU and the U.S. after Russian proxies gunned down the Malaysian Airlines passenger jet flying over Eastern Ukraine in July 2014.[41] This widely condemned incident instigated the second round of sanctions known as sectoral sanctions, aimed primarily at Russia's energy firms and state-owned corporations in the defense and financial sectors.[42] The July 2014 sanctions went much further than the Crimea sanctions. The financial sanctions prohibited lending to the sanctioned state banks and companies for 30 days or more, and the European Bank for Reconstruction and Development was blocked from offering new financing in Russia.[43] The energy sanctions were limited to three kinds of oil development: deep offshore drilling, arctic offshore, and tight oil. They did not harm production in the short term, but in the long term. The EU insisted that gas must not be subject to any sanctions because of its great dependence on Russian gas.[44]

President Barack Obama imposed the Ukraine related US sanctions through presidential executive orders, which meant that they could be modified at any time.[45] During the presidential election campaign in 2016, then candidate Donald Trump repeatedly criticized the US sanctions on Russia, arousing fear that he would abolish them.[46] In response, Congress codified these sanctions into law in the Combating America's Adversaries through Sanctions Act (CAATSA),[47] which President Trump signed into law on August 2, so that the President no longer could alter the Russia sanctions without the consent of Congress.

In April 2018, the US Treasury issued its first Ukraine-related sanctions based on CAATSA and the authority therein.[48] They were so severe, they were unprecedented. The Treasury sanctioned 24 people and 14 enterprises. Most of the people sanctioned were quite close to Putin, including his former son-in-law Kirill Shamalov. Several big oligarchs were sanctioned, notably Oleg Deripaska. These were designations, meaning that no US person was allowed to do any business with these people or enterprises. Finally, these sanctions hit some

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[37] Anders Aslund, Western Sanctions on Russia over Ukraine 2014-2019, 20 CESifo Forum 14 (December 2014). [hereinafter Aslund, Western Sanctions].
[38] *Id.*
[39] The EU sanctioned Kovalchuk and Arkady Rotenberg as well, and a fifth crony Nikolai Shamalov. *see, id.,* at 14.
[40] A government by people who use their power to steal their country's resources, *Kleptocracy*, OXFORD DICTIONARY (7th ed. 2013).
[41] *Collateral damage*, THE ECONOMIST (Jul. 24, 2014), https://www.economist.com/briefing/2014/07/24/collateral-damage.
[42] Aslund, Western Sanctions, *supra* note 37.
[43] *Id.*
[44] CRS 2019, *supra* note 36.
[45] Exec. Orders, *supra* note 33.
[46] OFAC: CAATSA: Ukraine/Russia-Related Sanctions Program (2017), https://home.treasury.gov/system/files/126/eo13662_directive4_20171031.pdf.
[47] Countering America's Adversaries Through Sanctions Act of 2017, *see,* H.R. 3364, 115th Cong. (Jan. 3, 2017) (CAATSA) (enacted).
[48] OFAC: CAATSA, *supra* note 46.

very big enterprises, notably Deripaska's company Rusal, which was a listed company and accounted for 6 percent of global aluminum production.

Though sanctions were broad and severe, they were largely considered to have failed in deterring Russian advancement in Ukraine because the Russian economy was not sufficiently impacted to change the Kremlin's foreign policy.[49] The Russian government skillfully mitigated the damage of the 2014 and subsequent sanctions, through banking policies and purposefully devaluating the Russian currency.[50]

B. Current Sanctions against Russia

On February 24, 2022, Vladimir V. Putin ordered Russian forces to invade Ukraine.[51] The repercussions were immediate, and far-reaching. Now, following the launch of Russia's full-scale invasion, the largest mobilization of forces Europe has seen since 1945 is underway. So far, Moscow has struggled to secure a dominant victory failing to capture major cities across the country, including Kyiv, the capital. It has been weighed down by an ill-prepared military and has faced tenacious resistance from Ukrainian soldiers and civilian resistance fighters.[52] Still, Russia has superior military might, and President Putin has indicated that his goal is to capture Kyiv, take down Ukraine's democratically elected government, and retain Ukraine again as Russia's sovereign land.[53]

The invasion threatens to destabilize the already volatile post-Soviet region, with serious consequences for the security structure that has governed Europe since the 1990s. Mr. Putin has long lamented the loss of Ukraine and other republics when the Soviet Union broke apart. Before invading, Russia made a list of far-reaching demands[54] to reshape that structure — positions NATO and the United States rejected.[55]

The response from Western countries globally, has been swift and fierce. Within days of Russia's initial invasion into Ukraine, the EU and US levied sweeping economic sanctions against the aggressor. The difference between the current sanctions and the 2014 sanctions is that there has been a unified front from the West to cripple Russia's economy. Australia, Canada, the European Union, Japan, Great Britain, and the United States, have all collaborated

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[49] After the initial round of sanctions, the Kremlin's aggression grew. Russia formally absorbed Crimea and upped its financial and military support for pro-Russian rebels in eastern Ukraine (including those who allegedly shot down the Malaysia Airlines flight.) It is speculated that the sanctions may have deterred Russia from even greater aggression in Ukraine at the time, but based on Russia's current, ongoing invasion of Ukraine, it seems all Russia really was intending with the annexation of Crimea was a "slow-burning insurgency.", *see*, Emma Ashford, *Not-So-Smart Sanctions: The Failure of Western Restrictions Against Russia*, 95 FOREIGN AFFAIRS 114, 116 (Council on Foreign Rel. ed., Jan./Feb. 2016), https://www.jstor.org/stable/43946631.

[50] Corey Flintoff, *Russia Marks Crimea Annexation with A Banknote Rapidly Losing Value*, NPR (Dec. 23, 2015, 2:18 PM), https://www.npr.org/sections/parallels/2015/12/23/460831232/russia-marks-crimea-annexation-with-a-banknote-rapidly-losing-value.

[51] ALJAZEERA, *supra* note 1.

[52] Dan Bilefsky, et. al, *The Roots of the Ukraine War: How the Crisis Developed*, N.Y. TIMES (Oct. 12, 2022), https://www.nytimes.com/article/russia-ukraine-nato-europe.html.

[53] *Id.*

[54] Andrew E. Kramer & Steven Erlanger, *Russia Lays Out Demands for a Sweeping New Security Deal With NATO*, N.Y. TIMES (Dec. 17, 2021), https://www.nytimes.com/2021/12/17/world/europe/russia-nato-security-deal.html.

[55] Bilefsky, *supra* note 52.

in imposing sanctions against Russia.[56] The aim is to limit Russia's access to money. To do this, the US has barred Russia from making debt payments using foreign currency held in US banks. Major Russian banks have been removed from the international financial messaging system, Society for Worldwide Interbank Financial Telecommunication (SWIFT).[57] Cutting certain Russian banks from accessing SWIFT was a striking and previously unconsidered move to harm and isolate Russian financial markets. This has delayed payments to Russia for its oil and gas exports.[58]

The United Kingdom (UK) has excluded key Russian banks from the UK financial system, frozen the assets of all Russian banks, barred Russian firms from borrowing money and placed limits on deposits Russians can make at UK banks.[59] In addition to the financial measures, Western countries, specifically the UK and US are working to end their reliance on Russian gas, by imposing additional sanctions including: the European Union's ban on imports of Russian oil brought in by sea from December, and a ban on all new imports of refined oil products from Russia.[60] The U.K. will phase out Russian oil by the end of 2022 and no longer imports Russian gas.[61] In another astounding move, Germany cancelled the licensing of Nord Stream 2 ,an already completed gas line between Germany and Russia, signaling to Russia that the EU will no longer prioritize its economic relations over a humanitarian crisis.[62] Germany has already reduced their imports of Russian gas from 55% to 35% with the goal of eventually importing no gas from Russia.[63] The US has followed suit introducing strict sanctions, including a ban on all Russian oil and gas imports.[64]

The US, EU, UK and other countries have also sanctioned more than 1,000 Russian individuals and businesses - including so-called oligarchs.[65] Most recently, the US is imposing sanctions on 278 members of Russia's parliament, for enabling the supposed referendums to

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[56] *How much pain will the West's sanctions cause Vladimir Putin?,* THE ECONOMIST, (Feb. 23, 2022), https://www.economist.com/the-economist-explains/2022/02/23/how-much-pain-will-the-wests-sanctions-cause-vladimir-putin.

[57] Russell Holten, *Ukraine conflict: What is Swift and why is banning Russia so significant?*, BBC NEWS SERV. (May 4, 2022), https://www.bbc.com/news/business-60521822.

[58] *What are the sanctions on Russia and are they hurting its economy?,* BBC NEWS SERV. (Sept. 30, 2022), https://www.bbc.com/news/world-europe-60125659.

[59] *Id.*

[60] *Id.*

[61] *Id.*

[62] *Nord Stream 1: How Russia is cutting gas supplies in Europe*, BBC NEWS SERV (Sept. 29, 2022), https://www.bbc.com/news/world-europe-60131520.

[63] *Id.*

[64] Ashford, *supra* note 49.

[65] Press Release, Treasury Sanctions Kremlin Elites, Leaders, Oligarchs, and Family for Enabling Putin's War Against Ukraine, U.S. Dept. of Treasury, (March 11, 2022); *see also*, Daniel Sanford, *Russia oligarchs: The mega-rich men facing global sanctions*, BBC NEWS SERV (March 15, 2022), https://www.bbc.com/news/uk-60593022, (Defining that [o]ligarchs are wealthy business leaders, Russian elites who are thought to be close the Kremlin, such as former Chelsea Football Club owner Roman Abromovich.). Assets belonging to President Putin and Foreign Minister Sergei Lavrov have been frozen in the US, EU, UK and Canada.; *see also*, Press Release, $300 Million Yacht of Sanctioned Russian Oligarch Sulemian Kerimov Seized by Fiji at Request of United States, D.O.J. (May 5, 2022), https://www.justice.gov/opa/pr/300-million-yacht-sanctioned-russian-oligarch-suleiman-kerimov-seized-fiji-request-united#:~:text=May%205%2C%202022-,%24300%20Million%20Yacht%20of%20Sanctioned%20Russian%20Oligarch%20Suleiman%20Kerimov%20Seized,sanctioned%20Russian%20oligarch%20Suleiman%20Kerimov (Superyachts linked to sanctioned Russians have been seized); *see also,* Tier 1 Investor Visa route closes over security concerns, Home Office, The Rt Hon Priti Patel MP, Gov.UK, (Feb. 17, 2022), https://www.gov.uk/government/news/tier-1-investor-visa-route-closes-over-security-concerns, (The UK has stopped the sale of "golden visas", which allowed wealthy Russians to get British residency rights).

annex four regions in Ukraine.[66] It is also targeting 14 people connected with its defense industries.[67] The US says it will also target organizations outside Russia which provide support for its military, or its annexation of Ukrainian territory.[68] A new round of sanctions, drawn up by the European Commission, proposes a further ban on Russian imports. It would also ban more hi-tech goods from being exported.[69] These economic efforts will isolate Russia more than any sanctions have previously done, but they can still be further escalated to send a message to the Kremlin.

III. UNDERSTANDING CRYPTOCURRENCY AND REGULATION

A. A Brief History of Cryptocurrency

Cryptocurrency, in the simplest definition is a digital or virtual currency that uses cryptography for security, meaning it can be virtually impossible to counterfeit or double-spend.[70] Many cryptocurrencies are decentralized systems based on blockchain technology, a ledger distributed and enforced across a large network of computers. [71] The use of cryptocurrency has revolutionized international commerce unlike any other financial mechanism or institution.[72]

The first digital currency and still the most widely traded, Bitcoin, was developed in 2009.[73] As of 2019, an estimated forty-two million users have access to over 2000 digital currencies.[74] The gain in popularity of digital currencies[75], including cryptocurrencies among private and state actors, hinges on two key aspects.[76] One distinct feature of cryptocurrencies, is that they are typically decentralized, meaning they are organic in nature; generally not issued by any central authority, "rendering it theoretically immune to governmental interference or manipulation."[77] In practice, this means that transactions can be completed without the use of intermediaries such as banks.[78] Decentralization is attractive because, it in essence removes the middle men who serve as gatekeepers to the intersections of economies and charge a fee for entrance in the process.[79]

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[66] Press release, Treasury Imposes Swift and Severe Costs on Russia for Putin's Purported Annexation of Regions of Ukraine, U.S. Dept. of Treas. (Sept. 30, 2022), https://home.treasury.gov/news/press-releases/jy0981.
[67] *Id.*
[68] *Id.*
[69] Ashford, *supra* note 49.
[70] *See* Jake Frankenfield, Cryptocurrency Currency Explained with Pros and Cons for Investment, INVESTOPEDIA (Sept. 26, 2022), https://www.investopedia.com/terms/c/cryptocurrency.asp
[71] *Id.*
[72] Ilker Koksal, *The Rise of Crypto as Payment Currency*, FORBES (Aug. 23, 2019 10:28AM), https://www.forbes.com/sites/ilkerkoksal/2019/08/23/the-rise-of-crypto-as-payment-currency/#42d0901b26e9.
[73] Frankenfield, *supra* note 70.
[74] *Id.*
[75] *See generally,* Tommaso Mancini-Griffoli et al., *Casting Light on Central Bank Digital Currencies*, INT'L MONETARY FUND (Nov. 12, 2018) (Describing that [t]here are distinctions between digital currencies and cryptocurrencies. Digital currencies are the "overall superset" that includes cryptocurrency. Some digital currencies, such as Central Bank Digital Currencies ("CBDCs") have the potential for mass centralization. However, cryptocurrencies rely on cryptography (unlike, for example CBDCs), which lends itself to decentralization.
[76] *Id.*
[77] Frankenfield, *supra* note 70.
[78] Koksal, *supra* note 72.
[79] *Id.*

Secondly, cryptocurrencies are mostly "pseudo-anonymous." They are pseudonymous, versus strictly anonymous because each user has a public address (or public key) that theoretically could be traced back to an IP address or exchange account (and by proxy, an actual identity) through proper network analysis.[80]

Cryptocurrency, like Bitcoin depends on a distributed ledger system (that tracks transactions made with these public keys) known as the blockchain.[81] The essential power of blockchain technology is its ability to distribute information. Because it is distributed across all the nodes, or individual computers, that make up the system, the term "blockchain technology" is often swapped with "distributed ledger technology."[82] A blockchain's database is not held in a single location, which could be infiltrated or controlled by a single party, but rather it is hosted by numerous (typically thousands) computers all at once.[83]

The blockchain system employs encryption, allowing users to key in special passwords to send digital money directly to each other without disclosing those passwords to any person or institution.[84] Equally important, it lays out the steps that computers in the network must perform to reach a consensus on the validity of each transaction. Once that consensus or verification has been reached, a payee knows that the payer has sufficient funds - that the payer isn't sending counterfeit digital money.[85] Put simply, cryptocurrency is an asset existing virtually rather than in physical (or fiat) form and blockchain is the technology making that happen.[86]

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[80] To understand how this pseudo-anonymity works, one must first understand an aspect of blockchain technology that underlies all cryptocurrencies. This technology is called "public key cryptography." Public key cryptography is a cryptographic system that uses a pair of digital keys. Each cryptocurrency user has two keys. One is a public key, and one is private. The private key is a randomly generated hexadecimal number. As the name suggests, the user must always keep their private key private. Public keys are another hexadecimal number; they are derived from (and mathematically related to) the private key. *See generally, Is Bitcoin Anonymous?,* BITCOIN MAG. (Aug. 17, 2020), https://bitcoinmagazine.com/guides/is-bitcoin-anonymous. For more on pseudo-anonymity and public key cryptography, *see Public and Private Keys*, BLOCKCHAIN.COM (Mar. 29, 2020), https://support.blockchain.com/hc/en-us/articles/360000951966-Public-and-private-keys; *see also, Surveillance Defense*, SURVEILLANCE SELF-DEFENSE (Nov. 29, 2018), https://ssd.eff.org/en/module/deep-dive-end-end-encryption-how-do-public-key-encryption-systems-work.

[81] *What is a Blockchain?,* BITCOIN MAG. (Aug. 17, 2020), https://bitcoinmagazine.com/guides/what-is-blockchain.

[82] *Id.*

[83] The blockchain network automatically verifies itself at certain intervals, creating a self-auditing system that guarantees the accuracy of the data it holds. Groups of this data are known as "blocks," and as these blocks are cryptographically chained together, the pieces of data get buried and harder to manipulate. Altering any piece of data on the blockchain would require a huge amount of computing power. *see, id.*

[84] PAUL VIGNA & MICHAEL J. CASEY, THE AGE OF CRYPTOCURRENCY: HOW BITCOIN AND DIGITAL MONEY ARE CHALLENGING THE GLOBAL ECONOMIC ORDER 9 (2015).

[85] VIGNA & CASEY, *supra* note 84.

[86] Of the digital currencies, Bitcoin is generally considered the first completely decentralized currency and is by far the most widely used cryptocurrency., *see* Nathan Reiff, *What Was the First Cryptocurrency?*, INVESTOPEDIA (July 23, 2022), https://www.investopedia.com/tech/were-there-cryptocurrencies-bitcoin/; Broken down to its simplest form, Bitcoin is made up of "the digital units of value that are used by people in exchange for goods and services or other currencies, and whose price tends to swing wildly against traditional government issued currencies." Because of this, many laws and regulations fashioned by governmental institutions to regulate cryptocurrencies often refer to these currencies as bitcoin(s), utilized as a catch-all term to refer to cryptocurrencies more broadly., *see* Mancini-Griffoli, *supra* note 75., *see also*, Bernard Marr, *A Short History of Bitcoin and Cryptocurrency Everyone Should Read*, FORBES (Dec. 6, 2017), https://www.forbes.com/sites/bernardmarr/2017/12/06/a-short-history-of-bitcoin-and-crypto-currency-everyone-should-read/#70edd3813f27.

Finally, crypto exchanges are platforms that allow investors and consumers to "buy, sell, and trade cryptocurrencies through fiat currencies" such as US dollars or other cryptocurrencies.[87] Exchanges reflect current market prices of the cryptocurrencies they offer. You can also convert cryptocurrencies back into the U.S. Dollar or another currency on an exchange, to leave as cash within your account (if you want to trade back into crypto later) or withdraw to your regular bank account.[88]

Millions of people globally, including 16 percent of adult Americans, have purchased digital assets—which reached a market capitalization of $3 Trillion globally last November. Digital assets present potential opportunities to reinforce U.S. leadership in the global financial system and remain at the technological frontier. But they also pose real risks as evidenced by recent events in crypto markets. The May crash of a so-called stable coin and the subsequent wave of insolvencies wiped out over $600 billions of investor and consumer funds. Cryptocurrency may be still evolving but it is doing so exponentially.

B. Decentralized and Unregulated

One of the unique qualities of cryptocurrency, equally attractive to some and concerning for governments, is the unregulated, decentralized nature of the infrastructure. At their core, cryptocurrencies are built around the principle of a universal, inviolable ledger, one that is made fully public and is constantly being verified by these high-powered computers, each essentially acting independently of the other, creating inherent self-regulation.[89] The digital ledger (in most cases, blockchain) works as a stand-in for the middlemen since it can just as effectively identify whether a party to a transaction is good for his or her money.[90] The remarkable thing about this technology is that while cutting out the middleman it still provides an infrastructure inside of which strangers can exchange currency with one another globally.[91]

However, governments, institutions and banks alike point to cryptocurrencies novelty and what supporters opine, as its best feature (being decentralized), as a significant threat to the stability of our global financial institutions, creating an environment ripe for individuals and states seeking to evade taxes and or sanctions to have a work around.[92] In addition to concerns about users' risks associated with a decentralized, unregulated currency[93], the concern

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[87] Kendall Little, *Want to Buy Crypto? Here's What to Look for In a Crypto Exchange?,* TIME (May 3, 2022), https://time.com/nextadvisor/investing/cryptocurrency/what-are-cryptocurrency-exchanges/.
[88] *Id.*
[89] Marr, supra note 86.
[90] *Id.*
[91] *Id.*
[92] The Digital Asset Sanctions 5 Compliance Enhancement Act of 2022 has yet to pass, but Senator Elizabeth Warren continues to press for robust regulatory system of the digital finance and cryptocurrency sector. *See*, S. 912, 117th Cong. (2022). *See also*, Elizabeth Warren, Regulate Crypto or It'll Take Down the Economy, WALL ST. J.: OP-ED (Nov. 22, 2022, 11:57 AM), https://www.wsj.com/articles/regulate-crypto-or-itll-take-down-the-economy-fraud-reporting-know-your-customer-loophole-energy-disclosure-ftx-bankman-fried-ftx-11669123750?mod=opinion_lead_pos5. Unlike with fiat currency, all cryptocurrency transactions are recorded. That makes them perfectly traceable, so it's easy to monitor dealings between legitimate businesses. However, the problem is that ownership of virtual cash is not necessarily attributable to specific people or businesses. And digital currency units can be anonymized by putting them through what's known as a tumbler or 'mixer', "a service that changes the owner's identity by exchanging the tokens with ones belonging to other users also seeking anonymity.", *see generally*, Owen Matthews, *Bitcoin and Blockchain: A Russian Money Laundering Bonanza?*, NEWSWEEK (September 18, 2017, 1:16 PM), https://www.newsweek.com/russia-finally-embracing-virtual-currencies-666794.
[93] For more on risks associated with investing in cryptocurrency, *see* Frankenfield, *supra* note 70. Unlike traditional finance, there is no way to reverse or cancel a cryptocurrency transaction after it has already been

for nefarious and illicit activity continues to rise. The evolution of cryptocurrency appears to be happening at a pace faster than any revelation of what kind of a regulatory counterpart fits the industry. One of the fundamental challenges for regulation has been determining how to quantify and categorize what, cryptocurrency is thus being able to identify who and how it should be regulated; is it a commodity, currency, a security to be governed by the U.S. Securities and Exchange Commission (SEC)[94]?

Cryptocurrencies globally are regulated differently on a country-to-country basis.[95] Despite the global, borderless nature of cryptocurrency, there is yet to form an international regulatory body or system. In the United States, there is increased regulatory uncertainty around cryptocurrency, but the Federal government is taking small steps toward solutions.[96] Though domestic tax compliance may seem unrelated to preventing foreign state and non-state actors from evading sanctions, but cryptocurrency by nature is transnational, it is easy for US citizens to engage in aiding or at the very least, being complicit in helping Russian's evade sanctions through the exchange of cryptocurrency.[97]

Federally, the Biden administration has worked to develop and define cryptocurrency regulations, however the U.S. government "finds itself caught between two extremes".[98] On

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sent. By some estimates, about a fifth of all bitcoins are now inaccessible due to lost passwords or incorrect sending addresses. Also, there are counterparty risks; many investors and merchants rely on exchanges or other custodians to store their cryptocurrency. Theft or loss by one of these third parties could result in the loss of one's entire investment. As seen in the recent FTX scandal. *See* Kelsey Piper, *Sam Bankman-Fried tries to explain himself*, VOX (Nov. 16, 2022, 3:20 PM), https://www.vox.com/future-perfect/23462333/sam-bankman-fried-ftx-cryptocurrency-effective-altruism-crypto-bahamas-philanthropy?campaign_id=9&emc=edit_nn_20221117&instance_id=77783&nl=the-morning&regi_id=72351920&segment_id=113408&te=1&user_id=7e8ea228414c430288453c1748fdc9f6.

[94]*See* J. Riley Key *et. al*, *Cryptocurrencies: Currency, Commodity, Security, or Something Else?*, FIN. SERV. PERSPECTIVE (Feb. 5, 2019), https://www.financialservicesperspectives.com/2019/02/crytpocurrencies-currency-commodity-security-or-something-else/ ([A]ssessing a few American legal decisions regarding how cryptocurrencies should be defined, and how these definitions conflict amongst the various US regulatory agencies: "While the SEC appears to take a broad view of what constitutes a security in the cryptocurrency space, not all regulators and courts agree"). *See also*, SEC v. Ripple Labs Inc, U.S. District Court, Southern District of New York, No. 20-CV-10832. (Ripple's founders created XRP in 2012. XRP is the world's seventh largest cryptocurrency. The SEC sued the San Francisco-based company and its current and former chief executives in December 2020, alleging they have been conducting a $1.3 billion unregistered securities offering since the token's creation.). The ruling in this case will no doubt have major implications on the SEC's ability to regulate in the crypto space. *See generally*, Jody Godoy, Ripple, *SEC make final bids for a quick win in XRP lawsuit*, REUTERS (Dec. 5, 2022, 9:49 AM), https://www.reuters.com/legal/transactional/ripple-sec-make-final-bids-quick-win-xrp-lawsuit-2022-12-05/.

[95] *See*, Global Legal Research Center, Regulation of Cryptocurrency Around the World, L. Libr. Cong. 9-9 (June 2018), https://www.loc.gov/law/help/cryptocurrency/cryptocurrency-world-survey.pdf.

[96] U.S. DEPT. OF TREAS., THE AMERICAN FAMILY PLAN TAX COMPLIANCE AGENDA (May 2021) (Showing [a]n amended version of President Biden's American Family Plan, including a new rule for businesses and crypto exchanges, requiring them to report any cryptocurrency transactions with a fair market value of $10,000 or more to the IRS.).

[97] Press Release, U.S. Dept. of Just., Two European Citizens charged for Conspiracy with a U.S. Citizen to Assist Korea in Evading U.S. Sanctions (April 25, 2022), https://www.justice.gov/opa/pr/two-european-citizens-charged-conspiring-us-citizen-assist-north-korea-evading-us-sanctions. (U.S. citizen Virgil Griffith pleaded guilty to conspiring to assist North Korea in evading sanctions in violation of the International Emergency Economic Powers Act (IEEPA), and was sentenced on April 12 to 63 months in prison and a $100,000 fine by U.S. District Judge P. Kevin Castel).

[98] Exec. Order 14067, 87 FR 40881 (Mar. 9, 2022); *see,* FACT SHEET: White House Releases First-Ever Comprehensive Framework for Responsible Development of Digital Assets, White House (Sept. 16, 2022) (outlining the six key priorities identified in the EO: consumer and investor protection; promoting financial stability; countering illicit finance; U.S. leadership in the global financial system and economic competitiveness; financial inclusion; and responsible innovation).

one hand, the government is unwilling to actively block cryptocurrency transactions as it does not want to hamstring or restrain a growing and potentially lucrative, and critical industry for engaging in the global financial market. However, with the rise of cryptocurrency-based cybercrimes, the government cannot remain uninvolved in policing illicit and criminal activity in this sphere.[99]

The Biden administration remains committed to supporting the growth of the cryptocurrency industry while simultaneously searching for ways to restrict illegal uses.[100] The emphasis seems to be on information sharing, within federal agencies, including the Securities and Exchange Commission (SEC), Commodity Futures Trading Commission (CFTC), Consumer Financial Protection Bureau (CFPB) and Federal Trade Commission (FTC), but also across international lines.[101] Federal agencies are scrambling to keep up and adapt their practices to fit the world of cryptocurrency.[102]

The Department of Justice also established a 'crypto enforcement' arm in 2019. The Market Integrity and Major Frauds Unit (MIMF) works to prosecute those who commit fraud and market manipulation involving cryptocurrency.[103] The MIMF unit often works in collaboration or parallel to the U.S. SEC and the CFTC.[104] In just under three years prosecutors have charged, crypto CEOs, Traders, Founders, Executives, etc. with over $2 billion in intended financial losses to investors.[105]

IV. THE LACK OF CRYPTOCURRENCY REGULATION LINKED TO EVASION OF SANCTIONS

Sanctions are intended to exert pressure on the targeted party, through economic isolation measures. The more severe and more prolonged the sanctions, however, the greater incentive there is for individuals and governments, restrained by the sanctions to pursue creative new avenues to continue to participate in financial transactions globally. In recent years, digital and cryptocurrency have emerged as an attractive tool for individuals and regimes seeking to evade sanctions. Barred from traditional cross-border payment networks, parties

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[99] Josephine Wolff, The competing priorities facing U.S. crypto regulations, Brookings Inst.: TECH STREAM (Oct. 17, 2022), https://www.brookings.edu/techstream/the-competing-priorities-facing-u-s-crypto-regulations-bitcoin-ethereum/.

[100] Exec. Order 14067, *supra* note 98.

[101] *Id.*

[102] OFAC's recent guidance confirmed that "sanctions compliance obligations apply equally to transactions involving virtual currencies and those involving traditional fiat currencies." *see* OFAC, Sanctions Compliance Guidance for Virtual Currency ("OFAC Guidance"), at 1 (Oct. 2021)

[103] Using traditional law enforcement strategies coupled with blockchain data analytics, prosecutors aim to identify and prosecute a variety of cryptocurrency-based cybercrimes. "Since 2019, the Unit has charged cryptocurrency fraud cases involving over $2 billion in intended financial losses to investors from around the world. Prosecutors use blockchain data analytics and traditional law enforcement techniques to identify and prosecute complex cryptocurrency investment schemes; price and market manipulation involving cryptocurrencies; unregistered cryptocurrency exchanges involved in fraud schemes; and insider trading schemes affecting cryptocurrency markets." *See* U.S. Dept. of Just., Crypto Enforcement (Sept. 26, 2022), https://www.justice.gov/criminal-fraud/crypto-enforcement.

[104] *Id.*

105 *See e.g.,* United States v. Satish Kurjibhai KUMBHANI, aka "Vindee," aka "VND," aka "vndbcc,", Defendant., 2022 WL 609822 (S.D.Cal.).; *see also,* Kristina Davis, *Founder of cryptocurrency company BitConnect charged in $2.4-billion fraud*, LA TIMES (Feb. 26, 2022), https://www.latimes.com/california/story/2022-02-26/cryptocurrency-founder-charged-in-2-4-billion-fraud (Where [p]rosecutors consider the kind of alleged price manipulation conspiracy committed by BitConnect, to be commodities fraud, which is believed to be the first time cryptocurrency has been alleged to function as a commodity, the U.S. attorney's office said).

targeted by sanctions — and even some nonsanctioned, nefarious parties — have zeroed in on borderless digital alternatives to escape the scrutiny of government regulators.[106]

A. Illicit Cryptocurrency Activity

When pressed to be innovative, sanctioned governments and individuals have found ways to continue to move money around, outside of the traditional methods, i.e., setting up a shell company in the Cayman Islands. Several different strategies using digital currencies and cryptocurrencies have been employed to commit criminal acts or specifically to evade sanctions.

1. The Bolivarian Republic of Venezuela

In 2017, the U.S. imposed broad new sanctions prohibiting the Venezuelan government from accessing U.S. financial markets. In response, shortly thereafter, Venezuela attempted to create its own oil-backed cryptocurrency, the Petro.[107] Venezuelan President Nicolas Maduro was brazened and transparent in his promotion of the Petro, describing his regime's focus on cryptocurrency as one aspect of Venezuela's efforts to "circumvent the financial blockade created by the U.S. government".[108] Despite its launch in 2018[109],Venezuelan citizens do not appear to actively use the Petro. However, Venezuelans do trade an estimated $8 million worth of bitcoin each week, and Maduro recently announced plans for the Venezuelan government to move to a fully digitalized economy.[110]

2. The Russian Federation

The sanctions imposed upon Russia by the United States in 2014, in response to the invasion of Crimea, hit the country's economy hard. Economists estimated that the sanctions imposed by Western countries in 2014 cost Russia $50 billion.[111] Russia announced plans in 2017 for a state-run cryptocurrency called the Crypto ruble. Russia's approach to digital currency was slightly different than Venezuela's, however. Crypto rubles would be issued by the Russian government rather than mined — i.e., verified through cryptographic algorithms, like the bitcoins of the world — and would thus resemble a digital fiat currency, equal in value to a regular ruble.[112] Importantly, however, the Russian government would have the ability to provide anonymity to crypto ruble users. The Russian government stated the purpose of the crypto ruble — which is still under development — in no uncertain terms: The digital currency will help Russia "settle accounts with [its] counterparties all over the world with no regard for sanctions."[113] In line with their propensity for hacking and ransomware attacks, Russia has

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[106] *See infra* Part IV (A-C).
[107] Ulmer & Buitrago, *supra* note 5.
[108] *Id.*
[109] Nicolle Yapur, *Venezuela's Maduro Plans to Shift to Fully Digitalized Economy*, BLOOMBERG (Jan. 2, 2021, 10:47 AM), https://www.bloomberg.com/news/articles/2021-01-02/venezuela-s-maduro-plans-shift-to-a-fully-digitalizedeconomy.
[110] *See,* Jeffrey Gogo, *Venezuela to Start Using Cryptocurrency in Global Trade in Efforts to Fend Off U.S. Sanctions*, BITCOIN (Oct. 1, 2020), https://news.bitcoin.com/venezuela-to-start-using-bitcoin-in-global-trade-in-efforts-to-fend-offu-s-sanctions; *See also,* Yapur, s*upra* note 109.
[111] Emily Flitter & David Yaffe-Bellany, *Russia Could Use Cryptocurrency to Blunt the Force of U.S. Sanctions*, N.Y. TIMES, (Feb. 24, 2022), https://www.nytimes.com/2022/02/23/business/russia-sanctions-cryptocurrency.html.
[112] Jake Rudnitsky, Vladimir Putin aide eyes cryptocurrencies to beat sanctions, Russia newswire says. THE SYDNEY MORNING HERALD (December 13, 2017, 7:04 AM), http://www.smh.com.au/world/vladimir-putin-aide-eyes-cryptocurrencies-to-beat-sanctionsrussian-newswire-says-20171212-h03jju.html.
[113] *Id.*

also developed a software called Hydra, that can mask the origin of the transaction on blockchain, allowing Russian businesses to trade without detection.[114]

3. The Democratic People's Republic of North Korea

North Korea is perhaps the starkest example of a country that has sought to exploit digital currencies to circumvent sanctions restrictions. [115] Sanctioned in some capacity since the 1950s in response to their prolific nuclear program[116], North Korea, an already isolated,[117] totalitarian state, turned to using talented skillful,[118] homegrown, hackers to evade sanctions.[119] North Korea openly employs state sponsored cybercriminals like the infamous Lazarus Group, in an effort to hack and steal their way around sanctions.[120] The crypto sector is their latest sanctions evasion route of choice.[121] Compared to the more traditional fiat currency-generating crimes such as narcotics trafficking and arms trade,[122] cybercrimes offer criminals greater protection from investigation through layers of anonymity.

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[114] At present, Hydra cannot handle the volume of transactions that would be required to evade sanctions, but other money laundering techniques could be deployed. *see*, Thorston J. Gorny, *Russia Sanctions and Sanctions Evasion with Cryptocurrencies,* SANCTIONS.IO (June 14, 2022), https://www.sanctions.io/blog/russia-sanctions-and-sanctions-evasion-with-cryptocurrencies#:~:text=Last%20year%2C%2074%25%20of%20global,the%20US%20and%20other%20nations. *See id.*, Last year, 74% of global ransomware profits ($400 million of cryptocurrency) went to entities affiliated with Russia.

[115] *See generally*, KING MALLORY, NORTH KOREAN SANCTIONS EVASION TECHNIQUES 15 (RAND Corp. 2021).; *See also*, Andrew W. Lehren & Dan De Luce, *Secret Documents Show How North Korea Launders Money Through U.S. Banks*, NBC NEWS (Sept. 20, 2020), https://www.nbcnews.com/news/world/secret-documents-show-how-north-korea-launders-money-through-u-n1240329.

[116] *See* Kelsey Davenport & Elizabeth Philipp, *UN Security Council Resolutions on North Korea*, ARMS CONTROL ASS'N (Apr. 2018), https://www.armscontrol.org/factsheets/UN-Security-Council-Resolutions-on-North-Korea.; *see also,* Eleanor Albert, *What to Know About Sanctions on North Korea*, COUNCIL ON FOR. REL. (July 16, 2019, 8:00 AM), https://www.cfr.org/backgrounder/what-know-about-sanctions-north-korea. *See North Korea Overview*, NUCLEAR THREAT INITIATIVE (Oct. 19, 2021), https://www.nti.org/analysis/articles/north-korea-overview/.

[117] *See generally*, Charlotte Alfred, *How North Korea Became So Isolated*, HUFFPOST (Oct. 17, 2014, 05:42 PM), https://www.huffpost.com/entry/north-korea-history-isolation_n_5991000.

[118] See, U.S. DEP'T HEALTH & HUM. SERV.., OFF. INFO. SEC., NORTH KOREAN CYBER ACTIVITY 3 (2021), https://www.hhs.gov/sites/default/files/dprk-cyber-espionage.pdf.; *See also*, Morten Soendergaard Larsen, *While North Korean Missiles Sit in Storage, Their Hackers Go Rampant*, FOREIGN POLICY (Mar. 15, 2021), https://foreignpolicy.com/2021/03/15/north-korea-missiles-cyberattack-hacker-armies-crime/ (quoting Bruce Klingner--a former CIA deputy division chief and current Heritage Foundation senior research fellow).

[119] North Korea conspired with a cryptocurrency expert to teach and advise members of the North Korean government on cutting-edge cryptocurrency and blockchain technology, all for the purpose of evading U.S. sanctions meant to stop North Korea's hostile nuclear ambition. *See* Press Release, U.S. Dept. of Just., Two European Citizens charged, *supra* note 91. See also, U.S. DEP'T TREASURY, National Strategy for Combating Terrorist and Other Illicit Financing 21 (2020).

[120] North Korea harbors a massive army of cyber operatives as part of its strategy for conducting cyber-based financial crimes as part of its sanction's evasion strategy. Most of the commercial hackers that focus on financial crimes operate under the command of the Reconnaissance General Bureau, North Korea's key military-intelligence division, and its subunits of hackers like the Lazarus Group. *See*, Ed Caesar, *The Incredible Rise of North Korea's Hacking Army*, NEW YORKER (Apr. 19, 2021), https://www.newyorker.com/magazine/2021/04/26/the-incredible-rise-of-north-koreas-hacking-army.

[121] *See, Lazarus Group Pulled Off 2020's Biggest Exchange Hack and Appears to be Exploring New Money Laundering Options,* CHAINALYSIS: BLOG (Feb. 9, 2021), https://blog.chainalysis.com/reports/lazarus-group-kucoin-exchange-hack.

[122] MALLORY, *supra* note 115, at 19.

To strategically overcome economic sanctions, North Korea has increasingly employed advanced cyber capabilities to conduct ransomware attacks, [123] digital bank heists, cryptocurrency theft, crypto-based cyber scams,[124] and crypto jacking schemes[125]--all of which include money laundering aspects. The cyber-based nature of these financial crimes, especially in a constantly evolving arena of cryptocurrency, leaves the U.S. and international community strained in their attempts to curb North Korea's continued sanctions evasion and money laundering activities that are often assisted by individuals and organizations across the globe.[126]

According to the United States Department of Justice (DOJ), the three North Koreans named in the February indictment acted on behalf of the North Korean government as part of a North Korean military intelligence agency.[127] And a more recently the Lazarus group have been linked with the theft of over $600M in crypto by hacking Axie Infinity Video game.[128] Since the attack in March, the hackers are still laundering the stolen money via Blender, a cryptocurrency mixer. Cryptocurrency-based financial crimes are likely to remain North Korea's primary sanctions evasion and money laundering operations in cyberspace.[129] North Korea has shown remarkable willingness and ability to utilize blockchain technology and possesses sophisticated levels of adaptability and maturity in deploying its schemes. Members of the international community, therefore, need to respond with urgency.

4. The Islamic Republic of Iran

Iran's long history of economic isolation from U.S. sanctions began in 1979, when President Jimmy Carter's administration banned Iranian imports and froze $12 billion in assets over the storming of the U.S. Embassy in Tehran.[130] With few other options, Iran has turned to

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[123] Ransomware attack generally involves infecting a victim's computer with an access-denying malware and then demanding payments in cryptocurrency in return for granting the victim access to his or her computer. S*ee* Thomas Brewster, *Microsoft Just Took a Swipe at NSA Over the WannaCry Ransomware Nightmare*, FORBES (May 14, 2017), https://www.forbes.com/sites/thomasbrewster/2017/05/14/microsoft-just-took-a-swipe-at-nsa-over-wannacry-ransomware-nightmare/?sh=7fec72133585 [https://perma.cc/6UMS-N93R].; *See* Alex Hern & Samuel Gibbs, *What is WannaCry Ransomware and Why is it Attacking Global Computers?*, GUARDIAN (May 12, 2017), https://www.theguardian.com/technology/2017/may/12/nhs-ransomware-cyber-attack-what-is-wanacrypt0r-20 [https://perma.cc/942S-6SUU].

[124] *See* North Korea's alleged attempt to lure investors to its dubious Marine Chain Vessel Token Offering represents this type of cyber scam. *See* Cristina Rotaru, *The Curious Case of Marine Chain: The DPRK Cyberscam Behind a Blockchain-Powered Maritime Investment Marketplace*, VERTIC (Apr. 24, 2019), https://www.vertic.org/2019/04/the-curious-case-of-marine-chain-the-dprk-cyberscam-behind-a-blockchain-powered-maritime-investment-marketplace/.

[125] Cryptojacking refers to the act of using malware-infected computers' computing power to mine cryptocurrency. *See* U.S. DEP'T JUST. ET AL., DPRK CYBER THREAT ADVISORY: GUIDANCE ON THE NORTH KOREAN CYBER THREAT 2 (Apr. 15, 2020) [hereinafter DPRK CYBER THREAT ADVISORY].

[126] *See* Arjun Kharpal, *Hackers Have Found a Way to Mine Cryptocurrency and Send It to North Korea*, CNBC (Jan. 9, 2018), https://www.cnbc.com/2018/01/09/north-korea-hackers-create-malware-to-mine-monero.html.

[127] Supra note 118.

[128] Carly Page, *US officials link North Korean Lazarus hackers to $625M Axie Infinity crypto theft*, TECHCRUNCH, (April 15, 2022), https://techcrunch.com/2022/04/15/us-officials-link-north-korean-lazarus-hackers-to-625m-axie-infinity-crypto-theft/.

[129] While its hackers roam cyberspace launching illicit attacks, North Korea runs little risk of being targeted itself because most of the country is offline. "For North Korea, it's a low-cost, low-risk but high-return criminal enterprise," said Yoo Dong-ryul, a former chief antiterrorism analyst at the South Korean national police agency. *See*, Choe Sang-Hun & David Yaffe-Bellany, *How North Kora Used Crypto to Hack Its Way Through the Pandemic*, NY TIMES (June 30, 2022), https://www.nytimes.com/2022/06/30/business/north-korea-crypto-hack.html.

[130] *See generally*, Patrick Clawson, *Iran Primer: U.S. Sanctions*, PBS: FRONTLINE (Oct. 21, 2010), https://www.pbs.org/wgbh/pages/frontline/tehranbureau/2010/10/iran-primer-us-sanctions.html.

digital currencies to alleviate the crippling impact of sanctions in recent years.[131] Cheap, heavily subsidized energy sources have fueled a robust, fast growing crypto mining industry and encouraged foreign crypto mining operations to move their energy-intensive computer farms to Iran.[132] In 2019, Iran was one of the first countries to officially recognize crypto mining as a legitimate industry, and since then the Iranian government continues to focus on deriving much-needed income through crypto mining industry regulation.[133] Effectively, Iran is selling its energy reserves on the global markets, using Bitcoin mining to bypass trade embargoes. Miners based in Iran are paid directly in cryptocurrency which can in turn be used to pay for imports, circumventing financial sanctions.[134] The government has adopted crypto mining officially as an effective tool for evading sanctions.[135]

V. PUSHBACK AND LOOPHOLES

A big debate is underway on whether sanctions evasion with crypto is a realistic possibility. Insiders and practitioners of the cryptocurrency industry deny the possibility. Their main arguments include: 1) issues with liquidity, the crypto industry is just too small, with the entire market cap at approximately $2 trillion, 2) SWIFT processes 42 million financial messages on average every day. The current decentralized financial technology is not robust enough to efficiently handle that kind of scale, 3) the use of blockchain, a publicly accessible, highly traceable ledger, does not, some crypto experts think, make it an effective tool for illicit activity, especially on a grand scale and 4) they further argue that the idea that some cryptocurrency can be used to evade sanctions is highly dependent on that particular asset being purchased for widespread use, which is not the case at the moment.

Cryptocurrencies are created and exchanged through blockchain networks, which store "tamper-resistant" records of transactions.[136] Most cryptocurrency transactions between parties are recorded directly on public blockchains meaning anyone can view the records.[137] Cryptocurrency supporters argue that sanctions evasion is impossible because transactions are publicly viewable on blockchains, which law enforcement may trace using analytics software and user's public key addresses. However, it is not that simple. There are ways sanction evaders may attempt to obscure their blockchain transactions and evade any measures imposed by exchanges.

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[131] *See, e.g.*, Thomas Erdbrink, *How Bitcoin Could Help Iran Undermine U.S. Sanctions*, N.Y. TIMES (Jan. 29, 2019), https://www.nytimes.com/2019/01/29/world/middleeast/bitcoin-iran-sanctions.html.

[132] Bitcoin and other crypto asset networks run on electricity, a lot of it. "Bitcoin miners run power-hungry computers, which process new transactions and add them to the blockchain." In return, the miners are rewarded with bitcoins - both from transaction fees as well as the minting of new bitcoins. The mining process effectively converts energy into cryptocurrency. Iran has seized upon Bitcoin mining as an attractive opportunity for their heavily sanctioned economy suffering from a shortage of liquid cash, but with a surplus of oil and natural gas. See Tim Robinson, *How Iran Uses Bitcoin Mining to Evade Sanctions and "Export" Millions of Barrels of Oil*, ELLIPTIC: BLOG (May 21, 2021), https://www.elliptic.co/blog/how-iran-uses-bitcoin-mining-to-evade-sanctions.

[133] *See id.*, (Showing that Iran charges a tariff, thought cheaper than most, for their electricity sources for the purpose of crypto mining).

[134] *Id. See also,* Sebastian Sinclair, *Iran Central Bank to Allow Money Changers, Banks to Pay for Imports Using Mined Crypto*, COINDESK (Sept. 14, 2021, 5:46 AM), https://www.coindesk.com/markets/2021/04/27/iran-central-bank-to-allow-money-changers-banks-to-pay-for-imports-using-mined-crypto/.

[135] *See* Behnam Gholipour, *Official Report: Iran Could Use Cryptocurrencies to Avoid Sanctions*, Iran Wire (March 2, 2021), https://iranwire.com/en/features/69084/.

[136] *See* supra Part III (A).

[137] *Id.*

One method is called chain-hopping. This is a process of converting one cryptocurrency into another to hide illicit funds.[138] Another way to increase the difficulty of determining the source of illicit funds is to use mixers or tumbling services.[139] Users pay a fee to send cryptocurrency to a mixer account, which combines cryptocurrencies from various customers, before sending to the end recipient.[140] One of the more publicly discussed concerns and areas of new sanctions on Russia are in relation to the use of un-hosted wallets.[141] A wallet is digital software or hardware for storing private keys corresponding to cryptocurrency and other blockchain based assets.[142] Exchanges may provide 'hosted" wallets but are not required to monitor transactions with un-hosted wallets. If law enforcement agencies are aware of a sanctioned individual's un-hosted wallet, they may be unable to access and recover the cryptocurrency without the wallet's private keys.

Nevertheless, un-hosted wallets still require an exchange as an "off-ramp" for users to convert to fiat currency. Individuals may use un-hosted wallets to shift funds to exchanges in jurisdictions with fewer anti-money laundering (AML) or Know Your Customer (KYC) requirements. The Office of Foreign Assets Control (OFAC) has sanctioned certain Russian-linked cryptocurrency exchanges to eliminate certain pathways for potential sanctions evasion.[143] The Financial Crimes Enforcement Network (FinCEN) has a proposed rulemaking extending reporting requirements to un-hosted wallets.[144] If enacted, crypto exchanges would be required to collect names and home addresses, among other personal details, from anyone hoping to transfer cryptocurrencies to their own private wallets.[145]

Another area of vulnerability could be Peer-to-Peer (P2P) exchanges.[146] These are cryptocurrency exchanges that operate without any central intermediary or authority to transmit assets or collect customer information. This increases the difficulty of tracing illicit activity or complying with the Bank Secrecy Act (BSA), which requires U.S. financial institutions to assist the government in detecting and preventing money laundering. Though concern exists that illicit activity could be more easily hidden via P2P exchanges, FinCEN considers P2P

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[138] *What is blockchain?, supra* note 81.
[139] Gareth Jenkinson, Into the storm: The murky world of cryptocurrency mixers, COIN TELEGRAPH (Dec. 7, 2022), https://cointelegraph.com/news/into-the-storm-the-murky-world-of-cryptocurrency-mixers.
[140] *Id.*
[141] Helen Partz, *Blockchain.com closes crypto custody for Russians amid EU sanctions*, COIN TELEGRAPH (Oct. 14, 2022), https://cointelegraph.com/news/blockchain-com-closes-crypto-custody-for-russians-amid-eu-sanctions.
[142] *Id.*
[143] Press Release, U.S. Dept. of the Treasury, Treasury Sanctions Russia-Based Hydra, World's Largest Darknet Market, and Ransomware-Enabling Virtual Currency Exchange Garantex (April 5, 2022) (on file with the author).
[144] "FinCEN is proposing to amend the regulations implementing the Bank Secrecy Act (BSA) to require banks and money service businesses (MSB) to submit reports, keep records and verify the identity of customers in relation to transactions involving convertible virtual currency (CVC) or digital assets with legal tender status ('legal tender digital assets' or 'LTDA') held in un-hosted wallets, or held in wallets hosted in a jurisdiction identified by FinCEN." Requirements for Certain Transactions Involving Convertible Virtual Currency or Digital Assets, 85 Fed. Reg. 83840 (Dec. 23, 2020) (to be codified 31 CFR pts. 1010, 1020, 1022).
[145] *Id.*, However, crypto advocates said they were concerned the rules might be impossible for certain wallets to comply with because they are not controlled by people and therefore are not tied to this personal information. There is also concern the compliance requirement might be overly burdensome for individuals. *see*, Nikhilesh De, *The Unhosted Crypto Wallet Rule is Back*, COINDESK (Jan. 31, 2022, 7:13 AM), https://www.coindesk.com/policy/2022/01/29/the-unhosted-crypto-wallet-rule-is-back/.
[146]Darren Kleine, *Crypto Regulation is Coming to Europe: Are Exchanges Ready for New Rules?*, COINTELEGRAPH (Dec. 18, 2019), https://cointelegraph.com/news/crypto-regulation-is-coming-to-europe-are-exchanges-ready-for-new-rules.

exchanges and mixers to be money service businesses and are therefore already under regulation.

However, many do not register with FinCEN which is required. It comes back to the question of enforcement both of compliance with registering and tracking down violators.[147] As it stands, Cryptocurrency transfers on digital financial exchanges, that are not yet fully regulated for anti-money laundering and counter-terrorist financing. Tokens can be used to bypass steep economic sanctions in cases where exchanges don't comply with rules, if companies have inadequate compliance procedures, or when technologies that increase anonymity are used.[148] Though mass, country-wide evasions of sanctions may not be a current reality, the preverbal crypto-train has left the station and as described above, there is illicit activity and money laundering taking place via cryptocurrency channels.[149]

VI. A WAY FORWARD FOR REGULATIONS

Looking at recent litigation offers some insights into possible options for crypto regulation, but the cases still do not offer bright line rules, rather how best to enforce and rule on sanctions evasions through crypto-based crimes, still seems to be fact and case sensitive. Earlier this year the DOJ charged, for the first time, an unnamed U.S. citizen for using cryptocurrency to evade sanctions against Russia.[150] This citizen allegedly opened two digital currency accounts, one in the U.S. and one in the sanctioned country, with which the citizen transmitted over $10 million worth of bitcoin between the U.S. and the sanctioned country, using a U.S.-based IP address.[151] Civil and criminal liability for evading sanctions has been around for decades. The International Emergency Economic Powers Act (IEEPA) which authorizes the president to levy sanctions, has long made it unlawful to "violate, ... conspire to violate, or cause a violation of" levied sanctions.[152] Most sanction regimes "prohibit the direct and indirect importation, exportation, and re-exportation of goods, services, and technology, without a license from OFAC."[153] Services include "any transfer of funds, directly or indirectly."[154] What appears to be new, if not surprising, is guidance affirming that

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[147] The Department of Justice (DOJ) has prosecuted P2P exchangers for money and laundering and BSA violations. *See*, Press Release, U.S. Dept. of Just., Operator of Unlawful Bitcoin Exchange Sentenced to More Than 5 Years in Prison For Leading Multimillion-Dollar Money Laundering And Fraud Scheme (June 27, 2017), https://www.justice.gov/usao-sdny/pr/operator-unlawful-bitcoin-exchange-sentenced-more-5-years-prison-leading-multimillion#:~:text=MURGIO%20was%20sentenced%20today%20by,million%20in%20illegal%20Bitcoin%20transactions.

[148] Kleine, *supra* note 146.

[149] *See supra* Part IV(A).

[150] In May 2022, DOJ filed an application for a criminal complaint with Judge Faruqui charging a U.S. person ("Defendant") with conspiring to violate the International Emergency Economic Powers Act ("IEEPA"), 50 U.S.C. § 1705, and defrauding the United States, in violation of 18 U.S.C. § 371. The docket in this case is under seal. For that reason, the court redacted facts and identifying information about the witnesses and defendant and declined to mention the specific country to which the U.S. citizen allegedly transferred the cryptocurrency. Possible countries include Cuba, Iran, North Korea, Syria or Russia.; *see also*, In re: Criminal Complaint, No. 22-mj-067-ZMF at 1–3 (D.D.C. May 13, 2022). IEEPA makes it illegal to violate comprehensive trade-based sanctions programs (*e.g.*, Iran, North Korea, and Russia) administered by the Treasury's Office of Foreign Assets Control ("OFAC") and carries a stiff maximum penalty – 20 years' imprisonment and a $1,000,000 fine. Most sanction regimes "prohibit the direct and indirect importation, exportation, and re-exportation of goods, services, and technology, without a license from OFAC."

[151] *Id.*

[152] IEEPA, *supra* note 30.

[153] In re: Criminal Complaint, *supra* note 150, at 3.

[154] *Id.*

cryptocurrency transactions fall within the IEEPA's reach.[155] The U.S., like other countries are independently searching for and testing out methods of regulation and enforcement by using existing regulatory mechanisms.[156] However, the cryptocurrency arena is transnational, fast moving and ever changing and actors seeking to evade international sanctions in this space, thus fall under multi-national jurisdictions. Therefore, the need for an internationally coordinated approach to cryptocurrency regulation, will be critical to curtailing sanctions evasions.

A. Three Considerations for International Regulation

There are a few areas worth considering when looking at how best to stem the flow of sanction evasions by way of cryptocurrency. A successful international regulatory framework of cryptocurrency should include two aspects. First, it should provide governments with the identities of their countries' cryptocurrency users. This should preserve a level of "pseudo-anonymity" and permit the implementation of regulatory functions: users' identities will remain anonymous to all but certain governmental actors.[157] This is important as a frequent concern raised in response to the prospect of an international regulatory regime is the erasure of cryptocurrency users' anonymity.[158]

Exposing parts of a user's identity should be viewed as a shift on the spectrum of anonymity instead of an erasure of user anonymity altogether, as it pertains to regulations. The European Union recently implemented Know Your Customer ("KYC") laws modeling one way this shift might be accomplished.[159] These KYC regulations require European financial institutions to identify and verify their clients' identities.[160] Cryptocurrency exchanges throughout Europe have been impacted, as they are now required to peel back layers of anonymity to uncover their users' identities.[161] This system possesses still, several

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[155] That guidance came last October when the U.S. Department of the Treasury's Office of Foreign Assets Control which administers the IEEPA, issued guidance stating that: OFAC sanctions compliance obligations apply equally to transactions involving virtual currencies and those involving traditional fiat currencies. *See* U.S. Dep't of the Treasury, Sanctions Programs and Country Information, https://home.treasury.gov/policy-issues/financial-sanctions/sanctions-programs-and-country-information (last visited Nov. 18, 2022); *See also*, Off. Foreign Assets Control, Sanctions Compliance Guidance for the Virtual Currency Industry 1 (Oct. 2021), https://home.treasury.gov/system/files/126/virtual_currency_guidance_brochure.pdf.

[156] *See supra* Part III.

[157] This is a key component of why cryptocurrency works. *See, supra* note 72.

[158] Rakesh Sharma, *What Does Government Regulation Mean for Privacy-Focused Cryptocurrencies?*, INVESTOPEDIA (June 25, 2019), https://www.investopedia.com/news/what-does-increased-government-regulation-mean-privacyfocused-coins (quoting the CEO of Digital Dash, an open source alternative cryptocurrency: "Privacy is important for many practical reasons including user safety, so we believe it is an important aspect to incorporate into our solutions."); *see also*, Jerry Brito, *China intends to launch a national digital currency that will let the government easily surveil spending. Following in their footsteps would be a mistake*, COINCENTER (Oct. 21, 2019), https://www.coincenter.org/china-intends-to-launch-a-national-digital-currency-that-will-let-the-government-easily-surveil-spending-following-in-their-footsteps-would-be-a-mistake/ ("Any ... American-led effort [to regulate cryptocurrencies] must ... mak[e] anonymity and censorship-resistance core network features.").

[159] S*ee The Impact of Rising KYC & AML Regulations in Europe*, Know Your Customer, https://knowyourcustomer.com/impact-rising-kyc-aml-regulations-europe (last visited Oct. 11, 2020).

[160] Fedor Poskriakov et al., *Cryptocurrency Compliance and Risks: A European KYC/AML Perspective*, BLOCKCHAIN & CRYPTOCURRENCY REGULATION (Josias N. Dewey ed., 2nd ed. 2020), https://www.globallegalinsights.com/practice-areas/blockchain-laws-and-regulations/11-cryptocurrency-compliance-and-risks-a-european-kyc-aml-perspective.

[161] Importantly, KYC laws do not reveal crypto users' identities to the public at large. Rather, users' identities are mandatorily disclosed to a select sphere of institutional actors as identified in the KYC regulations. *See generally* Craig Adeyanju, *What Crypto Exchanges Do to Comply with KYC, AML and CFT Regulations*,

vulnerabilities as untrustworthy third-party intermediaries still act as gatekeepers to sensitive data.[162] However, the European KYC laws illustrate that cryptocurrency regulations can exist without handicapping users' pseudo-anonymity altogether. Financial institutions, moreover, can learn by putting in practice traditional approaches to financial regulation, in an adaptable way and still maintain cryptocurrency's structural integrity.[163]

B. International Coordination and Information Sharing

Secondly, when considering how to make the sharing of sensitive information streamlined, secure and easy to monitor both at the international and state level, we can look at an existing framework for guidance. One such organization is the International Civil Aviation Organization ("ICAO"), a specialized agency of the United Nations.[164] ICAO develops recommended aviation practices followed by signatories of the Convention on Civil Aviation (the "Chicago Convention").[165] One program many are familiar with and participants of already, is the Traveller Identification Programme ("TRIP").[166] The objective of TRIP is for all U.N. Member States to have the ability to "uniquely identify individuals," i.e., that all citizens who wish to travel internationally, will have a unique identifying number, colloquially, your passport number.[167] The program outlined in TRIP allows countries autonomy and flexibility in meeting these goals.[168] Crucially, the TRIP program simultaneously maintains a global network in which passports--and thereby individuals--can be identified at any international juncture.[169] The multilateral nature of ICAO allows for evolution and the continuous adaptation of travel protocols.[170] For these reasons, a coordinated "public key directory" could be a streamlined way to track and share information as part of a regulatory

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COINTELEGRAPH (May 17, 2019), https://cointelegraph.com/news/what-crypto-exchanges-do-to-comply-with-kyc-aml-and-cft-regulations; Darren Kleine, *Crypto Regulation is Coming to Europe: Are Exchanges Ready for New Rules?*, OINTELEGRAPH (Dec. 18, 2019), https://cointelegraph.com/news/crypto-regulation-is-coming-to-europe-are-exchanges-ready-for-new-rules.

[162] *See supra* Part IV.

[163] Adeyanju, *supra* note 162.

[164] *See Convention on International Civil Aviation--Doc 7300*, ICAO, https://www.icao.int/publications/pages/doc7300.aspx (last visited Oct. 11, 2020).

[165] *See* Convention on International Civil Aviation, Dec. 7, 1944, 15 U.N.T.S 295.

[166] *Traveller Identification Programme,* ICAO, https://www.icao.int/security/FAL/TRIP/Pages/default.aspx, (last visited Dec. 8, 2022).

[167] Id. To facilitate the TRIP objective, the ICAO issues recommendations that help countries develop databases to store and process credible evidence of identification. The ICAO also facilitates the creation of globally connected systems which link passports to their holders.

[168] For example, TRIP permits nations flexibility in the identifying information held in each national passport database. Some nations such as Argentina maintain biometric data accessible by a wide variety of Argentinian governmental agencies; others, such as Canada, are in the process of eliminating the development of centralized databases containing biometric information. *Biometric Data Retention for Passport Applicants and Holders*, L. LIBR. CONG. (Mar. 2014), https://www.loc.gov/law/help/biometric-data-retention/biometric-passport-data-retention.pdf [hereinafter *Biometric Data Retention*]. TRIP also provides recommendations for Machine Readable Travel Documents ("MRTD" or passports) which allows for flexibility in their form and substance. *See Machine Readable Travel Documents (Doc 9303)*, ICAO (7th ed. 2015), https://www.icao.int/publications/Documents/9303_p3_cons_en.pdf.

[169] *Id.*

[170] For example, ICAO has recently begun to engage with the United Nations' sustainable development goals ("SDGs") and has linked its strategic objectives to these goals. It continuously monitors the effects of these goals and develops its framework as appropriate. *Aviation Development*, ICAO, https://www.icao.int/about-icao/aviation-development/Pages/default.aspx (last visited Oct. 11, 2020); *ICAO and the United Nations Sustainable Development Goals*, ICAO, https://www.icao.int/about-icao/aviation-development/pages/sdg.aspx (last visited Oct. 11, 2020).

scheme of cryptocurrency. Cryptocurrencies are a fast-developing market[171] which national governments and inter-government agencies struggle to fully understand.[172] For an industry that is constantly changing, flexibility and agility will be crucial especially in the beginning stages of an international regulatory structure.[173]

C. A Need for "Friendly Adversarialism"

Finally, when seeking to regulate a volatile, non-traditional financial mechanism such as open-source cryptocurrency, one that resembles the wild west more than an organized institution, we must consider equally non-traditional, and sometimes riskier, means of regulation. One way that companies and governments could aim to safeguard themselves from sanction evaders, particularly those who use ransomware, malware or spyware to steal and launder money through cryptocurrency, [174] is to consider utilizing White Hat Hackers (WHH).[175] The use of WHHs (i.e., ethical hackers), is a controversial approach yet one that puts companies and governments in an offensive, empowered position to better regulate, monitor and potentially curtail theft, and catch bad actors.[176] A WHH's main goal is to find and expose vulnerabilities in codes, the same way cybercriminals do. The difference is, WHHs give the money back, expose the threat, and sometimes aid in correcting the flawed systems.[177] WHHs operate in a presumed grey area, both ethically and legally.[178]

Decentralized finance continues to be a vulnerable industry with anonymous founders, open-source code and billions of dollars looking to take on risk. The enormous amount of capital in this space has created an incentive system aligned with teams that build fast and

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[171] There are over 2000 different cryptocurrencies available on the market. *See generally,* Lubomir Tassev, *The Number of Cryptocurrency Wallets is Growing Exponentially*, BITCOIN.COM (Sept. 26, 2019), https://news.bitcoin.com/the-number-of-cryptocurrency-wallets-is-growing-exponentially/.

[172] *See supra* Part V.

[173] Timothy Massad, *It's Time to Strengthen the Regulation of Crypto-Assets*, BROOKINGS UNIV. 21, 42 (Mar. 2019).

[174] *See supra* Part V (North Korea).

[175] The terms "white hat" and "black hat" come from the golden age of Hollywood Westerns, when the good guy and the bad guy were easily identifiable to the audience by the color of their hats. Black hats are no-gooders who will steal anything and everything from anyone. White hats, by contrast, work to protect companies, projects and individuals., *see* Andrew Froehlich, What is a white hat hacker?, TECHTARGET, https://www.techtarget.com/searchsecurity/definition/white-hat#:~:text=The%20terms%20come%20from%20old,legally%20permitted%20to%20do%20so. (last visited Dec.10, 2022).

[176] *See* Edward Oosterbaan, *Why White Hat Hackers are Vital to the Crypto Ecosystem*, COINDESK (Dec. 10, 2022), https://www.coindesk.com/layer2/2022/02/23/why-white-hat-hackers-are-vital-to-the-crypto-ecosystem/, (Stating that Jay Freeman (a WHH) stopped a potential $750 million vulnerability from being exploited on three of Ethereum's layer 2 networks.)

[177] Freeman has also contemplated where the middle ground between "Code is Law" and third-party trust falls. "Bug bounties are essential in incentivizing good actors to seek out and find vulnerabilities. By setting the reward for being a good actor on a similar scale as the payout for being a bad actor, that scale suddenly tilts the incentives toward white hatting." As Freedman put it, this sort of "friendly adversarialism" can encourage ecosystem participants to be more open, honest and even pessimistic about new ideas. *see id.*

[178] While the open nature of blockchain technology means that most protocols and smart contracts are accessible without breaking into a corporate network to look for weaknesses, even testing that a vulnerability exists can be something the law frowns upon. *See id.*

release tokens.[179] This can be a lucrative, exciting profession for talented hackers, and a means to expose and secure vulnerabilities on a regular basis.[180]

Of course, another important part of crypto security, specifically relating to how actors might be evading sanctions, is being able to protect against and track hacked funds, whether going out or coming in.[181] This however, requires a more coordinated effort than solely employing, often rouge white hats that traditionally work for themselves and are more motivated by the chase and bug bounties than working on an internal team to monitor particular companies.[182] WHHs should be viewed as tool in the hands of a more coordinated multi-agency (both current and potentially new) regulation scheme. There is a growing presence of analytics platforms[183] that may fill the gap where traditional compliance officers or companies lack the skill, expertise to combat crypto-based crimes and sanctions evasions.[184] These platforms can build and monitor risk management systems, monitor potential compliance problems, and investigate and track digital assets.[185] Just as traditional financial institutions employ skilled compliance officers and general counsel to ensure regulatory compliance and asses risk for traditional methods of doing business, businesses in the financial sector and businesses that deal in cryptocurrency, will need to be proactive to enhance their due diligence.[186] The ways in which the government and international agencies regulate this space by nature has and will continually evolve and adapt, since cryptocurrency is still evolving. Now more than ever businesses must arm themselves with cyrpto-saavy compliance and legal teams and expert advisors to guard against current and possible risks.[187]

CONCLUSION

Russia invaded Ukraine earlier this year. Ever since people from all over the world have donated tens of millions of dollars' worth of cryptocurrency directly to the Ukrainian

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[179] In Praise of White Hat Hackers, CRYSTAL BLOCKCHAIN (Sept. 15, 2021), https://crystalblockchain.com/articles/in-praise-of-white-hat-hackers/.

[180] White hats have many motivations, beginning with making a living by doing something they love and showing off their skills while doing good. Others are largely doing it for fun or for rewards — the "bug bounties" many tech companies offer for bringing security flaws to their attention. "Bug bounties" can range from $500 to $500,000 depending on the amount of the breach. *See id.*

[181] CRYSTAL BLOCKCHAIN, *supra* note 179.

[182] *In Praise of White Hat Hackers*, *supra* note 181.

[183] *See e.g.,* Press Release, Chainalysis Launces Sanctions Screening Tools Free of Charge for Cryptocurrency Industry, CISION PR NEWSWIRE (Mar. 10, 2022), https://www.prnewswire.com/news-releases/chainalysis-launches-sanctions-screening-tools-free-of-charge-for-cryptocurrency-industry-301500350.html.

[184] There is a growing number of advisors filling the space to educate and guide best practices for companies. *See generally*, Che Sidanius, *How are digital assets used to evade sanctions?*, REFINITIV: REGULATIONS (Aug. 8, 2022), https://www.refinitiv.com/perspectives/regulation-risk-compliance/how-are-digital-assets-used-to-evade-sanctions/.; *See id.*, A coalition to fight financial crime, established The Digital Asset Task Force (DATF) an expert committee comprising a range of industry leaders concentrating on the relationship between digital assets and financial crime.

[185]*See generally*, Crypto assets and Sanctions Compliance Report, Global Blockchain Business Council (GBBC) Digital Finance, (2022), https://www.gdf.io/wp-content/uploads/2022/07/Cryptoassets-and-Sanctions-Compliance-Report-Final-1.pdf. [hereinafter GBBC Report].

[186] Because U.S. individuals and companies, broadly are prohibited from engaging in transactions with sanctioned parties, and as sanctions are "strict liability," sanctions evasion not only presents designation risks for evaders and facilitators, but also creates risks of enforcement action (financial penalties), as well as practical and reputational risks to unwitting parties that process such payments. *See generally*, Winston & Strawn, LLP, Russia-Ukraine Conflict Increases Regulatory Risks for Sanctions Evasion Through Crypto-Based Transaction (Jul. 27, 2022), https://www.winston.com/en/global-trade-and-foreign-policy-insights/russiaukraine-conflict-increases-regulatory-risks-for-sanctions-evasion-through-crypto-based-transactions.html#!/closed_state.

[187] GBBC Report, *supra* note 186, at 8-9.

government,[188] some of which has already used the funds to help purchase military equipment.[189] This is an inspiring demonstration of how cryptocurrency enables people to easily engage in financial transactions, across borders at the speed of the worldwide web and serves as a powerful example of what this relatively new financial ecosystem can do. The possibilities for financial inclusion as the cryptocurrency space matures, seem to be boundless.

As highlighted in this Paper, these innovations are available to both good and bad actors. While those in favor of democracy and the sovereignty of countries, celebrate the Ukrainian government's successful fundraising initiative, the very real concerns, and incidences where cryptocurrency is being used by sanctioned entities and individuals in Russia to evade sanctions, continues to beckon an international regulatory response. As independent countries work to bolster existing agencies,[190] an international regulatory initiative, rooted in coordination, innovation, and modification of existing laws, are important next best steps on the journey to pay sheriff in the wild west of cryptocurrency.

[188] Magenzie Sigalos, *Ukraine has raised more than $54 million as bitcoin doations pour in to support the war against Russia*, CNBC (Mar. 24, 2022), https://www.cnbc.com/2022/03/03/ukraine-raises-54-million-as-bitcoin-donations-surge-amid-russian-war.html.
[189] Olga Kharif, *Ukraine Buys Military Gear With Donated Cryptocurrencies*, BLOOMBERG (Mar. 5, 2022 7:21 AM), https://www.bloomberg.com/news/articles/2022-03-04/ukraine-spends-15-million-of-crypto-donations-on-military-gear?sref=tHYYdqx0#xj4y7vzkg.
[190] See supra section on US regulation

MONEY FOR NOTHING?: CAN NFTS SOLVE MUSICIANS' MONETIZATION PROBLEM?

Dan Ankenman*

Abstract: Despite the immeasurable value music provides society, finding ways to monetize their music is often an elusive and challenging prospect for musicians. The music industry has evolved into a consolidated "hits market" in which profits are highly concentrated in a small set of intermediaries and relatively few superstars. This "hits market" not only makes it incredibly difficult for most musicians to make a living with their music, it also fails to capture and compensate musicians who aren't extremely popular for the significant value they create. In the face of this deadweight loss, non-fungible tokens (NFTs) could be a means of disrupting the economic status quo and creating a superior set of economic incentives for musicians. This Article is the first in the legal literature dedicated to evaluating the viability of NFTs as an additional income stream for musicians. After detailing the economics of the traditional music industry and providing a framework for understanding NFTs' asserted value, this Article considers constraints imposed by contractual obligations and copyright law to analyze NFTs' potential to transform music monetization. Ultimately, this Article concludes that, notwithstanding their limitations, NFTs are likely to be an important new source of revenue for musicians who have been left behind by the popularity-driven economic incentives of the traditional music industry.

Keywords: NFTs; Blockchain; Music Monetization; Copyright; Web3

* J. Reuben Clark Law School, Brigham Young University, United States.

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INTRODUCTION

In October 2007, British rock band Radiohead shocked the world by initially releasing their album *In Rainbows* through their website as a digital download available for the price of "whatever you want"—including nothing.[1] Radiohead's decision to offer their music to fans for free elicited praise from the likes of Bono and Jay-Z and scorn and disbelief from Oasis's Liam Gallagher and Kiss's Gene Simmons.[2] In the nearly fifteen years since the release of *In Rainbows*, the emergence of streaming services has proven prophetic David Bowie's prediction that "[m]usic itself is going to become like running water or electricity."[3] But another emerging technology makes Radiohead's experiment worth revisiting. Non-fungible tokens (NFTs) enable digital scarcity and facilitate new possibilities for artists to transact directly with their fans, offer fans ownership in digital assets, and invite fans to price assets themselves.

Despite their limitations, NFTs are likely to prove to be an important new source of revenue for musicians who can use them to create value for and capture value from their fans that the music industry has previously missed. The benefits of NFTs will be most pronounced for musicians who have been overlooked by the music industry's popularity-driven "hits market" as they take advantage of NFTs' potential for price tiering and community building to capitalize on their tremendous but historically underappreciated value. However, NFT enthusiasts should take care to note that contractual constraints and copyright law are likely to present barriers to NFTs' ability to transform music monetization. In navigating the application of contractual agreements and copyright law to NFTs, courts and practitioners would also do well to recognize that, though they are a transformative transactional technology, NFTs are distinct from the assets in which they represent ownership.

This Article proceeds in three Parts to examine music's current monetization possibilities and predict how NFTs may transform the landscape of music monetization. Part I analyzes the revenue streams, legal framework, and economic incentives that drive the music industry today to explain their impact on musician's monetization opportunities. Part II provides a framework for understanding NFTs and the new economic value many have placed in them by providing a background on the distributed ledger technology that enables NFTs and describing how NFTs derive and create value. Part III ties Parts I and II together by predicting what is likely to occur as the traditional music industry and NFTs collide and concludes that NFTs are poised to provide musicians with an additional income stream that will likely most benefit musicians who build strong communities around their NFTs and take advantage of NFTs' potential for granular price tiering to create and capture value the traditional music industry has previously missed.

I. MUSIC MONETIZATION IN THE TRADITIONAL MUSIC INDUSTRY

It has never been easy to make it in the music industry. Many musicians struggle to generate income from their music; even fewer attain enough stability to be able to make a living off their music alone. As Billy Joel explained the musician's plight, "I am the Entertainer. And I know just where I stand. . . . Today I am your champion. I may have won your hearts. But I know the

[1] Hilary Lewis, *Radiohead's Innovative Approach Paid Off...Or Did It?*, BUSINESS INSIDER (Oct. 15, 2008, 12:54 PM), https://www.businessinsider.com/2008/10/radiohead-s-innovative-approach-paid-off-or-did-it-.
[2] Craig McLean, *Caught in the Flash*, GUARDIAN, (Dec. 9, 2007), https://www.theguardian.com/music/2007/dec/09/popandrock.radiohead1.
[3] Jon Pareles, *David Bowie, 21st-Century Entrepreneur*, N.Y. TIMES (June 9, 2002), https://www.nytimes.com/2002/06/09/arts/david-bowie-21st-century-entrepreneur.html.

game, you'll forget my name. And I won't be here in another year if I don't stay on the charts."[4] Music is ubiquitous in society, and technological developments have made it easier than ever for artists to create, release, and distribute music. In addition, customers are constantly consuming music in myriad settings including streaming services, social media, films, television, videogames, and more.

Despite the ever-increasing availability of music and the endless demand for music, financial success remains elusive for most professional musicians.[5] In the words of acclaimed songwriter, record producer, and musician T Bone Burnett, "[i]n the digital marketplace, everyone seems to have found a way to make a living off music except the creators . . . ."[6] As a result of limited economic opportunities, musicians must be creative professionally as well as musically to forge their own financial fortunes through a diverse set of income streams that are not purely musical and include tasks many musicians do not find artistically fulfilling.[7] A 2018 survey of musicians in the United States found that the median musician made between $20,000 and $25,000 annually from between three and four different musical sources of income with sixty-one percent of respondents reporting that "their music-related income is not sufficient to meet their living expenses."[8] Additionally, the survey found that only two-thirds of the average musician's annual income came from music-related activities.[9]

Though the picture looks bleak for everyday musicians, the music industry's future appears bright. The recorded music industry has surpassed its 1999 peak after being rocked by the advent of the internet and the digital age.[10] According to the analysis of Spotify's former chief economist, Will Page, the global value of music copyright was $39.6 billion in 2021, an increase of eighteen percent from the year before, notwithstanding the impact of the coronavirus pandemic.[11]

While this data demonstrates that there is money in music, the music industry, like other creative industries, is fundamentally a "hits market" in which investors face a "low risk of extremely high returns and a high risk of a complete loss."[12] To mitigate the costs of the high probability of failure and maximize returns on infrequent successes, Professor Jonathan Barnett has noted that institutional intermediaries (record labels and publishers in the music industry) tend to dominate creative markets.[13] These intermediaries enjoy economies of scale, diversify risk by having large portfolios of creative works, and can generate income internally to "finance future creative productions at a lower cost relative to any source of external capital."[14]

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[4] BILLY JOEL, *The Entertainer*, *on* STREETLIFE SERENADE (Columbia Records 1974).
[5] *See* Li Jin, *The Creator Economy Needs a Middle Class*, HARV. BUS. REV., 2020 (Dec. 17, 2020), https://hbr.org/2020/12/the-creator-economy-needs-a-middle-class.
[6] T Bone Burnett, *Our Culture Loves Music. Too Bad Our Economy Doesn't Value It.*, WASH. POST (Dec. 18 2015), https://www.washingtonpost.com/posteverything/wp/2015/12/18/our-culture-loves-music-too-bad-our-economy-doesnt-value-it/.
[7] Liz Ansley, *Six Tips to Avoid a Life of Poverty as a Musician*, MUSIC INDUSTRY INSIDE OUT (Mar. 7, 2018), https://musicindustryinsideout.com.au/six-tips-avoid-poverty-musician/.
[8] MUSIC INDUSTRY RESEARCH ASSOCIATION, INAUGURAL MUSIC INDUSTRY RESEARCH ASSOCIATION (MIRA) SURVEY OF MUSICIANS, 1 (June 19, 2018), https://psrc.princeton.edu/sites/g/files/toruqf1971/files/resource-links/report_on_mira_musician_survey.pdf.
[9] *Id.* at 3.
[10] *U.S. Sales Database*, RIAA, https://www.riaa.com/u-s-sales-database/ (last visited May 3, 2023).
[11] Will Page, Global Value of Music Copyright Jumps 18% to a Record High of $39.6bn in 2021: Could it Have Been Even Higher?, TARZAN ECON. (Nov. 3, 2022), https://tarzaneconomics.com/undercurrents/music-copyright-2021.
[12] Jonathan M. Barnett, *Copyright Without Creators*, 9 REV. L & ECON. 389, 398–99 (2013).
[13] *Id.* at 401.
[14] *Id.* at 401–02.

Economic necessity has consequently caused the music industry to evolve into a consolidated market in which record labels and publishers assume the brunt of the risk of product failure but reciprocally capture a sizable portion of the value music generates. Because labels and publishers only profit on the exceptional instances in which an artist or songwriter is commercially successful (and thereby face notable uncertainty when signing unproven artists or songwriters), they must be able to capitalize on this success when it occurs. This is primarily accomplished through copyright law. Accordingly, music copyright and these intermediaries are deeply interconnected as each has shaped the development of the other. A basic knowledge of these intermediaries and a basic knowledge of music copyright thus go hand in hand and are essential for understanding how music can be monetized. This Part describes how musicians and intermediaries monetize copyrights in songs and recordings, gives a brief synopsis of musicians' income from sources other than copyright, and finishes with a summary of how musicians' dependence on different sources of revenue may shift over time.

A. Copyright as a Monetization Tool

In the United States, copyright protection extends to "original works of authorship fixed in any tangible medium of expression."[15] Music copyright presents special complexity because music generally implicates two separate categories of works of authorship identified by the Copyright Act: (1) "musical works" and (2) "sound recordings."[16] Thus, there are separate copyrights in an underlying musical work or song, commonly referred to as the "publishing" rights, and the copyright in a sound recording, or "master."[17] For example, the copyright in the underlying musical work of Bob Dylan's "Make You Feel My Love" is separate from the copyright in Dylan's recording of the song. Recordings of the song by artists such as Adele, Garth Brooks, Billy Joel, and Timothy B. Schmidt each carry their own master use rights, but each implicates the same publishing rights in one underlying musical work.

Copyright holders enjoy a bundle of exclusive rights that include the rights to reproduce, adapt, distribute, publicly perform, and publicly display their copyrighted works.[18] Publishing rights and master use rights are rights in distinct works of authorship in the eyes of copyright law and often have different copyright holders.[19] Consequently, publishing and master use rights have discrete entitlements and monetization opportunities in addition to uses that require permission from and compensation to both the controllers of the publishing rights and the master use rights.[20]

1. Master Monetization

There are a variety of ways in which rights in recordings may be monetized. The exclusive rights pertinent to copyright in masters are the rights to reproduce, adapt, distribute, and publicly perform the sound recording by means of a digital audio transmission.[21] The largest players in the monetization of these recordings are record labels. Three major labels dominate the recorded music industry. As of 2020, Universal Music Group had a thirty-two percent market share; Sony Music Entertainment had a twenty-one percent market share; and

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[15] 17 U.S.C. § 102(a).
[16] *Id.*
[17] KRISTELIA GARCIA, CONTRACTS AND COPYRIGHT: CONTEMPORARY MUSICIAN INCOME STREAMS, OXFORD HANDBOOK OF MUSIC L. & POL'Y 3 (Sean M. O'Connor ed. 2020).
[18] 17 U.S.C. § 106.
[19] GARCIA, *supra* note 19, at 3.
[20] *Id.* at 3–4.
[21] 17 U.S.C. § 106.

Warner Chappell Music had a sixteen percent market share in the recorded music industry.[22] Other "independent" labels frequently partner with one of these major labels for at least some functions, such as distribution and promotion, though there are some labels that are "true independents" and do not rely on major labels for these functions.[23] The following Subsections explore the fundamental bargain labels strike with artists, including an explanation of how each provides value to the other, and summarize the revenues that masters produce for labels and artists.

a. Labels' Bargain with Artists

Notwithstanding the dramatic changes the recording industry has undergone in the digital age, most artists still seek to partner with record labels to produce and commercialize their recordings. Historically, it was cost prohibitive for an artist to record, produce, mix, promote, distribute, and monetize recordings of their music without the financial support, infrastructure, and expertise of a record label.[24] But technological progress has made recording technology and distribution channels far more accessible. For instance, Billie Eilish and her brother and producer Finneas famously recorded Eilish's multi-Grammy-winning album *When We All Fall Asleep, Where Do We Go?* in a bedroom studio set up estimated to cost around $3,000.[25] In addition to advancements in recording technology, the internet has completely reshaped music promotion and distribution as streaming platforms and social media have overtaken traditional music distribution and advertising channels.

While some question the need for labels at all in today's music world, record labels have reinvented themselves and remain incredibly powerful and influential.[26] Indeed, the International Federation of the Phonographic Industry contends: "In today's dynamic global music ecosystem, the role of the record label as the leading investor in music and partner and collaborator with artists has never been more important."[27] Modern labels perform a wide variety of functions such as identifying talent, sculpting artists' public images, funding and overseeing recording projects, distributing recordings, promoting recordings, managing artist catalogs, and collecting royalties on behalf of artists.[28] Independent artists must fulfill these functions themselves and may not have the interest, expertise, or time to perform all of them. Many artists (including Eilish, who is with Universal's Interscope Records)[29] still find tremendous value in partnering with major labels. In addition to deep pockets, labels have a wealth of connections, experience, and staff that remain important for artists, especially those seeking to reach a large audience.[30]

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[22] Dylan Smith, *What Are the Biggest Record Labels? Here's a Quick Rundown*, DIGITAL MUSIC NEWS (June 18, 2021), https://www.digitalmusicnews.com/2021/06/18/biggest-record-labels-of-2021/.
[23] DONALD S. PASSMAN, ALL YOU NEED TO KNOW ABOUT THE MUSIC BUSINESS 72–73 (10th ed. 2019).
[24] *Id.* 1t 75.
[25] Ashley King, *Billie Eilish's Bedroom Studio Costs Less Than $3,000—What's Your Excuse?*, DIGITAL MUSIC NEWS (Jan. 30, 2020), https://www.digitalmusicnews.com/2020/01/30/billie-eilish-bedroom-studio/.
[26] LARRY S. MILLER, SAME HEART. NEW BEAT. HOW RECORD LABELS AMPLIFY TALENT IN THE MODERN MUSIC MARKETPLACE, MUSONOMICS 7, https://s3.amazonaws.com/cache.transmissionmedia.com/musonomics/MusonomicsModernLabelReport.pdf.
[27] *Record Companies: Powering the Music Ecosystem*, IFPI, https://powering-the-music-ecosystem.ifpi.org/ (last visited May 3, 2023).
[28] *Id.*
[29] *Billie Eilish*, INTERSCOPE RECORDS, https://www.interscope.com/artist/billie-eilish/#/ (last visited May 3, 2023).
[30] PASSMAN, *supra* note 25, at 77.

Although the terms of recording contracts vary widely, labels are not willing to perform these functions for free. Labels typically require that artists assign them the copyrights to their recordings in exchange for financing the recording process and the other services labels perform.[31] Though the Copyright Act provides a statutory process for terminating copyright assignments,[32] labels likely capture the vast majority of value generated by masters before the termination window begins as the economic value of sound recordings, including "blockbuster" records, tends to decline sharply within a year after its release.[33] Still, the specter of termination rights may empower artists with greater leverage to renegotiate more favorable terms,[34] while other artists may choose to recapture the rights in their masters to regain control or to assign the rights to someone else. Recording contracts also almost always contain exclusivity provisions[35] and restrictions on the artist's right to re-record songs recorded during the term of the contract.[36]

In return for these concessions, artists receive a portion of royalties generated by their masters. However, before artists receive any royalties, the artists' share of the masters must first generate enough revenue to recoup any advance artists received from the label.[37] Labels pay artists advances to cover the costs of producing recordings.[38] Artists are not be required to repay labels directly for advances, but artists will not receive any royalties from their masters until the label has recouped its costs.[39] Because advances may be substantial, records often do not generate enough revenue to recoup the advance.[40] This means that many artists, including those signed to major labels, do not receive any royalties from their recordings.[41]

Because labels do not recoup their investments in most artists, they must capitalize on revenue from the relatively few artists who defy the odds and are profitable by requiring artists to assign their rights in their recordings and taking a majority of the revenue generated by the recordings.[42] While this model enables labels to take a chance on unproven artists, all artists receive a lower share of revenues from their recordings as a result. Though established artists may be able to secure more favorable terms,[43] successful artists may feel undercompensated as much of the revenue they generate is used to finance the label and other artists. But that is the

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[31] *Id.* at 198.
[32] Assignments made on or after January 1, 1978, may be terminated within a five-year window that begins thirty-five years after the date of assignment, 17 U.S.C. § 203, while assignments made before January 1, 1978 may be terminated within a five-year window beginning on the later of fifty-six years after the assignment or January 1, 1978, *Id.* § 304(3).
[33] Kristelia García, James Hicks & Justin McCrary, *Copyright and Economic Viability: Evidence from the Music Industry*, 17 J. EMPIRICAL L. STUD. 704–09 (2020) (finding that average album sales decline to five percent of "their initial peak only months after release and are negligible beyond the first year;" *Id.* at 704, that average track sales fall to twenty percent of "their initial peak after one year of release" and thereafter "slowly decline[] to a negligible volume;" *Id.* at 705, that streaming declines "more gently," with albums falling to about twenty-five percent of their initial peak after one year, before later "flatten[ing] out" at slightly under twenty percent of its initial peak; *Id.* at 706–07, and that "declines are remarkable similar" for "blockbuster recordings, *Id.* at 709.
[34] Kike Aluko, *Terminating the Struggle over Termination Rights*, 10 HARV. J. SPORTS & ENT. L. 119, 123 (2019).
[35] PASSMAN, *supra* note 25, at 166–69.
[36] *Id.* at 170.
[37] GARCIA, *supra* note 19, at 3–4.
[38] *Id.*
[39] PASSMAN, *supra* note 25, at 85–87.
[40] Mark Tavern, *An Artist's Guide to Royalties, Recoupment & Cross-Collateralization*, MARK TAVERN MGMT., (Aug. 1, 2022), https://www.marktavern.com/blog/2020/8/1/an-artists-guide-to-royalties-recoupment-amp-cross-collateralization.
[41] *Id.*
[42] *See* Barnett, *supra* note 14, at 405.
[43] PASSMAN, *supra* note 25, at 91–92.

nature of a "hits market" like the music industry where labels do not profit at all from the vast majority of artists and survive off of revenue from the rare artists who are profitable.[44]

b. Master Revenue Streams

Having established their respective rights, labels and artists are positioned to monetize their recordings. Masters generate revenue through royalties received from physical sales and streaming, royalties from digital radio transmission from services like Pandora and SiriusXM,[45] and synchronization license fees.[46] Because streaming is by far the most important of these, this Article focuses on that source of revenue.

Streaming revenue alone accounted for eighty-four percent of revenue for the recorded music industry in 2022.[47] Despite the significant revenue generated by streaming, most artists do not receive meaningful royalties from streaming of their recordings. Though per-stream numbers can be calculated retroactively, Spotify, like other streaming services, pays artists on a pro-rata—not a per-stream—basis.[48] This means that streaming services distribute a portion of revenue from a given period, typically around two-thirds of revenue per month, to record labels based on the "streamshare" associated with each label in that period.[49] The labels subsequently distribute royalties to artists based on their contractual terms. This prorated system distributes streaming revenue according to the relative share of streams an artist has and not by their absolute number of streams. While the number of artists generating significant income from streaming services is growing,[50] streaming revenue is nonetheless concentrated in a relatively small number of highly successful artists.[51] And because three major labels dominate the market, the major labels receive revenue from streams of known and unknown artists while revenues from streaming royalties are profoundly uneven for artists.

The prorated nature of streaming stands in stark contrast to the traditional model of physical sales (as well as digital downloads) in which artists received a fixed royalty per unit sold, regardless of how many times that unit was used. Streaming, on the other hand, rewards repeated and widespread use instead of sale of a particular good. While consumers benefit greatly from the convenience of accessing millions of songs an unlimited number of times for a fixed rate, this new model comes at a cost to artists who have a hard time competing in an increasingly congested market that rewards artists solely on their ability to break through the noise and become popular. No matter how ardently a small group of fans listens, today's model requires far more than a cult following to produce meaningful streaming revenues. But for labels and artists with substantial streamshares, streaming royalties make copyright in recordings highly profitable.

2. Monetizing Publishing Rights

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[44] Barnett, *supra* note 14, at 398–99.
[45] *See* PASSMAN, *supra* note 25, at 314–15; *Digital Performance Royalties: The Basics*, SOUNDEXCHANGE, https://www.soundexchange.com/digital-performance-royalties/ (last visited May 3, 2023).
[46] For a brief synopsis of synchronization licensing, see *infra* Section I.A.2.C.
[47] Joshua P. Friedlander & Matthew Bass, YEAR-END 2022 RIAA REVENUE STATISTICS, RIAA 1 (Mar. 2023), https://www.riaa.com/wp-content/uploads/2023/03/2022-Year-End-Music-Industry-Revenue-Report.pdf.
[48] *Spotify and the Streaming Economy*, LOUD & CLEAR, https://loudandclear.byspotify.com/ (last visited May 3, 2023).
[49] *Id.*
[50] *Id.*
[51] Tim Ingham, *Spotify Dreams of Artists Making a Living. It Probably Won't Come True*, ROLLING STONE (Aug. 3, 2020), https://www.rollingstone.com/pro/features/spotify-million-artists-royalties-1038408/.

The second class of copyrighted works relevant to the music industry is the right in an underlying musical work, or the publishing right. Publishing rights generate revenue through the exclusive rights to publicly perform, adapt, and reproduce the work.[52] Songwriters often choose to assign copyright in their songs to entities called publishers who handle the administration of the copyright in exchange for a share of monies generated by the song.[53] Publishers work to promote and place songs, match songwriters with each other, collect royalties, and otherwise handle the administration of a song's copyright.[54] Universal, Sony, and Warner Chappell all have publishing arms, but the publishing market is much less concentrated than the recorded music market. Publishing companies are also generally organizationally simpler than record labels and do not require as much staff or financing to get off the ground. Though songwriters may also choose to self-publish, assigning copyright to a publisher allows a songwriter to focus on writing music instead of handling the administration and monetization of their copyrights alone.

The share of royalties that a songwriter receives is referred to as the "writer's share" while the portion received by the publisher is called, unsurprisingly, the "publisher's share."[55] If a song has more than one writer, each writer may have a different publisher. The number of writers and publishers with an interest in a musical work can consequently grow large very quickly, especially in today's world where songs frequently have many writers. Although compensation for publishing rights takes multiple forms, the most important revenue streams for songwriters and publishers are public performance royalties, mechanical license royalties, and synchronization license fees.[56]

a. Public Performances

Public performance royalties are the most significant source of income songwriters receive from the rights in their songs. Copyright holders have the exclusive right to publicly perform their works.[57] The Copyright Act's broad definition that "to 'perform' a work means to recite, render, play, dance, or act it, either directly or by means of any device or process . . ." encompasses a wide range of activities.[58] The Act's definition of a "public" performance tempers this slightly but is nonetheless expansive:

> To perform . . . a work "publicly" means—
>
> **(1)** to perform . . . at a place open to the public or at any place where a substantial number of persons outside of a normal circle of a family and its social acquaintances is gathered; or
>
> **(2)** to transmit or otherwise communicate a performance . . . of the work to a place specified by clause (1) or to the public, by means of any device or process, whether the members of the public capable of receiving the performance or display

[52] 17 U.S.C. § 106.
[53] PASSMAN, *supra* note 25, at 220–25.
[54] *Id.*
[55] *Id.* at 222.
[56] *Id.* at 225
[57] 17 U.S.C. § 106(4).
[58] *Id.* at § 101.

receive it in the same place or in separate places and at the same time or at different times.[59]

Public performances of music are thus ubiquitous, occurring not only at formal events like concerts but also online, on television, on the radio, in stores, in schools, and in social gatherings.

Because it is impracticable for songwriters and publishers to monitor and grant permissions for all public performances and collect these royalties themselves, Performing Rights Organizations (PROs) were formed to keep track of public performances, collect public performance royalties, and distribute these royalties to songwriters and publishers. In the United States, the primary PROs are the American Society of Composers, Authors and Publishers (ASCAP); Broadcast Music, Inc. (BMI); SESAC (formerly the Society of European Stage Authors and Composers); and Global Music Rights (GMR). Rather than require a license for each individual song in a PRO's catalogue, PROs offer blanket licenses that cover every song in their catalogues. ASCAP and BMI are the oldest and most dominant PROs and allow any songwriter to affiliate with them. Due to their concentrated control of performance rights, ASCAP and BMI have their prices governed by consent decrees set by the Southern District of New York and cannot refuse to grant blanket licenses.[60] In contrast, songwriters must be invited to join SESAC and GMR, who both charge higher prices based on their narrow focus on promoting elite catalogues. Songwriters may only affiliate with one PRO at once while major publishers generally have arrangements with all of the major PROs.[61] As a result, SESAC and GMR have more limited catalogues but generally charge higher prices based on the high caliber of writers affiliated with them (SESAC has artists like Bob Dylan, Adele, and David Crosby[62] while GMR, whose catalogue is much smaller, represents artists like Bruno Mars, Leon Bridges, and Bruce Springsteen).[63]

b. Mechanical Royalties

The second major source of revenue for songwriters and publishers is mechanical royalties. Mechanical royalties are a share of royalties record labels pay to use a song in a recording. Because a recording of a song is a derivative work and copyright holders of songs have the exclusive right to create derivative works, a mechanical license is necessary to reproduce and distribute a musical work as a recording.[64] Congress established compulsory mechanical licenses to prevent monopolistic abuse by publishing rights holders, though parties may also reach voluntary agreements.[65] Calculating royalties is much simpler for physical record sales and digital downloads than for streaming activity because mechanical royalties are

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[59] *Id.*

[60] *See Antitrust Consent Decree Review – ASCAP and BMI 2019*, U.S. DEP'T JUST., https://www.justice.gov/atr/antitrust-consent-decree-review-ascap-and-bmi-2019 (last visited May 3, 2023). Songwriters and publishers argue that they are undercompensated in part because of the consent decrees. The Music Modernization Act sought to remedy some of the problems by moving to a "willing buyer/willing seller" review to model arm's length negotiations and alternating consent decree reviews between judges in the Southern District of New York instead of assigning all reviews to a single judge.

[61] PASSMAN, *supra* note 25, at 226–31.

[62] SESAC Inc, *SESAC Celebrates Songwriters and Publishers with 2021 Nashville Music Awards*, PR NEWSWIRE (Nov. 16, 2021), https://www.prnewswire.com/news-releases/sesac-celebrates-songwriters-and-publishers-with-2021-nashville-music-awards-301425938.html.

[63] *We Represent the Greatest & Your Favorite Music Creators*, GLOBAL MUSIC RIGHTS https://globalmusicrights.com/catalog (last visited May 3, 2023).

[64] BOB KOHN, KOHN ON MUSIC LICENSING 683–84 (5th ed. 2019).

[65] *Id.* at 700–01; 17 U.S.C. § 115.

set at a fixed rate for each unit sold. In the United States, the Harry Fox Agency is often enlisted by publishers to issue and enforce mechanical licenses and collect royalties, in exchange for a share of monies collected.[66]

In recent years, streaming services have greatly complicated the mechanical royalty landscape. One of the primary objectives of the Music Modernization Act, enacted in 2018, was to update the mechanical royalty infrastructure in light of the transformative effect of streaming services on music distribution.[67] Songwriters and publishers had brought infringement suits against streaming services that frequently failed to obtain mechanical licenses for songs and pay royalties and often had not even identified the rightsholders to songs.[68] To better ensure that songwriters and publishers received compensation and evade pending legal peril for streaming companies, Congress created the Mechanical Licensing Collective (MLC) to facilitate the payment of mechanical royalties to songwriters and publishers from streaming services.[69] The MLC established a publicly available database where rightsholders can register their shares in songs.[70] The MLC distributes royalties based on works registered on the site. If a song or a portion of the publishing rights remains unclaimed, the MLC is authorized to distribute unmatched royalties to songwriters and publishers on a market share basis after holding the royalties for three years.[71]

c. Synchronization Licensing

Finally, publishers and songwriters often license their songs to be synchronized with audiovisual works (such as films, televisions programs, music videos, and social media posts) in exchange for a fee. These licenses are referred to as synchronization or synch licenses. If the licensee is not using an original recording, they also need to receive permission from the label or whoever controls the master to obtain a synch license. There are no compulsory licenses for audiovisual works, so synchronization licenses always need to be negotiated. Licensing fees can be impacted by numerous factors including the value of a song, the importance of the song for its intended use, the scope of the intended use, co-publishing or songwriting agreements, and the budget of a project.[72] Together, these three revenue streams make up the most important sources of revenues for publishers and songwriters from copyrights in songs.

B. Other Major Sources of Musicians' Income

While music copyright is worth more than ever before,[73] musicians are venturing more and more into income streams outside of music, such as television appearances, clothing lines, and sponsorships.[74] Not wanting to be left out, record labels have increasingly inserted

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[66] PASSMAN, *supra* note 25, at 231–32.
[67] *See Id.* at 239–41.
[68] *Id.*
[69] *Id.*
[70] *The MLC Public Work Search*, MECHANICAL LICENSING COLLECTIVE, https://portal.themlc.com/search (last visited May 3, 2023).
[71] *See* 17 U.S.C. § 115(d)(3)(H)(i); *Historical Unmatched Royalties*, MECHANICAL LICENSING COLLECTIVE, https://www.themlc.com/historical-unmatched-royalties (last visited May 3, 2023).
[72] KOHN, *supra* note 66, at 484–94.
[73] *See* Will Page & Shannon Nitroy, *Global Value of Music Copyright is Bigger Now Than It's Ever Been*, TARZAN ECON. (Mar. 30, 2022), https://tarzaneconomics.com/undercurrents/copyright-2001-2020.
[74] *See* Neil Shah, *From Rihanna to Kanye West: Why Music's Biggest Stars Aren't Focused on Actual Music*, WALL ST. J. (July 22, 2020, 9:00 PM), https://www.wsj.com/articles/from-rihanna-to-kanye-west-why-musics-biggest-stars-arent-focused-on-actual-music-11595466000.

themselves into these revenue streams through the emergence of "360 deals."[75] In a 360 deal, labels receive not only a portion of revenue generated by recordings, but also revenue from touring, sponsorships, songwriting royalties, television appearances, and potentially any income artists generate. Labels justify receiving shares of these income streams by asserting that, in today's music industry, they do not just make records but build artists' brands and deserve a piece of all revenue created by the brands they build.[76] Superstar artist brands have economic value far beyond musical activities. According to reporting by Neil Shah, music executives estimate that "[r]oughly 20% to 50% of a typical superstar's income now comes from revenue unrelated to music activities."[77] Terms vary based on the respective bargaining power of artists and labels, but these arrangements underscore the powerful positions of record labels today and their unwillingness to undertake risk in an uncertain market without ensuring a piece of any reward of that risk.

The internet has created other new revenue streams for musicians through services like YouTube, TikTok, Patreon, Twitch, and Instagram.[78] YouTube, TikTok, and Instagram all generate the bulk of their revenue from advertising. As a result, creators are compensated based on how much their content exposes users to ads. Patreon derives its inspiration from patrons of the arts who sponsored artists prior to the commoditization of art and allows creators to charge a monthly fee to users in exchange for access to exclusive content or access to the creator. Twitch is a livestreaming service that allows artists and fans to interact and also allows creators to collect subscription fees and tips from fans in addition to revenue available from advertisements. All these services require creators to satisfy criteria, such as having a certain number of followers, before they can monetize their content. In addition, these new content forms have illustrated the interactive relationship between technology and creativity in incentivizing or even constraining creators to make certain types of content to succeed on the platform.[79] Each of these forums enables creators to build a community of followers and interact with them and to receive compensation from the platform in exchange for the activity, and resulting user data, they produce for the website. Though these platforms have established a new source of income for creators, it remains the case that, as with traditional income streams for musicians, "wealth is concentrated at the top."[80]

C. Overall Picture for Musicians

As noted, musicians often rely on a diverse set of income streams, many of which may not be directly related to copyright royalties and intermediaries. Though touring revenue steeply declined in 2020 as a result of the Coronavirus pandemic, a trend many are hopeful has passed,[81] it was historically a critical aspect of musicians' income with global touring revenues peaking in 2019 at $5.55 billion.[82] Other important revenue streams include sponsorships and social media, as discussed in Part I.B above. Still, 360 deals in many cases give labels a piece

[75] *See* PASSMAN, *supra* note 25, at 102–07.
[76] *Id.* at 102.
[77] Shah, *supra* note 76.
[78] Jin, *supra* note 5.
[79] *See* Rex Woodbury, *The Two-Way Mirror of Art and Technology*, DIGITAL NATIVE (Apr. 21, 2021), https://digitalnative.substack.com/p/the-two-way-mirror-of-art-and-technology.
[80] Jin, *supra* note 5; *see also* Herbert Lui, *YouTube and Patreon Still Aren't Paying the Rent for Most Creatives*, MARKER (Mar. 21, 2021), https://marker.medium.com/if-you-cant-afford-to-do-it-for-free-don-t-be-a-creator-569488f3ef72.
[81] Dan Gallagher, *Music Needs to Get the Show Back on the Road*, WALL ST. J., Feb. 28, 2022, https://www.wsj.com/articles/music-needs-to-get-the-show-back-on-the-road-11646049780.
[82] Marie Charlotte Götting, Global Music Tour Revenues 2011-2020, STATISTA, Nov. 9, 2021, https://www.statista.com/statistics/380120/global-music-tour-gross-revenues/.

of these income streams. Moreover, the importance of particular revenue streams may depend on the stage of an artist's career. Following a qualitative survey of artists at various stages of their careers, Professor Kristelia Garcia concluded that copyright-related income streams—stemming from recording, publishing, and synch—appeared to be most important at the beginning of an artist's career when the artist receives an advance and toward the end of a successful artist's career when artists may reclaim their masters.[83] Touring and other income unrelated to copyright thus seems to correspondingly make up the largest portion of income in the middle stages of an artist's career.[84]

This explanation of strategies for monetizing music highlights both the complexity of the music industry and the copyright law that drives it as well as the music industry's nature as a "hits market" in which there is typically little room between fame and fortune and poverty and obscurity. Although music that does not top the charts may still have great artistic value, the current model does not offer such music meaningful economic viability. A possible technological solution has recently emerged: non-fungible tokens (NFTs) enabled by distributed ledger technology (DLT).

II. NFTS AND DISTRIBUTED LEDGER TECHNOLOGY

An NFT is a record of a "unique digital asset whose ownership is tracked on a blockchain . . . ."[85] In 2021, NFTs crawled out of the woodwork to amass a trading volume of roughly $21.5 billion that year.[86] The NFT market has since cooled down considerably, but NFTs accumulated approximately $24.7 billion in sales in 2022 despite steep declines in the NFT market and crypto assets generally later in the year.[87] Although NFTs have been especially popular in art and media, they are a transactional technology that can be used to represent any unique digital asset. While NFTs and other blockchain-based technologies have garnered significant public attention, and some are unabashedly "bullish" about how they may revolutionize practically every aspect of life,[88] NFTs and blockchain technology remain little understood by many. For example, it is easy to conflate an NFT with the asset whose ownership it represents. But NFTs only authenticate ownership; "an NFT is not the thing it represents."[89]

Fueling the rise of NFTs is a broader belief in a digital evolution to a "decentralized internet run on crypto tokens" known as "Web3."[90] Fed up with "giant tech gatekeepers profiting off everyone's creativity and data,"[91] believers posit that—powered by DLT systems—Web3 will decentralize and democratize everything on the internet and enable users

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[83] GARCIA, *supra* note 19, at 17.
[84] *Id.*
[85] Linda Xie, *A Beginner's Guide to NFTs*, MIRROR, Jan. 4, 2021, https://linda.mirror.xyz/df649d61efb92c910464a4e74ae213c4cab150b9cbcc4b7fb6090fc77881a95d.
[86] The Rise of NFTs, CRYPTOSLATE (Jan. 14 2022, 3:30 PM), https://cryptoslate.com/the-rise-of-nfts-footprint-analytics-annual-report-2021/.
[87] Andrew Hayward, *NFT Sales in 2022 Nearly Matched the 2021 Boom, Despite Market Crash*, DECRYPT (Jan. 4, 2023), https://decrypt.co/118438/2022-versus-2021-nft-sales.
[88] Andrew Steinwold, *Crypto Will Change Value, NFTs Will Change Society*, SUBSTACK (Jul. 19, 2020), https://andrewsteinwold.substack.com/p/crypto-will-change-value-nfts-will.
[89] What is an NFT?, ECONOMIST (Oct. 15, 2021), https://www.economist.com/the-economist-explains/2021/10/12/what-is-an-nft.
[90] Ephrat Livni, *Welcome to 'Web3.' What's That?*, N.Y. TIMES (Dec. 5, 2021), https://www.nytimes.com/2021/12/05/business/dealbook/what-is-web3.html.
[91] Ephrat Livni & Eric Lipton, *How Venture Capitalists Think Cryptocurrency Will Reshape Commerce*, N.Y. TIMES (Nov. 2, 2021), https://www.nytimes.com/2021/10/29/us/politics/crypto-currency-venture-capitalists.html.

to steal back control of the internet from overgrown intermediaries.[92] Yet, as part of a movement predicated on disintermediation and decentralization, terms like blockchain technology, NFTs, and cryptocurrency have in many ways become "meaningless buzzwords."[93] Lacking a "genuine and universal definition," they leave many, both expert and novice, confused and with "unrealistic expectations."[94] Still, an attempt at a basic conceptual framework for the technological ecosystem NFTs inhabit is necessary to analyze their potential utility and economic value. To lay the groundwork for analyzing how NFTs could revolutionize the monetization of music, this Part provides an overview of the DLT systems that enable NFTs, explains what NFTs are and what makes them valuable, and concludes with a summary of common critiques of DLT systems and NFTs and typical responses NFT enthusiasts give to these criticisms.

A. What is Distributed Ledger Technology?

Cryptocurrencies, blockchains, and NFTs are all built around DLT systems. Although the phrases "DLT system" and "blockchain technology" are frequently used interchangeably, blockchain technology may be thought of as a type of DLT system "that uses a particular data structure consisting of a chain of hash-linked blocks of data."[95] DLT systems take many forms but are fundamentally "a system of electronic records that enables independent entities to establish a consensus around a shared 'ledger'—without relying on a central coordinator to provide the authoritative version of the records."[96] One group of scholars proposes that a true DLT system is a system of electronic records with five elements: (1) a consensus mechanism; (2) an "authoritative ordering of cryptographically-validated ('signed') transactions" resulting from the consensus mechanism; (3) transactions must be recorded and "made persistent" by replicating the data across a network of computers, each a "node;" (4) transactions must be linked by cryptographic hashes to make them "tamper-evident;" and (5) a shared authoritative record of the results of the consensus process—the "ledger."[97] These interconnected characteristics of DLT systems may be best understood by illustrating them through an example: the Bitcoin blockchain.

In 2009, the pseudonymous Satoshi Nakamoto created the first cryptocurrency: Bitcoin.[98] Arguing that reliance on third parties to transact and communicate over the internet raises transaction costs and leads to the ever-present specter of reversed transactions, Nakamoto proclaimed the need for "an electronic payment system based on cryptographic proof instead of trust . . . ."[99] This substitution of cryptographic proof for trust is accomplished through a DLT system based on blockchain technology that provides a decentralized and publicly available record of all transactions. Bitcoin can be created in two ways: (1) by

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[92] *See* Livni, *supra* note 92; Livni & Lipton, *supra* note 93.
[93] Michel Rauchs, Andrew Glidden, Brian Gordon, Gina Pieters, Martino Recanatini, François Rostand, Kathryn Vagneur & Bryan Zhang, DISTRIBUTED LEDGER TECHNOLOGY SYSTEMS: A CONCEPTUAL FRAMEWORK, CAMBRIDGE CENTRE FOR ALTERNATIVE FINANCE (Aug. 2018) 92, https://www.ssrn.com/abstract=3230013 [hereinafter DISTRIBUTED LEDGER TECHNOLOGY SYSTEMS].
[94] *Id.* at 20.
[95] *Id.* at 15.
[96] *Id.* at 23.
[97] *Id.*
[98] Satoshi Nakamoto, *Bitcoin: A Peer-to-Peer Electronic Cash System*, BITCOIN (2009), https://bitcoin.org/bitcoin.pdf.
[99] *Id.* at 1.

someone purchasing Bitcoin and (2) by someone "mining" Bitcoin. But Bitcoin's source code caps the eventual supply of Bitcoin at twenty-one million.[100]

"Mining" is the consensus mechanism employed by Bitcoin to verify the authenticity of transactions. Miners verify transactions on the blockchain proposed by users by solving "cryptographic proof of work problems."[101] These problems require an intense amount of computing power as, through trial and error, miners solve a hash function to verify transactions and add blocks to the chain.[102] In other words, miners provide the cryptographic proof upon which Bitcoin is premised. These hash problems are described as "proof of work" because their complexity dictates that someone could only find a solution by putting in the work.[103] The solutions to hash functions (1) have a predetermined length (64 characters for Bitcoin, which uses the SHA-256 algorithm), (2) cannot be solved in reverse, and (3) are changed dramatically even by only slight changes in the input.[104] Miners compete to be the first to solve these cryptographic hash functions and are rewarded with Bitcoin if they are the first to solve a problem and verify a transaction. The ledger is not held in any centralized server or source but is shared across the network of computers of Bitcoin miners.[105] Additionally, the ledger builds upon itself and relies upon the history of past transactions to authenticate new transactions.[106] Because each Bitcoin's full history is recorded on the ledger, and new transactions are predicated on approval through the "proof of work" consensus mechanism, it is virtually impossible to double spend Bitcoin or reverse Bitcoin transactions.[107] All of this is accomplished through reliance on cryptography and computer code rather than trust in third-party intermediaries.

Many other cryptocurrencies have been developed since Bitcoin, and these newer currencies use a variety of approaches to engineering a DLT system. The Ethereum blockchain is second only to Bitcoin in its current economic value. Ethereum was developed to be a highly customizable "blockchain with a built-in . . . programming language" and uses self-executing "smart contracts" to give users the power to create their own systems and use cases.[108] Eventually, programmers devised the ERC-721 standard to allow non-fungible assets to be recorded and exchanged using the Ethereum blockchain.[109] The smart contracts Ethereum employs are not conventional legal contracts but rather "computerized transaction protocols" that are self-executing and "minimize the need for trusted intermediaries."[110] A sort of "digital vending machine," smart contracts guarantee specified output if given the right input.[111]

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[100] David Canellis, *Here's Why Satoshi Nakamoto Set Bitcoin's Supply Limit to 21 Million*, NEXT WEB (Jul. 8, 2019, 12:42 PM), https://thenextweb.com/news/heres-why-satoshi-nakamoto-set-bitcoin-supply-limit-to-21-million.
[101] Ritchie S. King, David Yanofsky & Sam Williams, *By Reading this Page, You Are Mining Bitcoins*, QUARTZ, (Dec. 17, 2013), https://qz.com/154877/by-reading-this-page-you-are-mining-bitcoins/.
[102] *Id.*
[103] *Id.*
[104] *Id.*
[105] *Id.*
[106] *Id.*
[107] *Id.*
[108] Vitalik Buterin, *Ethereum Whitepaper*, ETHEREUM.ORG (May 1, 2023), https://ethereum.org/en/whitepaper/.
[109] *ERC-721 Non-Fungible Token Standard*, ETHEREUM.ORG (Apr. 7, 2023), https://ethereum.org/en/developers/docs/standards/tokens/erc-721/.
[110] Nick Szabo, Smart Contracts (1994), https://www.fon.hum.uva.nl/rob/Courses/InformationInSpeech/CDROM/Literature/LOTwinterschool2006/szabo.best.vwh.net/smart.contracts.html.
[111] *See Introduction to Smart Contracts*, ETHEREUM.ORG (Apr. 11, 2022), https://ethereum.org/en/developers/docs/smart-contracts/.

Programmers can code smart contracts to execute virtually any transaction, including royalty payments.[112]

B. What is an NFT?

Like fungible cryptocurrencies such as Bitcoin and Ethereum's "Eth," NFTs are built upon DLT systems. But unlike Bitcoin or Eth, NFTs represent "non-fungible" digital assets. Fungible assets are "[c]ommercially interchangeable with other property of the same kind."[113] For example, dollar bills are generally interchangeable with each other as are cobs of corn. In contrast, assets like art or land are typically not commercially interchangeable—each piece of art or land is seen as unique and could not be substituted for another. Though some insist that the term NFT can only accurately describe a token that represents ownership in a completely unique good, fungibility can be both "relative" and "subjective."[114] Furthermore, the decentralized nature of the blockchain means that there is no single authority on what criteria a good must satisfy to be an NFT. As such, NFTs are used to represent assets that are truly one-of-a-kind as well as assets that are limited in supply. Although the digital assets NFTs represent may easily be duplicated, the decentralized ledger enabled by blockchain technology purports to make ownership of the assets scarce and verifiable.

1. What Makes NFTs Valuable?

Because many of the assets NFTs represent ownership in can be easily duplicated and shared, many find it difficult to see what utility or value there is in an NFT. NFTs connect ownership of non-fungible assets to an ostensibly immutable[115] and publicly available record on the blockchain. But, as with fiat money and cryptocurrencies, this link only has value to the extent that there is "a fundamental agreement about what holds monetary value" between members of a group.[116]

Even if the assets they represent can often be easily duplicated, NFTs possess several characteristics that have, so far, motivated some to place sometimes astronomical monetary value in them. While the source of an NFT's value may depend on the NFT or the preferences of a particular owner, NFTs derive their value from three broad attributes: (1) provenance and collectability; (2) utility associated with ownership of the NFT; and (3) making the internet ownable by turning digital assets into "things." The introduction of scarcity to a class of goods that is widely accessible underpins each of these sources of value.

a. Provenance and Collectability

First, NFTs are digital collectibles inextricably linked to their provenance, or proof of their origin and authenticity. Although many of the assets NFTs represent may be replicated

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[112] *See* James Beck, *Can NFTs Crack Royalties And Give More Value To Artists?*, CONSENSYS (Mar. 2, 2021), https://consensys.net/blog/blockchain-explained/can-nfts-crack-royalties-and-give-more-value-to-artists/.
[113] *Fungible*, BLACK'S LAW DICTIONARY (11th ed. 2019).
[114] Devin Finzer, *The Non-Fungible Token Bible: Everything You Need to Know About NFTs*, OPENSEA (Jan. 10, 2020), https://opensea.io/blog/guides/non-fungible-tokens/.
[115] Gideon Greenspan, *The Blockchain Immutability Myth*, COINDESK (Mar. 6, 2023, 7:53 AM), https://www.coindesk.com/markets/2017/05/09/the-blockchain-immutability-myth/ (explaining that "the bitcoin blockchain and its ilk are not immutable in any perfect or absolute sense" but "immutable so long as nobody big enough and rich enough decides to destroy them.").
[116] Christian Catalini, Ravi Jagadeesan & Scott Duke Kominers, *Bitcoin and Beyond*, PROJECT SYNDICATE (Apr. 23, 2021), https://www.project-syndicate.org/onpoint/bitcoin-and-new-digital-ledger-applications-by-christian-catalini-et-al-2021-04.

easily and endlessly, NFTs purport to make ownership in these assets scarce and verifiable. For example, while a picture may be electronically duplicated thousands of times and shared across the internet, blockchain technology allows the creator of that picture to record and sell ownership of the original through a single NFT. Though there would be thousands of instances of the asset, the blockchain would record one owner of the canonical original "minted" or created by the author. The publicly available ledger would further make the full ownership history of the picture accessible to anyone on the internet anywhere in the world, and anyone could look to verify the ownership status of the asset at any point in time. Thus, although the picture could be duplicated through a simple copy-paste function, ownership of the NFT would remain tied to the cryptographically encrypted blockchain that is designed to be a secure and irreversible record of ownership. NFT owners often argue that the value of an NFT grows as it is "shared and seen online"[117] and consequently frequently retort that those who duplicate and distribute their images are "actually doing free marketing" and increasing the NFTs value, not stealing or duplicating the NFT.[118]

The tokenization of ownership through an NFT creates "a truly unique version of the asset" inextricably linked to its provenance.[119] By tokening unique assets on a blockchain, "NFTs are able to instantly verify who created what, when, and where" and keep a complete history of subsequent transactions.[120] NFTs thus serve as their own "proof of authenticity," obviating the need for third-party authenticators of unique assets. Furthermore, the ownership history of an asset may itself increase its value. For instance, some might find value in knowing that they owned the same digital asset that was previously owned by someone else, such as a celebrity or well-known collector.

In addition to being a "proof of authenticity," NFTs could also serve as a "proof of passion."[121] Because "the when and what, and for how much" of an NFT purchase "all are indelibly and universally established" on the blockchain, NFTs may imbue early support of creative projects with new economic and social value as support of a project is memorialized on the blockchain.[122]

b. Utility

Second, NFTs often come bundled with utility beyond ownership of the underlying assets they represent. NFT creators can grant NFT owners exclusive access to content or private chat rooms, deliver new assets directly to NFT owners, or even give NFT owners a voice in the creative process. Combining this utility with NFTs' value as collectibles offers NFT creators a unique opportunity to build a community around their NFTs. In many cases, membership in one of these communities could be at least as valuable as the underlying assets NFTs represent.

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[117] Jesse Walden, *NFTs Make the Internet Ownable*, VARIANT FUND (Feb. 15, 2021), https://variant.mirror.xyz/T8kdtZRIgy_srXB5B06L8vBqFHYlEBcv6ae2zR6Y_eo.
[118] Jack Morse, *NFT Owners Insist They're Totally Not Owned by "Right-Click Savers,"* MASHABLE (Aug. 19, 2021), https://mashable.com/article/non-fungible-tokens-nfts-right-click-save.
[119] Shin Hyung Choi, *Proof of Provenance: Why NFTs Can Be Valuable*, MEDIUM (Apr. 12, 2021), https://shinhyungchoi.medium.com/proof-of-provenance-why-nfts-can-be-valuable-1489ed1395fd.
[120] *Id.*
[121] Tal Shachar & Jonathan Glick, *Proof of Passion*, TRENDS, ANALYSIS, LIES & STAT. (Mar. 1, 2021), https://tals.substack.com/p/proof-of-passion.
[122] *Id.*

The Bored Ape Yacht Club (BAYC) illustrates how NFTs' value can stem both from their status as collectibles and from their utility. To date, the BAYC has generated over $2.5 billion in all-time sales,[123] and its members include celebrities such as Stephen Curry, Shaquille O'Neal, Snoop Dogg, Eminem, and Jimmy Fallon.[124] Descriptively named, BAYC NFTs represent ownership in one of a collection of a set of 10,000 unique images of cartoon-like apes, each programmatically generated from a set of over 170 possible traits.[125] More than just representing ownership in an image, the NFTs are also "Yacht Club membership card[s]" that grant[] access to members-only benefits."[126] These benefits include access to an exclusive BAYC channel on the Discord social media platform, additional airdropped NFTs (including serum to create mutant apes and NFT dogs), real life events, a collaborative community art space called "the Bathroom," and an Apes v. Mutants mobile game.[127] BAYC members also received early access to a new cryptocurrency launched by the BAYC called ApeCoin.[128] Additionally, while the BAYC retains ownership of the BAYC brand, NFT owners are granted the personal use rights to "use, copy, and display" their own Bored Apes and the commercial use rights to "use, copy, and display [their Bored Apes] for the purpose of creating derivative works . . . ;"[129]

Some BAYC members have already begun using these commercial use rights. After carefully selecting an ape they thought had "something to say," two friends purchased Ape 1798, which they named Jenkins the Valet.[130] The friends developed Jenkins into his own character and gave him an identity as the BAYC's valet and the "eyes and ears of the BAYC."[131] Jenkins has inspired a new lore around the BAYC and a tell-all memoir, which was minted and sold as an NFT, authored by New York Times bestselling author Neil Strauss.[132] Jenkins's book inspired the issuance of a set of "Writer's Room" NFTs that give owners a voice in the development of "Metaverse-defining stories" and enable owners to "turn their own avatars into interesting characters and then license them to appear in the works."[133] In another application of these commercial rights, Universal Music Group's 10:22PM label has formed Kingship: a "supergroup consisting of rare Bored Apes and a rare Mutant Ape."[134] Kingship grant fans access to their world through five thousand Key Card NFTs tied to "music, exclusive

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[123] *Bored Ape Yacht Club Sales Volume Data, Graphs & Charts*, CRYPTOSLAM!, http://cryptoslam.io/bored-ape-yacht-club/sales/summary (last visited May 3, 2023).
[124] *List of Celebrities who own Bored Ape NFTs*, COINCU NEWS, (Mar. 7, 2022), https://news.coincu.com/54001-celebrities-who-own-bored-ape-yacht-club/.
[125] BAYC, https://boredapeyachtclub.com/#/home (last visited May 3, 2023).
[126] *Id.*
[127] Cryptonite, *What Is Bored Ape Yacht Club? + Why The NFT's Are So Popular*, HACKERNOON, (Feb. 7, 2022), https://hackernoon.com/what-is-the-bored-ape-yacht-club-and-why-the-nfts-are-so-popular.
[128] Hannah Miller, *Bored Ape's New ApeCoin Puts NFTs' Power Problem on Display*, BLOOMBERG, (Mar. 19, 2022, 9:56 AM), https://www.bloomberg.com/news/articles/2022-03-19/nft-bored-ape-yacht-club-s-apecoin-benefits-backers-like-andreessen-horowtz.
[129] BAYC, *Terms and Conditions*, https://boredapeyachtclub.com/?ref=hackernoon.com#/terms (last visited May 3, 2023).
[130] *Jenkins - Jenkins the Valet*, COLOSSUS (Mar. 18, 2022), https://joincolossus.com/episodes/1087607/jenkins-jenkins-the-valet.
[131] Jenkins the Valet, *How the Valet at the Bored Ape Yacht Club Teamed Up with A 10x New York Times Bestselling Author*, MEDIUM (Nov. 12, 2021), https://jenkinsthevalet.medium.com/how-the-valet-at-the-bored-ape-yacht-club-teamed-up-with-a-10x-new-york-times-bestselling-author-80db25da0fbc.
[132] *Bored & Dangerous*, JENKINS YACHT VALET, https://www.jenkinsthevalet.com/bored-and-dangerous (last visited May 3, 2023).
[133] *Writer's Room*, JENKINS YACHT VALET, https://www.jenkinsthevalet.com/writers-room (last visited May 3, 2023).
[134] KINGSHIP, https://www.kingship.io/ (last visited Feb. 6, 2023).

content, utility, community, and token-gated experiences . . . ."[135] Following the announcement of Kingship's founding, NFT collector Jimmy McNeils, who furnished the bored apes to 10:22PM, emphasized that his collaboration with 10:22PM shows "how powerful commercial rights are for collectible NFT projects and their collectors."[136]

c. Turning Digital Assets into Things

Third, NFTs also introduce a new paradigm for internet ownership for both consumers and creators. When a creator posts content on an internet service, the content becomes subject to the provider's terms of service—often resulting in the platform obtaining some rights in the posted content.[137] With the "potential to invert media ownership on the internet," NFTs create a practically immutable record of ownership and new transaction possibilities.[138] The tokenization of unique assets and recording of these assets on a distributed ledger might alter market dynamics in a way that makes it possible for creators not to rely so heavily on large internet service providers. Rather than having all content be subject to a dizzying number of terms of service, NFTs could be a "modular" property system that could greatly simplify the transactional infrastructure and decrease information costs.

Advocating for a theory of property with "thing-based baselines" that are enriched by—not composed of—a bundle of rights,[139] Professor Henry Smith argues that modular property systems manage complexity and reduce the need for information costs.[140] The boundaries of modular ownership in a thing are more easily defined in goods like real property or personal property than in information "where interacting rights cannot be spatially separated."[141] Modularizing intellectual property is particularly difficult because licensing agreements are prone to "conflict . . . more easily" in intellectual property than in physical assets.[142] Although NFTs do not replace the current regulatory regime of intellectual property, cryptographic tokenization makes it more feasible to establish ownership of assets—including information and intellectual property—online, independent of centralized internet services. NFTs could thus be a liberating alternative to the wide-ranging terms of service to which online content is typically subject as NFTs' provenance permits authentication of NFT ownership across internet platforms. Tokenization of an asset through an NFT consequently causes the asset to more closely resemble a modular "thing" than a fragmented bundle of rights.

C. Critiques of NFTs and DLT Systems

To some, the decentralization of authoritative ownership records from intermediaries serves to simplify transactions and replace reliance on fallible institutions. Evangelists of DLT systems argue that, as "trust moves from institutions — like banks and regulators — to the apolitical ledger,"[143] control will move from intermediaries and institutions to consumers and creators. While some proclaim that Web3's democratization and decentralization of the internet

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[135] *Id.*
[136] *10:22PM Forms Kingship, the First-Ever Group Consisting of NFT Characters from Bored Ape Yacht Club*, UMG (Nov. 11, 2021), https://www.universalmusic.com/1022pm-forms-kingship-the-first-ever-group-consisting-of-nft-characters-from-bored-ape-yacht-club/.
[137] *See* Walden, *supra* note 119.
[138] *Id.*
[139] Henry E. Smith, *Property as the Law of Things*, 125 HARV. L. REV. 1691, 1694 (2011).
[140] *Id.* at 1703.
[141] *Id.* at 1711.
[142] *Id.* at 1712.
[143] Tressie McMillan Cottom, *The Strange Allure of the Blockchain*, N.Y. TIMES, (Jan. 24, 2022), https://www.nytimes.com/2022/01/24/opinion/crypto-blockchain-nfts.html.

will fundamentally alter every aspect of life, others insist that DLT systems "inevitably have a pyramid-shaped economic structure" and are high-tech multilevel marketing operations.[144]

Despite their potential benefits, NFTs are not without their costs. First, courts, creators, and consumers should all be careful not to conflate the novel technology of NFTs with the underlying assets they represent. Many may find it difficult to recognize that NFTs are tokens that represent ownership in an asset and are separate from the asset itself. Second, the flexibility of NFTs could make them highly complex. Creators and consumers alike might find this landscape difficult to navigate without regulations and intermediaries to help ensure the validity of transactions and manage consumer expectations. For example, an NFT could include commercial rights to use intellectual property, or it might simply be a license to a copy with no intellectual property rights. Without standardization or centralization, unsophisticated parties may not realize what they are selling or what they are buying when they transact using NFTs. While infringement and misrepresentation resulting from the assets NFTs represent would presumably give rise to legal causes of action, this is largely uncharted territory. The immutability of blockchain transactions further complicates what can be done if someone sells something they did not have the right to sell. And the pseudonymity of the blockchain makes it more difficult for aggrieved parties to identify from whom they should seek recourse.

Critics also point to the immense financial and environmental costs of maintaining and transacting on DLT systems. Despite the fact that maintaining DLT systems consumes astronomical amounts of electricity, crypto-enthusiasts claim that all transactions have an environmental cost and that the environmental impact of DLTs will diminish as technology develops.[145] In addition to the environmental costs, the monetary costs of transacting on DLT systems make small transactions infeasible as the transaction costs may exceed the value of the NFT.[146] Transaction costs also vary with traffic on the blockchain and similar factors. The day may come when transaction costs are more manageable and predictable, but this currently limits the economically feasible application of NFT technology to large transactions.

A common critique of NFTs in particular is that, while NFTs themselves reside on blockchains, the majority of the assets NFTs represent do not. This is because the high costs of using and storing data on the blockchain make it impractical for most assets NFTs represent ownership in to be stored on a blockchain, or "on-chain."[147] As a result, the underlying assets are generally stored "off-chain," meaning they are stored somewhere on the internet not on a blockchain through some sort of centralized service. If this service fails, the NFT owner may not be able to access the underlying asset, and it is not clear what value the NFT would retain. Some NFT projects are completely "on-chain," but current storage costs make this impossible for a majority of NFT projects.

In addition, skeptics assert that cryptocurrencies and NFTs are simply a bubble waiting to burst. Some fear that this bubble will have a disparate impact on economically vulnerable investors. Paul Krugman cautioned that he sees "disturbing echoes of the subprime [mortgage]

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[144] Christopher Mims, *NFTs, Cryptocurrencies and Web3 Are Multilevel Marketing Schemes for a New Generation*, WALL ST. J. (Feb. 19, 2022, 12:00 AM), https://www.wsj.com/articles/nfts-cryptocurrencies-and-web3-are-multilevel-marketing-schemes-for-a-new-generation-11645246824.

[145] *See* Romano Santos, *What Is the Environmental Impact of NFTs?*, VICE (Mar. 3, 2022, 12:08 AM), https://www.vice.com/en/article/bvnp95/what-nft-environment-impact-climate-crypto-explainer.

[146] *See* Griffin Mcshane, *What Are Ethereum Gas Fees?*, COINDESK (Jan. 13, 2022, 7:18 AM), https://www.coindesk.com/learn/what-are-ethereum-gas-fees/.

[147] *See* Dan Kahan, *Do You Really* Own Your NFT? Chances Are, You Don't*, DEFIANT (Mar. 31, 2021), https://thedefiant.io/do-you-really-own-your-nft-chances-are-you-dont/.

crisis" that led to the great recession as many investors in cryptocurrencies "don't know what they are getting into and are poorly positioned to handle the downside."[148] This concern is exacerbated by the recent collapse of FTX and other major crypto institutions along with plunging prices of crypto assets as crypto critics assert that belief in Web3 may not just be misplaced but could also result in "waste on an epic scale" if the current "crypto winter" turns out to be an eternal one.[149]

Lastly, buying NFTs remains a foreign and perplexing experience to many. While some vendors allow NFT purchasers to use fiat money, the vast majority first require buyers to separately convert cash into cryptocurrency. Buying an NFT also requires the use of a crypto wallet, and purchasers must keep track of their cryptographic key or lose all of their crypto assets.[150] If cryptocurrencies continue to grow in popularity, these processes could become more user friendly and integrated, and how to transact on the blockchain may gradually become common knowledge and practice. Meanwhile, courts and policymakers must contend with how NFTs will integrate with existing contractual constraints and copyright law as NFT creators seek to usurp the traditional music industry and revolutionize music monetization.

III. NFTS AS A MUSIC MONETIZATION TOOL

Having examined the current monetization opportunities for musicians and equipped with a basic framework for understanding NFTs and their potential value, we turn to the question of whether NFTs provide a viable additional income stream for musicians notwithstanding the obstacles presented by the traditional music industry, particularly contractual constraints and copyright law. With the promise to construct "a new music ecosystem founded on principles of fairness and transparency"[151] and "maximiz[e] the value of music for creators, improv[e] the music experience for consumers and reduc[e] friction, waste, and fraud . . . ,"[152] music NFTs have already generated high-profile use cases. These include Universal's virtual band Kingship[153] and Kings of Leon's 2021 album *When You See Yourself*.[154] Notwithstanding the uncertainty surrounding many aspects of NFTs and the applicability of contractual provisions and copyright law to them, NFTs appear to provide a budding new revenue stream for musicians. NFTs will likely have the greatest impact on musicians who can build strong communities and take advantage of the potential for granular price tiering. This Part begins with a discussion of how NFTs offer a superior economic model for musicians compared to the traditional "hits market" and concludes with a discussion of how

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[148] Paul Krugman, *How Crypto Became the New Subprime*, N.Y. TIMES (Jan. 28, 2022), https://www.nytimes.com/2022/01/27/opinion/cryptocurrency-subprime-vulnerable.html; *see also* Cottom, *supra* note 146; David Gerard, *The Cryptocurrency Crash Is Replaying 2008 as Absurdly as Possible*, FOREIGN POL'Y (May 12, 2022, 3:53 PM), https://foreignpolicy.com/2022/05/12/cryptocurrency-crash-2008-financial-crisis/.

[149] Paul Krugman, *Blockchains, What Are They Good For?,* N.Y. TIMES, (Dec. 2, 2022), https://www.nytimes.com/2022/12/01/opinion/blockchains-what-are-they-good-for.html.

[150] Joanna Stern, *I Gave My Mom a Crypto Wallet: A Simple Guide to NFTs, Blockchain and More*, WALL ST. J. (Dec. 13, 2021, 9:00 ET), https://www.wsj.com/articles/i-gave-my-mom-a-crypto-wallet-a-simple-guide-to-nfts-blockchain-and-more-11639404001.a

[151] Arya Taghdiri, *How Blockchain Technology Can Revolutionize the Music Industry*, 10 HARV. J. SPORTS & ENT. L. 173, 194 (2019).

[152] TONYA M. EVANS, BLOCKCHAIN AND THE DISINTERMEDIATION OF MUSIC, OXFORD HANDBOOK OF MUSIC L. & POL'Y 2 (Sean M. O'Connor ed. 2021).

[153] UMG, *supra* note 138.

[154] Sam Moore, *Kings of Leon Have Generated $2 million from NFT Sales of Their New Album*, NME (Mar. 12, 2021), https://www.nme.com/news/music/kings-of-leon-have-generated-2million-from-nft-sales-of-their-new-album-2899349.

these improved market incentives may be hampered by common contractual constraints and copyright law.

A. Improved Economics for Musicians

NFTs not only provide new collectible assets and utility for consumers but might also be game changing for creators seeking to monetize unique creative assets. Drawing upon Kevin Kelly's theory that creators only need one thousand "true fans" to make a living,[155] Chris Dixon suggests three ways in which NFTs "offer fundamentally better economics for creators:" NFTs (1) "remov[e] rent-seeking intermediaries" (or at least "force [them] to earn [their] fees"); (2) "enabl[e] granular price tiering;" and (3) "mak[e] users owners."[156] Each of these reasons rings true for musicians seeking a more favorable set of economic incentives in the Web3 world.[157]

Dixon's first contention—that NFTs will "remov[e] rent seeking intermediaries"[158]—suggests that, by using NFTs, musicians will be able to pocket a larger portion of the revenue they generate instead of giving most of it away to labels and publishers. To engage with users, creators today have little choice but to go through services controlled by Alphabet (Google), Apple, Amazon, or Meta (Facebook). Creators receive a fraction of the revenue generated by their content but must submit to the intermediaries' terms if they wish to reach users. Even partial disintermediation of transactions could result in creators retaining more of the value they create, which could have a "multiplier effect on creator disposable income."[159]

NFTs could provide musicians a viable path to financial success that does not require them to partner with intermediaries like labels and publishers. Beyond being financially liberating, this could endow musicians who feel constricted by contractual relationships with labels and publishers[160] with greater artistic freedom. Labels and publishers may also gain expertise and connections that could help NFT creators "optimize their revenue options" in the "brave new universe" of Web3,[161] but NFTs may nonetheless make joining a label feel more like one of multiple workable options instead of a financial necessity. If signing with a label were one of a few feasible paths, musicians could amass greater negotiating leverage that might shift the balance of power in musicians' favor.

Still, the prospect of disintermediating the music industry is clouded by doubts of the Web3 proposition that blockchain technology will obviate the need for intermediaries coming to fruition. NFTs are a "cultural and economic wave [labels and publishers] are determined not

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[155] Kevin Kelly, *1,000 True Fans*, TECHNIUM, https://kk.org/thetechnium/1000-true-fans/ (last visited May 3, 2023).
[156] Chris Dixon, *NFTs and a Thousand True Fans*, FUTURE (Feb. 27, 2021), https://future.a16z.com/nfts-thousand-true-fans/.
[157] *Id.*
[158] *Id.*
[159] *Id.*
[160] *See, e.g.*, PJ MORTON, *Claustrophobic (feat. Pell)*, *on* GUMBO (Morton Records 2017) ("I'm claustrophobic. I have a hard time trying to fit into your small mind."); TORI KELLY, *Unbreakable Smile*, *on* UNBREAKABLE SMILE (Capitol Records 2016) ("Sayin' 'Tori this'll sell more records.' But I'd rather make 'em yawn than be a pawn on your chess board.").
[161] Murray Stassen, *Warner Music Boss Steve Cooper: 'The Emergence of Web3 is Going to Further Amplify the Importance of Music Labels and Publishers.,'* MUSIC BUS. WORLDWIDE (Feb. 15, 2022), https://www.musicbusinessworldwide.com/warner-music-boss-steve-cooper-the-emergence-of-web3-is-going-to-further-amplify-the-importance-of-music-labels-and-publishers123/.

to miss," and labels and publishers are already investing heavily in a Web3 future.[162] In the parlance of The Who, it may be an instance of "[m]eet the new boss same as the old boss"[163] where Web3 continues to be dominated by the same intermediaries. This fear goes beyond the music industry. As Twitter founder Jack Dorsey cautioned Web3 enthusiasts, "[y[ou don't own 'web3.' . . . It's ultimately a centralized entity with a different label."[164] In reality, decentralization is unlikely to happen overnight or be an all-or-nothing proposition. But even slight disintermediation could pay powerful dividends in boosting musicians' disposable income and requiring intermediaries to reinvent themselves or give back power to creators.[165]

Dixon's second idea—that NFTs "enabl[e] granular price tiering"[166]—is an exhilarating concept for musicians who are not and may not want to be famous. While large intermediaries target the median consumer,[167] NFTs create a new transactional tool for creators to monetize consumers' "enthusiasm" and engage in "granular price tiering" tailored to their true fans.[168] The "long tail" effect posits that large internet vendors recognized in the early days of the internet that, if aggregated, sales of "the lowest selling obscure items would equal or in some cases exceed the sales of the few best-selling items."[169] Though internet vendors track user data and have created algorithms to tailor advertisements to consumer tastes, creators themselves are arguably better suited to "find and deliver niche audiences."[170] This means that there might be tremendous value large internet vendors are unable to capture because of their need to appeal to the masses. By enabling digital scarcity, NFTs produce market dynamics that ask buyers to pay what a unique asset is worth to them instead of an aggregated market price. This price tiering effect enables creators to reach portions of the demand curve large intermediaries have not.[171] This could shift economic incentives in a dramatic way by compensating creators for making works with obscure appeal in addition to incentivizing the creation of popular works.

The "hits market" economy of the music industry anticipates that the vast majority of music will be an economic failure and rewards only exceptional hits. By recognizing and remunerating music based on its performance in the market as a whole, this economic model largely does not account for the personal value music may have for a smaller group of fans. An artist's music may be worth far more to a fan than the cost of a Spotify subscription, merchandise, or even a concert ticket, but the "hits market" approach leaves this idiosyncratic value uncaptured. But NFTs provide a transactional innovation to address the deadweight loss the "hits market" creates because while "[a]ds monetize attention[,] NFTs monetize enthusiasm."[172] Monetizing enthusiasm potentially opens the floodgates for artists whose fans want to give more.

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[162] Eamonn Forde, *Web3-Casting: Music Companies Preparing for the Next Revenue Boom*, SYNCHTANK (Mar. 16, 2022), https://www.synchtank.com/blog/web3-casting-music-industry-preparing-for-the-next-revenue-boom/.
[163] THE WHO, *Won't Get Fooled Again*, *on* WHO'S NEXT (Polydor Ltd. (UK) 1971).
[164] @jack, TWITTER (Dec. 20, 2021, 8:51 PM), https://twitter.com/jack/status/1473139010197508098.
[165] Dixon, *supra* note 160.
[166] *Id.*
[167] Kelly, *supra* note 159.
[168] Dixon, *supra* note 160; *see also* Kelly, *supra* note 159.
[169] Kelly, *supra* note 159.
[170] *Id.*
[171] Dixon, *supra* note 160.
[172] @cdixon, TWITTER (Dec. 7, 2021, 9:39 AM), https://twitter.com/cdixon/status/1468258846363717633.

Radiohead's initial release of *In Rainbows* to fans for "whatever you want," though not an NFT sale, illustrates the power of price tiering.[173] Although a majority of downloaders opted to pay nothing for *In Rainbows*,[174] Radiohead made more revenue from *In Rainbows* than from their prior release *Hail to the Thief*, and because they independently released the album, the income from "pay what you want" downloads "dwarfed all the band's previous digital publishing income . . . ."[175] Though a majority of listeners eagerly consumed the music for free, thirty-eight percent chose to pay an estimated average global price of six dollars.[176] NFT price tiering is different because it introduces digital scarcity thus allowing musicians to tap into their fans' enthusiasm to incentivize them to pay for unique exclusive assets. For price tiering to work, musicians need to build fans' enthusiasm around their NFT projects. This is no simple task when people are constantly bombarded with content to consume. But for musicians who successfully captivate their fans, NFTs enable them to monetize this enthusiasm in an unprecedented way.

Third, Dixon suggests that NFTs' ability to "mak[e] users owners" unlocks a new set of economic incentives for creators and their fans.[177] NFTs alter market economics by turning users into owners. Buying an NFT is not just purchasing a product: it is "angel investing in culture."[178] NFTs align creators' and consumers' incentives because both can profit if the NFT becomes more valuable. With the ability to resell the scarce digital assets represented by NFTs, consumers have real "skin in the game."[179] Creators may also be able to share in resale royalties facilitated by smart contracts or see the value of new NFTs rise with the success of past NFTs.

Musicians commonly turn to services like Kickstarter and Indiegogo to ask fans to help them fund projects. To thank fans for supporting the project, creators determine and provide rewards for supporters (such as a copy of an album, an invitation to a release party, or a private concert) based on the level of supporters' contributions. Although this model has funded some successful creative projects, it has significant limitations. First, creators need to follow through on the rewards they promised supporters. Producing these benefits can require significant time and money, and creators must also execute the administrative tasks of keeping track of and delivering rewards to fans. Second, these rewards do not compensate contributors for their support. Though supporters do receive something in return for their contribution, the goal is to support and fund the project and not to benefit the supporter. NFTs are more akin to investments than contributions. They align creator and consumer incentive because NFT owners "actually own a piece of what [they] helped to create."[180] NFT owners could potentially resell their NFTs at an appreciated value if the project is successful. If an NFT owner decides not to resell, owning the NFT may serve as a "proof of passion" to memorialize the NFT owner's support. Of course, NFTs could be coupled with the rewards Kickstarter and Indiegogo

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[173] Lewis, *supra* note 1.
[174] RADIO X, *How Much Did Radiohead Make from In Rainbows?*, (Oct. 25, 2021, 11:08), https://www.radiox.co.uk/features/the-most-unusual-album-releases-of-all-time/.
[175] Lewis, *supra* note 1.
[176] Sheila Marikar, *Radiohead Lets Fans Set CD Price; Most Say $0*, ABC NEWS (Nov. 6, 2007), https://abcnews.go.com/Entertainment/story?id=3826638&page=1.
[177] Dixon, *supra* note 160.
[178] @evabeylin, TWITTER (Feb. 24, 2021, 11:00 AM), https://twitter.com/evabeylin/status/1364636214008061952.
[179] Dixon, *supra* note 160.
[180] *A Primer on NFTs*, COLOSSUS (Mar. 22, 2021), https://joincolossus.com/episodes/5917632/walden-a-primer-on-nfts.

campaigns provide, but the aspect of ownership transforms the economics of supporters by turning them into stakeholders instead of mere contributors.

B. Obstacles to Integrating NFTs into the Music Industry's Infrastructure

Notwithstanding the disruptive economic incentives NFTs could have on the economics of music, the traditional music industry is likely to present significant obstacles to music NFT creators independent of labels' Web3 activity. Music NFTs must inevitably come to a head with the infrastructure of the traditional music industry. Contractual agreements and copyright law are especially likely to present challenges and complications for music NFT projects.

1. NFTs and Contractual Restrictions

First, musicians who have or negotiate recording contracts will need to consider how these agreements may impact their freedom to create and profit from NFTs. The exclusivity provisions of recording contracts and re-recording restrictions are especially likely to limit artists' ability to make NFT projects, and 360 deals are likely to cut into the economic benefits of NFT projects. The exclusivity provisions of recording contracts prohibit artists from making recordings for other record labels.[181] The standard definition of a "recording" in these contracts is expansive encompassing "any kind of delivery of [the artist's] performances for consumer use, whether sound alone or with visuals."[182] Although labels may agree to some exceptions to exclusivity provisions, artists will need to know enough to ask for exceptions.[183] Moreover, though it remains unclear how labels will view exceptions for NFTs, it seems likely labels will be reluctant to grant exceptions for NFTs if they become reliant on revenue from NFTs themselves. Exclusivity provisions are also likely to complicate, if not prohibit, artists' efforts to collaborate on NFT projects.

Even if the exclusivity provisions of a recording contract have terminated, music NFTs may qualify as re-recordings of songs recorded during the term of a recording contract, which standard recording contracts prohibit for an agreed upon time without the label's permission. Re-recording restrictions have received unusual attention recently as Taylor Swift has had a public feud with her former label, Big Machine Records.[184] In 2019, Big Machine—along with the rights in the recordings Swift made for the label—was acquired by Ithaca Holdings, which is owned by prominent music manager Scooter Braun.[185] Swift described the news as her "worst case scenario" and claimed to have been a victim of "incessant, manipulative bullying" at Braun's hands.[186] Swift claims to have unsuccessfully sought to purchase her masters from Big Machine before the acquisition, and subsequently decided to re-record the albums she made while signed to Big Machine as her contract with Big Machine permits.[187] These re-recordings, dubbed "Taylor's versions," of Swift's albums have had remarkable commercial

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[181] PASSMAN, *supra* note 25, at 166.
[182] *Id.* at 78.
[183] *Id.* at 166–69.
[184] Raisa Bruner, *Here's Why Taylor Swift Is Re-Releasing Her Old Albums*, TIME (Mar. 25, 2021, 5:06 PM), https://time.com/5949979/why-taylor-swift-is-rerecording-old-albums/.
[185] *Id.*
[186] taylorswift, TUMBLR (June 30, 2019), https://taylorswift.tumblr.com/post/185958366550/for-years-i-asked-pleaded-for-a-chance-to-own-my.
[187] Bruner, *supra* note 190.

success and struck Swift's current label Universal with enough fear to cause Universal to extend the length of re-recording restrictions in its standard artist contracts.[188]

Although the success of Swift's re-recordings are a testament to the impact of Swift's music and her ability to engage her large and devoted fanbase, streaming technology likely also played a substantial role in making the success of Swift's re-recordings possible. Before streaming, Swift would have had to ask her fans to purchase new recordings of old music. Many of Swift's fans seem willing to have done this, but thanks to streaming, Swift did not need to ask fans to pay anything more than they were already paying to stream her music; fans simply had to listen to the new recordings and boycott the old ones.

This shows how re-recordings, even if not made by someone as prominent as Swift, may present a greater threat to labels today than they have in the past because they are now cheaper to create and consume. NFTs present new opportunities for artists to recast their music and potentially use old music to create new experiences for their fans. Because labels already seem to be alerted to the threat re-recordings might increasingly pose to their profits, re-recording restrictions could continue to become more stringent. NFT creators who are subject to re-recording restrictions should be aware of how these restrictions are likely to limit their ability to reuse music they have previously recorded even if the music is not released through another record label.

Additionally, 360 contracts may entitle labels to a portion of their artists' NFT-generated revenue. Like an actor who had a successful acting career before signing with a label is typically able to exclude acting revenue from 360 deals,[189] musicians who have successful NFT projects prior to signing with a label should be more likely to successfully exclude revenue from NFTs from their 360 deals. On the other hand, musicians who wish to venture into the NFT world after signing with a record label will more likely be required to share a portion of revenue from NFTs with their labels. Over time, contractual terms are likely to contemplate the specific risk that artists may create NFTs. but courts will need to grapple with how contractual language that predates NFTs should apply to the nascent technology.

Though it ultimately settled on undisclosed terms, a dispute between filmmaker Quentin Tarantino and Miramax Studios over Tarantino's announcement of a series of NFTs based on the film *Pulp Fiction* exemplified the types of contractual interpretation questions courts will likely confront as NFTs become more commonplace in the entertainment industry. Tarantino announced in November 2021 that he would release seven "exclusive scenes" NFTs through the blockchain platform Secret Network, granting owners exclusive access to previously unknown secrets about *Pulp Fiction* along with digitized excerpts from the original script and audio commentary from Tarantino.[190] Miramax promptly filed suit in the Central District of California, alleging that Tarantino's announced NFTs breached Tarantino's contractual agreement with Miramax and infringed upon Miramax's intellectual property rights.[191]

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[188] Anne Steele, *As Taylor Swift Rerecorded Her 'Red' Album, Universal Reworked Contracts*, WALL ST. J. (Nov. 12, 2021), https://www.wsj.com/articles/as-taylor-swift-rerecorded-her-red-album-universal-reworked-contracts-11636741201.
[189] PASSMAN, *supra* note 23, at 103.
[190] Taylor Dafoe, *Quentin Tarantino is Minting Seven 'Pulp Fiction' Scenes as NFTs That Will Reveal New Secrets About the Film*, ARTNET NEWS (Nov. 3, 2021), https://news.artnet.com/art-world/quentin-tarantino-is-minting-seven-pulp-fiction-scenes-as-nfts-that-will-reveal-secrets-about-his-vision-for-the-film-2029816.
[191] Complaint, Miramax, LLC v. Tarantino, No. 2:21-cv-08979 (C.D. Cal. Nov. 16, 2021).

In its complaint, Miramax contended that, except for specific "reserved rights," Tarantino granted Miramax "all of his rights to *Pulp Fiction*" in a 1993 agreement.[192] Accordingly, Miramax alleged that Tarantino's announced NFTs infringe upon its rights in *Pulp Fiction*. In response, Tarantino argued that the 1993 agreement explicitly reserved for Tarantino the right to "screenplay publication" and gave him "every right to publish portions of his original handwritten screenplay . . . ."[193]

The parties seemed to recognize that this was, at its core, a contractual dispute. Although NFTs are a new transactional tool and are likely to impact future contractual arrangements, they do not alter principles of contract law and contract interpretation. Tarantino appeared to abandon his NFT project after the sale of only a single NFT,[194] and the case settled in September of 2022.[195] While they did not disclose the terms of the settlement, Tarantino and Miramax released a joint statement sharing that they "agreed to put this matter behind them and look forward to collaborating with each other on future projects, including possible NFTs."[196]Although this lawsuit eventually settled, future cases involving similar agreements are likely to emerge given NFTs' growing prominence in the entertainment industry. The new market dynamics NFTs introduce will very likely affect the terms of future contractual agreements. Until then, though NFTs may not be explicitly mentioned, NFTs and their creators will be subject to existing contractual constraints as courts and practitioners seek to discern how NFTs fit into these agreements.

2. NFTs and Copyright Law

In addition to contractual constraints, NFT creators should be aware of the impact of copyright law on their ability to make and create NFTs. NFTs provide a new means of transacting in digital assets; however, they do not change what is and is not protected by copyright. In the United States, the Copyright Act extends copyright protection to all "original works of authorship fixed in any tangible medium of expression."[197] The extent to which NFTs themselves enjoy copyright protection is not clear, but it is well established that many of the assets in which NFTs commonly represent ownership are subject to copyright protection. Because copyright holders' exclusive rights include the rights to reproduce, adapt, distribute, publicly perform, and publicly display their copyrighted works,[198] NFT creators who do not own the rights to or have permission from the rightsholders of any copyrighted works implicated by their NFTs may be liable for copyright infringement. In short, NFTs do not make it legal for someone to sell an asset they do not have the right to sell.[199]

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[192] *Id.* at 2.
[193] Answer, Miramax, No. 2:21-cv-08979, at 2.
[194] Eduardo Próspero, *What Happened to Tarantino's "Pulp Fiction" NFT Collection? The Strange Finale*, NEWSBTC (Feb. 2022), https://www.newsbtc.com/crypto/what-happened-to-tarantino-s-pulp-fiction-nft-collection-the-strange-finale/.
[195] Notice of Settlement, Miramax, No. 2:21-cv-08979.
[196] Dominic Patten, *Quentin Tarantino & Miramax 'Pulp Fiction' NFT Legal Dust-Up Ends; Director & Studio Look Forward To "Future Projects,"* DEADLINE (Sept. 8, 2022, 1:16 PM), https://deadline.com/2022/09/quentin-tarantino-lawsuit-pulp-fiction-nft-auction-miramax-letter-1234907552/.
[197] 17 U.S.C. § 102(a).
[198] *Id.* § 106.
[199] While courts have yet to rule directly on how copyright law applies to NFTs, early cases relating to trademark claims seem to affirm that the novelty of the technology underlying NFTs does not narrow the reach of intellectual property laws. Yuga Labs, creators of the BAYC NFTs, recently prevailed in its motion for summary judgement convincing the judge that Yuga Labs owned a valid trademark in the BAYC (notwithstanding its grant of commercial and personal use rights for BAYC members' respective apes) and that

This is illustrated by a dispute between Roc-A-Fella Records and former Jay-Z collaborator Damon Dash. Roc-A-Fella Records brought suit in the Southern District of New York in June 2021 to prevent Dash from selling the copyright in Jay-Z's 1996 debut album *Reasonable Doubt*, arguing that Dash had "no right to sell" the album rights through NFTs because, though he was a minority shareholder in Roc-A-Fella Records, Roc-A-Fella Records—not Dash—owned the copyright in the album.[200] In July 2021, the court issued a preliminary injunction barring Dash from minting or selling NFTs of *Reasonable Doubt*.[201] In his answer, Dash admitted that he did not own any copyright in *Reasonable Doubt* but asserted that he had the unqualified right to sell his one-third interest in Roc-A-Fella Records.[202] The case remains unresolved (though the parties filed a joint letter on March 15, 2022, stating that they are in settlement talks to end the dispute),[203] but it affirms the importance of NFT creators ensuring that they have valid rights in the assets they seek to transact in using NFTs. As such, it appears that Dash could validly sell his own ownership rights in Roc-A-Fella Records through an NFT; however, he could not sell the copyright in *Reasonable Doubt* using NFTs because NFTs do not give Dash the right to sell what he does not own. Given the lack of regulation of NFTs, consumers would also do well to engage in due diligence to verify the authenticity of the assets they buy using NFTs and verify that those selling NFTs actually own or have rights to the underlying assets.

The unregulated nature of NFT markets exposes consumers to a high risk of deceit. SEC chairman Gary Gensler has described crypto assets as "rife with 'fraud, scams and abuse.'"[204] OpenSea, the largest NFT marketplace, drew scrutiny both when reporting revealed that thousands of NFTs are created daily using images without artists' permission and the company responded by limiting users to creating five NFT collections, each with fifty or fewer items—a restriction that was ultimately lifted after prompting outrage from Web3 enthusiasts who believed such centralized oversight was "antithetical to the blockchain movement."[205] While a purchaser of an infringing NFT may be able to bring a fraud or misrepresentation claim, and the copyright holder could presumably bring a copyright infringement claim, this remains largely uncharted territory—leaving the legal ramifications of creating infringing NFTs unclear.[206]

Even though DLT systems are intended to obviate the need for trust, the current lack of regulation and unclear availability of legal recourse make trust and reputational costs NFT purchasers' primary protection. If an NFT seller makes infringing NFTs or does not deliver

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a set of Ryder Ripps Bored Ape Yacht Club NFTs, which pointed to the same images as the original BAYC NFTs, was likely to confuse consumers. Yuga Labs, Inc. v. Ripps, No. 2:22-cv-04355, 2023 U.S. Dist. LEXIS 71336, at *23–31, (C.D. Cal. Apr. 21, 2023). In another case, a jury found that an artist's series of "MetaBirkins" NFTs infringed Hermès International's trademark in the luxury Birkin bag brand, unpersuaded by the artist's contentions that the use was artistic expression protected by the First Amendment and that the NFTs were unlikely to create consumer confusion. Zachary Small, *Hermès Wins MetaBirkins Lawsuit; Jurors Not Convinced NFTs Are Art*, N.Y. Times (Feb. 8, 2023), https://www.nytimes.com/2023/02/08/arts/hermes-metabirkins-lawsuit-verdict.html.

[200] Complaint, Roc-A-Fella Records, Inc. v. Dash, No. 1:21-cv-05411 (S.D.N.Y. June 18, 2021), at 3.

[201] Stipulation & Order, Roc-A-Fella Records, No. 1:21-cv-05411.

[202] Answer, Roc-A-Fella Records, No. 1:21-cv-05411, at 4.

[203] Joint Letter, Roc-A-Fella Records, No. 1:21-cv-05411.

[204] Paul Kiernan, *Crypto 'Wild West' Needs Stronger Investor Protection, SEC Chief Says*, WALL ST. J. (Aug. 3, 2021, 6:21 PM), https://www.wsj.com/articles/sec-will-police-cryptocurrencies-to-maximum-possible-extent-chair-gary-gensler-says-11628007567.

[205] Justin Scheck, *OpenSea's NFT Free-for-All*, WALL ST. J. (Feb. 12, 2022), https://www.wsj.com/articles/openseas-nft-free-for-all-11644642042.

[206] *Id.*

what is promised, the value of any future NFTs they sell is likely to plummet. Still, it is difficult to know how the reputation-based informal enforcement of the NFT market will play out if the space becomes more congested. As Professor Jonathan Barnett observed:

> Reputation-driven norms exert no force against one-shot or other participants that have no rational interest in accumulating reputational capital and . . . can be expected to exhibit declining force in general as any market exhibits increased group size, economic values, capital-intensity requirements and variation in innovative capacity.[207]

It is thus possible that NFT traffic will outgrow the capacity of trust and a decentralized ledger to monitor. The specter of fraud and copyright infringement invalidating transactions could make NFT markets susceptible to exploitation by one-shot participants or other opportunists who can evade the harm of reputational costs. As a result, NFTs seem best suited for close-knit communities that can effectively protect themselves from opportunism and enforce reputation-based punishments.

"Music is a world within itself"[208] and is uniquely positioned to establish these kinds of communities. Many genres of music that are disadvantaged by the economics of the traditional music industry, such as jazz, blues, bluegrass, folk, and gospel, bring together their own communities of fans and musicians rich with traditions and norms. Fans of these styles of music tend to be aware of these norms and traditions and engaged with the larger musical community. As such, artists who incur reputational harm are likely to face especially steep consequences. In addition, reputational capital within their musical community is particularly valuable to musicians in these genres because they typically do not enjoy the same popularity and financial success of stars in many other genres and must rely on their communities to support them. Fans of these genres of music may also be incentivized by the opportunity NFTs provide to invest in artists and musicians, especially if they feel that the music they love has often been undervalued by the traditional music market. NFTs could simplify transactions with copyright implications because of their unprecedented ability to make intellectual property rights modular. While this simplicity is a double-edged sword given the ease with which NFT creators can infringe others' rights or sell what they do not own, the benefits are likely to outweigh the risks in markets where reputational costs are a powerful enough deterrent for opportunists and bad players.

CONCLUSION

Even if labels maintain their dominance, NFTs may still allow artists to directly transact with fans in a way that could produce valuable additional income. Any added income would be incredibly helpful to most musicians who often struggle to find a way to monetize their music. While contractual constraints could impede or delay some NFT projects, NFTs might provide musicians more leverage in negotiating with labels by enabling musicians to demonstrate their economic viability in a way other than having a large social media following or an astronomical number of streams. Musicians with significant NFT income would also not be so dependent on joining a label to make a living and receive an advance. For those already with a label, NFTs could generate additional income and provide added value to and interaction with fans even if musicians must share part of that revenue under a 360 contract. Despite the complications copyright law imposes on the unregulated NFT economy, reputational costs are

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[207] Jonathan M. Barnett, *The Illusion of the Commons*, 25 BERKLEY TECH. L.J. 1751, 1754–55 (2010).
[208] STEVIE WONDER, *Sir Duke*, *on* SONGS IN THE KEY OF LIFE (Motown Records 1976).

likely to temper the risk of fraud and infringement, particularly in music markets for genres with tight-knit communities.

Realistically, the old "hits market" is unlikely to go away, but NFTs may provide an alternative path for musicians. Instead of requiring a large following to generate meaningful income through music, NFTs could create a new set of incentives that would reward idiosyncratic preferences and community building, not just going viral. This could be especially game-changing in genres where musicians are unlikely to gain a large following but may nonetheless have highly devoted fans. Musicians will likely continue to rely on a variety of revenue streams, and making a living on music alone may remain a difficult proposition. Even so, NFTs might be a source of additional income that could be a steppingstone towards or an important addition to other revenue sources. Perhaps most significantly, NFTs could allow musicians to monetize further along the demand curve and find new ways of generating income from and giving value to dedicated fans. Only time will tell, but for struggling musicians, the NFT space seems to provide promising potential and little risk. As Crosby, Stills & Nash might ask, "[w]hat have you got to lose?"[209]

[209] CROSBY, STILLS & NASH, *Suite: Judy Blue Eyes*, *on* CROSBY, STILLS & NASH (Atlantic Records 1969).

SAFEGUARDING CHILDREN'S PRIVACY: A STUDY OF REGULATION AND PRACTICE IN THE UNITED KINGDOM AND THE UNITED STATES

Juncheng Cao*

Abstract: In recent years, there has been a growing emphasis on protecting privacy in the global internet economy and innovation. Consequently, governments have implemented strict regulations on the issue. However, information society service providers (ISS providers) may approach this problem differently due to their unique service domains. Compliance with regulations such as the ICO code and COPPA may present challenges for operators due to technical difficulties and unclear guidelines. Unfortunately, these issues ultimately harm users, especially children. To address this problem, this note examines the key elements and regulations of the ICO code and analyzes the privacy policies for children issued by five major technology companies. The aim is to clarify existing protective measures and identify areas for improvement. Additionally, this note highlights the challenges ISS providers face when trying to identify children. The author's objective is to provide a clear understanding of the current system for protecting children's privacy, with the goal of improving the situation.

Keywords: Children's Privacy; ICO Code; Information Society Service Providers; Consent; Parental Control

* KoGuan School of Law, Shanghai Jiao Tong University, China.

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INTRODUCTION

Protecting personal information, especially children's data, has been emphasized recently. Due to the COVID-19 epidemic, children are now online more than ever, not just for school but also for socializing and gaming.[1] As a result, regulations related to this issue have been implemented by Russia, China, and OECD countries and regions. Examples include the Children's Online Privacy Protection Act (COPPA) in the United States and the Age Appropriate Design Code (children's code) issued by the UK Information Commissioner's Office. In addition to legal requirements, technology giants have also made efforts to update their privacy policies to meet the latest standards set by local authorities. Despite these efforts to comply, some tech companies are still facing legal consequences for failure to adhere to these regulations. ByteDance and its affiliates are among the companies that have faced such consequences.

On 23 March 2023, the testimony of Shou Chew, CEO of TikTok Inc., captured global attention for previously, the media giant was confronted with the pressure of forced sales in the United States.[2] This can be a piece of breaking news for TikTok has already gained a stable colossal market share worldwide, with at least 150 million users merely in America. The two domains of this testimony are American privacy and protecting children from online harm, respectively.[3] Although some have questioned whether this was an action taken by US authorities to combat Chinese development in this field, Chew's testimony exemplified how livestream media providers are responding to the challenges of protecting children from online harm. In the hearing, Chew stated:

Minor safety and wellness are priorities of TikTok; its age-appropriate settings and controls consider not only children (under 13, by US regulations) but also the 13-17 teenage group. For instance, children are not allowed to post videos on the platforms. Messaging with others and advertising to those under 13 have also been banned.[4] To identify potential unqualified users, TikTok has also introduced text-based models such as Natural Language Processing in pursuit of full compliance with its privacy policies. Additionally, TikTok limits screen time for teenage users and children. Only when they reach 18 shall they access unlimited screen time. Moreover, Family Paring, proposed by TikTok, allows parents or guardians to link their accounts to youngsters' ones, empowering them to customize their teens' privacy and safety settings.[5] So far, no further result concerning the hearing has been announced, but the testimony is sufficient for a general idea of the latest practice in children's privacy protection. Chew's hearing was only part of recent news concerning TikTok and ByteDance's future.

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[1] Chrissie Scelsi, *Children's Online Privacy Protection*, 37 GPSOLO 42 (2020).
Thanks to the COVID-19 pandemic, most schools are closed, turning every home with children into a home school of some sort. This often involves having students use various online platforms for classes and assignments. Kids are now online more than ever, not just for school but also for socializing and gaming, and parents who can work from home are often juggling trying to help their kids with school while managing their own workload.

[2] See March 23, 2023 - TikTok CEO Shou Chew testifies before Congress, https://edition.cnn.com/business/live-news/tiktok-ceo-congressional-hearing-shou-chew-03-23-23/index.html (last visited Apr. 12 2023)

[3] See Full Committee Hearing: "TikTok: How Congress Can Safeguard American Data Privacy and Protect Children from Online Harms", https://energycommerce.house.gov/events/full-committee-hearing-tik-tok-how-congress-can-safeguard-american-data-privacy-and-protect-children-from-online-harms (last visited Apr. 12 2023)

[4] Testimony Before the U.S. House Committee on Energy and Commerce, https://docs.house.gov/meetings/IF/IF00/20230323/115519/HHRG-118-IF00-Wstate-ChewS-20230323.pdf (last visited Apr. 12 2023)

[5] Id.

ByteDance, founded in March 2012, is a Chinese technology giant boasting several well-known products such as TikTok, Toutiao, and Lark. Taking TikTok as an example, it has offices across the globe, including New York, London, Paris, Dubai, etc.[6] On 26 December 2022, the UK Information Commissioner's Office (ICO) announced that it would impose a £27 million fine on TikTok for failing to protect children's privacy.[7] More specifically, the 'notice of intent' issued by the ICO indicated that TikTok may have breached UK data protection law between May 2018 and July 2020. Even though ICO's findings are provisional, and it may still take some time for ICO to make the final decision,[8] the author of the note is convinced that much effort should be devoted to discussing whether TikTok had full compliance with the obligation to protect the privacy of children.

This was not the first time that TikTok was involved in cases of this type. As early as Feb. 2, 2019, MUSICAL.LY, a well-known video-sharing app merged into TikTok in 2018, was charged with violating the COPPA rules and the False Claims Act (FCA) by failing to protect children's personal information and several other reasons.[9] The American version of the TikTok case ended with the settlement reached between Musical.ly and the US government on condition that the defendants (1) pay $5,700,000 as a civil penalty; (2) report on their deletion obligations under penalty of perjury; (3) strictly observe the compliance reporting obligations; (4) keep necessary records as required and (5) accept compliance monitoring according to the order.[10] Merely one year later approximately, TikTok was once more fined £123,000 in South Korea for collecting data of children under 14 years old without the consent of legal guardians.[11]

Thanks to the ample quantities of privacy policies available on the Internet, the author is blessed with the opportunity to look into how technology giants who provide services targeted at children comply with the latest versions of the ICO Children's Code. In the first part, I will focus on the primary issue: why should children be taken special care of in the field of privacy protection from the perspective of children's cognitive capabilities? In the second part of this note, it interprets several important sections included in the ICO Children's code (*If not especially noted, 'ICO ADC' & Age-Appropriate Design Code & ICO Children's Code share the same meaning in this note, these terms refer to the Age-Appropriate Design Code*

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[6] Our Products, https://www.bytedance.com/en/products (last visited Jan. 24, 2023)
TikTok is the leading destination for short-form mobile video. Our mission is to inspire creativity and bring joy. TikTok has offices across the globe, including Los Angeles, New York, London, Paris, Berlin, Dubai, Mumbai, Singapore, Jakarta, Seoul, and Tokyo.

[7] ICO could impose multi-million pound fine on TikTok for failing to protect children's privacy, https://ico.org.uk/about-the-ico/media-centre/news-and-blogs/2022/09/ico-could-impose-multi-million-pound-fine-on-tiktok-for-failing-to-protect-children-s-privacy/ (last visited Jan. 23, 2023)
TikTok could face a £27 million fine after an ICO investigation found that the company may have breached UK data protection law, failing to protect children's privacy when using the TikTok platform. The ICO has issued TikTok Inc and TikTok Information Technologies UK Limited ('TikTok') with a 'notice of intent' - a legal document that precedes a potential fine. The notice sets out the ICO's provisional view that TikTok breached UK data protection law between May 2018 and July 2020.

[8] Id.

[9] Musical.ly and Musical.ly, Inc.: [Proposed] Stipulated Order for Civil Penalties, Permanent Injunction, and Other Relief - February 27, 2019, https://www.ftc.gov/system/files/documents/cases/musical.ly_proposed_order_ecf_2-27-19.pdf (last visited Jan. 23, 2023)

[10] Id.

[11] TikTok fined for mishandling child data in South Korea, https://www.bbc.com/news/technology-53418077 (last visited Jan. 24, 2023)

issued by the UK Information Commissioner's Office[12]). This study covers a range of topics related to the ICO ADC, including its applicability, the effectiveness of GDPR in Britain post-Brexit, and the protective measures implemented by the ICO ADC, such as the legal definition of 'child'. It also explores the individual rights afforded to children, the roles of parental and children's consent with regard to the sharing of children's information, and the process for conducting a Data Protection Impact Assessment (DPIA). Additionally, this work offers insight into the privacy policies for children of five technology giants: Apple, Microsoft, Instagram, Twitter, and TikTok. The author compares their policies and assesses their compliance with the ICO ADC.

I. THE NECESSITY OF SPECIAL CARE FOR CHILDREN

Why should children be given special care? Although it is commonly believed that children have limited ability to understand events, it is important to consider how this applies to information and technology. In this article, the author refers to "special care" as additional protection and argues that it is essential to determine different levels of care for children of different ages. The problem at hand is rooted in children's ability to comprehend instructions or statements made by information society service (ISS) providers. The author has not had access to updated experiments or research on children's understanding of essential characteristics of internet services. However, surveys conducted by Rona Abramovitch and other researchers may provide valuable information.

Rona's empirical study measured children's capacity to consent to participation in psychological research.[13] The subjects were 163 children whose ages ranged from five to twelve. In the study, experimenters explained to the children that they might participate in the research voluntarily and that the survey result would be kept confidential. The survey may only be conducted after the children agree to participate. In the studies, children were presented with two sections of questions. One section is designed to measure children's comprehension of the survey explanation, including confidentiality, the character of voluntary, etc. Whereas the other section is a plain survey with little regard to this article, in which children were required to respond to questions concerning unrelated topics such as foods.[14]

The researchers found out that, generally, most subjects performed positively in retelling the contents of the experiment, with 100% of children aged 9 to 11 correctly answering the contents and approximately 85% of children aged 7 to 8 correctly responding. Nevertheless, children need to be more capable of accurately understanding why the research will be conducted. Concerning confidentiality, three-quarters of children fully understand that their answers will be kept secret, and 100% of 11-year-old children responded correctly to this task. In addition, more than 85% of children aged from 10 to 11 comprehended that they were entitled to withdraw from the experiment so long as they wanted because the survey is entirely voluntary. The figure for children aged from 8 to 9 is 75%.[15]

The statistics mentioned earlier show that children aged 7 to 12 generally understand the contents and core functions of a new item. They also comprehend the meaning of

[12] (Noted by the author) The pdf version of the code can be downloaded from the website: https://ico.org.uk/for-organisations/guide-to-data-protection/ico-codes-of-practice/age-appropriate-design-a-code-of-practice-for-online-services/

[13] See Rona Abramovitch et al., *Children's Capacity to Consent to Participation in Psychological Research: Empirical Findings*, 62 CHILD DEVELOPMENT 1100 (1991).

[14] *Id.*

[15] *Id.*

confidentiality, as long as the statement provided is accurate. In addition, they understand the definition of 'volunteer' with regard to consenting to participate in an experiment. This survey provides valuable insights, demonstrating that children are capable of comprehending the characteristics of a task, item, or service, which can aid in their growth. It also indicates that young children are partly mature enough to give consent, although parental control or influence is still necessary to ensure their understanding is correct. In addition, it's brilliant for the researchers to notice that external factors such as the emotion of experimenters may exert unexpected influence on children's decisions, contributing to the availability of adapting the research to this article concerning children's privacy protection.[16]

Returning to our topic, based on the research mentioned above, it seems that it's a good idea for parents to accompany children under 13. This is because children may not fully understand the instructions or explanations provided by service providers. While the survey used simple language that everyone could understand, things can be more complex in the real world. Some ISS providers use complicated expressions that make it hard for users to comprehend, which can discourage them from reading privacy policies. This is one reason why adults should be involved in giving their consent.

On the other hand, the survey found that children are vulnerable to external factors such as emotions, and their consent may not be taken seriously when presented with engaging visual content. From the perspective of children's understanding, they can grasp the general meanings of terms like 'confidential' and 'voluntary' to some extent, but it's important to provide unique explanations. For example, young children may understand 'not telling anyone else, including one's parents,' instead of 'keeping the information confidential.' To get individual consent from children, simplified versions of privacy policies should be available. However, the author couldn't find any mandate rules that requires ISS providers to publish policies designed for children to read. In this regard, parental involvement is still necessary.

Moreover, the research also found that when children and parents had differing opinions on the use of a specific service, a significant number of children chose to follow their parents' opinions. This demonstrates that for young children, they still believe parents' instructions should be followed and obeyed, even though they may prefer the opposite option.

Considering the apparent influence of external factors and children's reliance on parents, the author concludes that special care for children under thirteen is still necessary. For lack of proficiency in comprehensive understanding, children's information rights may be violated without notice. However, I still regard providing children with due respect in giving individual consent as appropriate since children in the research have displayed their understandings and have already generated ideas different from their parents'. As is deduced from the survey results, providing elder children with a higher level of freedom coincides with their capability for comprehensive understanding. In light of this trend, it is necessary to guide ISS providers to allow children's access to services or determine their affairs as they mature while providing extraordinary care and secure services.

II. REGULATORY BASIS FOR CHILDREN'S PRIVACY PROTECTION

A. A Brief Introduction to the ICO Code and ICO ADC

[16] *Id.*

First, it is necessary to clarify the legal status of the ICO code to be discussed in this note. The ICO Children's code is issued by the UK Information Commissioner's Office, which is not a legislative authority. ICO is the UK's independent body set up to uphold information rights.[17] Unlike laws issued by legislative authorities, violating the ICO codes may not lead to direct legal consequences. Still, the deed of violation can indicate a corporation's failure to protect the user's privacy in a required approach.

The legal basis of the ICO code derives from Section 121(1) of the UK Data Protection Act 2018:

The Commissioner must prepare a code of practice which contains—

(a)practical guidance in relation to the sharing of personal data in accordance with the requirements of the data protection legislation, and

(b)such other guidance as the Commissioner considers appropriate to promote good practice in the sharing of personal data.[18]

Analyzing the section quoted above, issuing ICO Code is the obligation of the Information Commissioner's Office, and the ICO code exists to ensure a better practice in personal data sharing. More specifically, according to Subsection (a), the ICO code is designed to guide Internet service providers to share personal data in ways that do not violate data protection legislation. Therefore, if a service provider's protection mechanism can not satisfy the requirement of the ICO code, it stands a higher chance of breaking the Data Protection Act. Furthermore, the legal status of ICO ADC is similar to the general ICO Code. Section 123 of the Data Protection Act 2018 required that the Information Commissioner's Office issue a code designed to guide the information society services likely to be accessed by children.[19]

On the whole, the ICO ADC is comprised of 15 standards that online services need to follow, with the code's aim targeted at ensuring Internet service providers comply with their obligations and children's privacy is protected in a proper and effective method.[20] Evidently, the ICO ADC does not apply to children and their parents. Instead, information society services shall bear the responsibility of protecting personal information. More specifically, the information society service mentioned above can, to a certain extent, be limited to those likely to be accessed by children, even though children are not aimed. Meanwhile, the formal definition of ISS is 'any service normally provided for remuneration, at a distance, by electronic means and at the individual request of a recipient of services.'[21]

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[17] About the ICO, https://ico.org.uk/about-the-ico/who-we-are/ (last visited Jan. 25, 2023)
[18] Data Protection Act, 2018. https://www.legislation.gov.uk/ukpga/2018/12/contents/enacted.
[19] Id. at Section 123.
The Commissioner must prepare a code of practice which contains such guidance as the Commissioner considers appropriate on standards of age-appropriate design of relevant information society services which are likely to be accessed by children. Where a code under this section is in force, the Commissioner may prepare amendments of the code or a replacement code.
[20] Introduction to the Age appropriate design code, https://ico.org.uk/for-organisations/guide-to-data-protection/ico-codes-of-practice/age-appropriate-design-code/ (last visited Jan. 24 2023)
[21] Id.
The code applies to "information society services likely to be accessed by children". The definition of an ISS is "any service normally provided for remuneration, at a distance, by electronic means and at the individual request of a recipient of services." What this means in practice is that most for-profit online services are ISS, and therefore covered by the code. [...] If your online service is likely to be accessed by children under the age of 18, even if

To further clarify the concept of ISS, the ICO indicated that the following services shall be under supervision: 'apps; programs; search engines; social media platforms; online messaging or internet-based voice telephony services; online marketplaces; content streaming services (e.g., video, music or gaming services); online games; news or educational websites; and any websites offering other goods or services to users over the internet.'[22] The wide range of services listed above contributes to the fact that most profit-driven services must comply with the ICO ADC to provide sufficient protection for children and their data.

It should be noted that the ICO ADC does not apply to schools or educational institutions, for they do not meet the definition of ISS.[23] That is, even though a certain information Society Service is provided for kids to use, if the service is provided via a school or similar institution, the ICO ADC shall not apply. However, this exemption differs from removing the school's responsibility regarding children's privacy protection. Schools still have to comply with the UK GDPR and other regulations. Since this note focuses mainly on the services to which the ICO children's code applies, I will not lay much emphasis on the regulation of schools.

In addition, the ICO children's code does not simply apply to companies registered in the UK. This code also applies to those who process the data of UK children.[24] This enables the ICO to be effective for overseas corporations, giving rise to more complex issues such as cross-border transferring of data, as I will discuss later.

B. Adaption of GDPR in the United Kingdom

The General Data Protection Act (GDPA in abbreviation) is one of Europe's most important legal sources of data protection. Due to Britain's exit from the European Union in 2018, GDPR no longer directly applied to Britain. Nevertheless, the EU GDPR has been incorporated directly into UK law as the UK GDPR.[25] Even though British data processors no longer have to comply with the EU GDPR in Britain, shall they wish to operate in the European Economic Area (EEA), they are still confined to the act.

For those data processors who obtain data from the EU or EEA, they shall be familiar with the term 'adequacy'. The European Union coined this term to describe countries,

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it's not aimed at them, then you are probably covered by the code. This means you may need to make some changes to how you design your service and how you process personal data to ensure you conform with the code.

[22] Id.

[23] FAQs for education technologies (edtech) and schools, https://ico.org.uk/for-organisations/childrens-code-hub/faqs-for-education-technologies-edtech-and-schools/ (last visited Jan. 25 2023)
To be defined as an Information Society Service (ISS), organizations must meet several qualifying conditions which are set out in services covered by the code. Schools do not meet the definition of an ISS. However, the code's vision – to ensure that the best interests of children are a primary concern when using their data – also closely aligns with schools' own educational mission. Schools are also required to comply with UK GDPR and the Data Protection Act 2018, and the code sets out what good practice compliance looks like in the areas it covers. We therefore encourage schools to aspire to meet the code's 15 standards as a matter of general good practice.

[24] Introduction to the Age appropriate design code, https://ico.org.uk/for-organisations/guide-to-data-protection/ico-codes-of-practice/age-appropriate-design-code/ (last visited Jan. 24 2023)

[25] See Overview – Data Protection and the EU, https://ico.org.uk/for-organisations/dp-at-the-end-of-the-transition-period/overview-data-protection-and-the-eu/ (last visited Feb. 16 2023)
The EU GDPR is an EU Regulation that no longer applies to the UK. You must comply with the Data Protection Act 2018 (DPA 2018) if you operate inside the UK. The provisions of the EU GDPR have been incorporated directly into UK law as the UK GDPR. There is little change to the core data protection principles, rights, and obligations in practice. GDPR recitals add depth and help to explain the binding articles. Recitals continue to have the same status as before – they are not legally binding and help understand the articles' meaning.

territories, sectors, or organizations with essentially equivalent data protection levels to the EU. So far, the EU Commission has adopted adequacy decisions for the UK GDPR, enabling British data processors to obtain data from EU countries freely on most occasions. However, if offices or branches of a UK corporation are established within EEA, this corporation shall comply with the UK and EU regulations.[26]

Except for the special case of corporations with branches mentioned above, it is worth noting that 'adequacy' does not apply to immigration exemption. Time and space limiting, I will not explain this case in this note.

C. What's the definition of children, and why should they be taken special care of in data protection?

Before discussing and analyzing the ICO ADC, it is of primary importance to define 'children' under the ICO code. As is indicated in Section 1 of the UK Family Law Reform Act 1969, the age of majority is set at 18, which gives rise to these issues: whether or not individuals must exceed 18 years old to consent to the use of their data. If not, how old will a child be mature enough to decide on the usage of his data? The answer to the above question lies in the application guideline named 'Children and the GDPR' issued by ICO. According to the guideline, if a child is to consent, the child should be at least 13 years old unless the ISS is an online preventive or counseling service.[27]

Generally speaking, children lack the legal status to fully shoulder legal liabilities because they may need to be more competent to understand the consequences of their deeds. Such is the case with data protection. Considering children's inability to understand what they consent to and what outcome their consents are giving rise to, they are deprived of the right to approve independently. However, shouldering legal liabilities and facing the risk of data misusing are of different severity. The latter one may exert less impact on a child since whether substantial harm may emerge remains unknown. Moreover, in the latter situation, the children's guardians may withdraw the previous consent as they wish, providing a chance to minimize the unwanted result aroused by false permission.

In conclusion, from the differences in consequence and possibility to compensate, it is reasonable to set lower age standards for children when it comes to data protection, and they should be granted more freedom to make their own decisions on data use even though they may not reach the age of majority.

D. Parental control versus children's independent right

Even though ICO has already provided several methods to guide ISS to identify teens below or above 13, children may make false presentations about their age to access services only available to older people, reducing the effect of the data protective mechanism. Moreover, not every child aged 13 can understand their approval's consequences. Therefore, parental control may be in place to keep children away from risks triggered by data misuse.

ICO indicates that introducing parental control is essential for children's best interests. Parental controls refer to the condition in which parents are allowed by service providers to monitor their children's internet-based activities, track their locations, or limit children's online

[26] Id.
[27] See https://ico.org.uk/for-organisations/guide-to-data-protection/key-dp-themes/children/ (last visited Feb. 17 2023)

activities. This seems unreasonable for service providers since they have fewer chances to get children to use their service, putting servers at risk of losing potential customers. However, from the perspective of cost and effect, service providers' willingness to accept parental control justifies that they operate the service on the condition that children's best interests are guaranteed, reducing their risks of violating the ICO ADC. Therefore, accepting parental control can be wise for ISS providers in the long run. As it turned out, hosts of Internet giants such as Apple Inc. have set up children's accounts, which can only be activated with the company of parent accounts. I will discuss the design of parent & child accounts in the latter parts of this note.

Nevertheless, it cannot be neglected that children should be freed from parents' supervision in certain respects. Children, who can be viewed individually as data subjects, also expect their data privacy and sense of their identities to be respected. Therefore, children should at least be notified if their parents monitor their online activities. In fact, the conclusion stated above derives from Article 5(1)(a) of the GDPR, which demands that personal data be processed lawfully, fairly, and transparently.

In response to the GDPR, the ICO set forth a matrix of recommendations to guide ISS providers to balance children's right to private space and the necessity of parental control. In the first place, the ICO divided children under 18 years old (the age of majority) into five groups based on their maturity: (1) Pre-literate & early literacy (aged 0 to 5); (2) Core primary school years (aged 6 to 9); (3) Transition years (aged 10 to 12); (4) Early teens (aged 13 to 15) and (5) Approaching adulthood (aged 16 to 17).[28] This classification approach matches perfectly with the application of GDPR issued by ICO, which stated that only children reaching 13 years old are qualified to consent. This is to say, only early teens and individuals who are approaching adulthood can give sole consent, but their parents may still monitor them. In line with the matrix, the protection of Class I children is of the highest level among the five classes, while children of Class IV and V are granted more freedom compared to individuals from the other three categories. Listed below are recommended methods designed by the ICO to help balance the protection of children and the call for privacy respect.

First, 'providing a clear and obvious sign that indicates when monitoring or tracking is active.' can be found in the recommended items for all age groups. It is easy to understand that this recommendation responds to the transparency requirement. Furthermore, as the author understands, indicating to children that their online activities are being tracked and monitored demonstrates respect for children's privacy since there's no chance of being supervised without notice. While on the other hand, in addition to knowing what their children are doing with the ISS, the tracking alert may also prevent children from misbehaving online since children are informed of their parents' accessibility to their activities.

Another recommended item of information to be provided is 'materials for parents explaining the children’s right to privacy under the UNCRC '. This recommendation can be found in all five categories. Still, for Class I, II, and III, parents may also be informed of children's possible increasing expectations about their privacy rights as they age. The author finds this designation meaningful since when children do not reach the stage of 'transition', they are less likely to make decisions on themselves since they won't be blessed with the right to

[28] For the sake of convenience, in this note, Class I represents 'Pre-literate & early literacy'; Class II represents 'Core primary school years'; Class III represents 'Transition years'; Class IV represents 'Early teens' and Class V represents 'Approaching adulthood'.

give independent consent. Parents' understanding of children's need to increase privacy space may enable children to transition smoothly from the core primary school years to the next stage.

The third universally applied recommendation for class I, II, and III is 'providing materials for the child to understand that their parent is being told where they are and/or what they do online to help keep them safe.' The only difference is whether the children's location should be provided to parents. Nevertheless, the author proposes that there's no need to make such a difference since parents cannot thoroughly screen out the possibility of pre/early literate children using ISS outside some safe regions. Moreover, these children from Class I are more vulnerable than those from Class II and III. Thus they deserve a higher standard of protection. Therefore, I understand that recommending ISS providers to adopt location supervision for children under 13 can be a better version. According to the recommendation matrix, when children reach the age of thirteen, the ICO suggests ISS providers supply children with materials explaining how the service works and the balance between parental monitor and child privacy rights, providing children with more respect for their own decision and privacy. What's unique about Class III is that the ICO recommends ISS providers to 'provide resources suitable for the child to use independently which explain the service and discusses privacy rights'. As I understand, the reason for which this item can only be found in Class III is that ICO was trying to prepare children from 10 to 12 for their future independent consent. Only after being exposed to real decision situations will they be capable of giving responsible and reasonable independent approvals when they reach the age of 13.

Summarizing the aforementioned analysis, ICO's efforts were mainly to balance protecting children's data privacy and respecting children's private space. The two parts contradict each other since protecting children's data is completed via parental control, which may deprive kids of their personal space. Nevertheless, even though these two benefits may be counter, they are designed for children's best interests. The detailed approaches may vary. However, the ultimate legal benefits protected by the ICO ADC stay fixed.

E. Data Protection Impact Assessment

Data protection impact assessment (DPIA in abbreviation) is a process targeted at reducing the data protection risk while providing information society services. The ICO requires that DPIAs be carried out if the service is likely to lead to high risks to individual interests. If the service provider cannot mitigate the risk, ICO must be consulted about the issue.[29] DPIAs are not designed only to block compliance risks for ISS providers. They aim at preventing the potential for social and economic disadvantages as well. [30] It should be noted that DPIAs are compulsory under certain circumstances and may also be regarded as the successors of PIAs (Privacy Impact Assessments). Therefore, ISS providers who had previously conducted PIAs may alter the past assessments to fit them into the present compliance framework.

ICO has listed 13 situations in which DPIAs should be conducted on its official website. These include 'using systematic and extensive profiling', 'monitoring publicly accessible places on a large scale', 'processing biometric or genetic data', etc. The 13 situations mentioned above may be roughly categorized into the following types: (1) providers are trying to process data

[29] Data Protection Impact Assessments (DPIAs), https://ico.org.uk/for-organisations/guide-to-data-protection/guide-to-the-general-data-protection-regulation-gdpr/data-protection-impact-assessments-dpias/ (last visited Feb. 19 2023)
[30] Id.

on a large scale; (2) the data to be processed is sensitive or closely related to data subjects' health and safety; (3) the data processing will be carried out without notifying the subjects. Therefore, adopting DPIAs can be considered a precaution for possible future breaches, preventing substantial deprivation of subjects' data rights from emerging.

A complete set of DPIA is comprised of the nine steps listed in the table below[31]:

Steps	Brief Intro	Requirements
1	Identify the need for a DPIA	The processors should indicate the purpose of data processing and clarify the types of data to be involved in the procedure.
2	2-1 Describe the nature of processing	In sub-step 2-1, the processors must reveal the data processing details. These details usually include the source of data; data sharing; the collection, use, storage, and deletion of data.
	2-2 Describe the scope of the processing	In sub-step 2-2, the processors should reveal the nature of the data to be worked on, including whether it is special or criminal offense data. In addition, critical information, including the quantity, the frequency of data collection, the storage period, the number of affected subjects, and geological coverage, are emphasized.
	2-3 Describe the context of the processing	In sub step 2-3, the relationship between processors and data subjects is critical. The processors shall reveal individuals' control over their data, the possible existence of vulnerable group of individuals, the public concern on the technology involved throughout the process, etc.
	2-4 Describe the purposes of the processing	In sub step 2-4, ICO intends to guide ISS providers clarify the ultimate intention of data processing and the benefits.
3	Consultation process	This step is intended by the ICO to learn how the processor is going to communicate with stakeholders and about whether other parties will be involved in the process.
4	Assess necessity and proportionality	As is universally recognized that personal data can only be processed based on necessity, this step requires processors to set forth the legal basis for the use of data and explain whether there exist alternative methods. Meanwhile, the ICO questions data processors how they are going to respect individuals' concerning rights in pursuit of proportionality.
5	Identify and assess risks	In step 5 of DPIAs, data processors are required to reveal the source of risk and the potential impact on individuals. More

[31] This table is summarized according to the DPIA template issued by the ICO. This table is abstracted from the original template; to find the original version, please refer to the official website: https://ico.org.uk/media/for-organisations/guide-to-data-protection/guide-to-the-general-data-protection-regulation-gdpr/data-protection-impact-assessments-dpias-1-0.pdf (last visited Feb. 19 2023)

		specifically, the risk is assessed from three dimensions: likelihood of harm, severity of harm and overall risk.
6	Identify measures to reduce risk	Apart from reminding the ICO (if necessary) and data subjects about the possible risks, ISS providers should go to lengths to mitigate the risks mentioned in Step 5. Simultaneously, the effect and residual risks of options to reduce risks shall also be included in the DPIA report so as to evaluate whether processors have fulfilled their obligations to minimize risks.
7	Sign off and record outcomes	Step 7 is a procedural step which requires processors to record the DPO advice; whether the advice was accepted or overruled and the reason for it; and the consultation response.
8	Integrate outcomes into plan	The outcome of the DPIA should not be separated with the practice. Therefore, DPIA outcomes shall be integrated into the project plans. Furthermore, ISS providers shall identify any action points and make sure they are implemented.[32]
9	Keep under review	As requested by the ICO, the aforementioned DPIA steps shall be cycled through until the plans are finalized. [33]

As far as the aid of transparency and accountability is concerned, data processors are encouraged to publish the DPIA outcome. In this way, data subjects may learn when, where, why, what, and how their data will be used, transferred, or deleted, allowing users to make prudent decisions on whether to accept the service. Reasonable as the publication can be, the openness of DPIA outcome is not mandatory. ISS providers may refuse to publicize their report and analysis because they intend to keep possible residual risks confidential. However, as the author understands, the refusal to open up DPIA reports may bring other disadvantages for data processors. For example, compared with those who choose to publish DPIA reports, others may not be trusted alike. Therefore, users may choose more transparent services, contributing to their eventual benefits.

Another problem with DPIA is whether ISS providers are required to submit the outcome of the assessment to the ICO. As the ICO maintains, processors do not always oblige to submit. If data processors identify high risks they cannot mitigate, then ICO must be consulted before the process starts. After the request for consultation is submitted to the ICO, the office will issue written advice within 8 or 14 weeks to warn service providers not to process or even ban the processing.[34]

[32] See How do we do a DPIA? https://ico.org.uk/for-organisations/guide-to-data-protection/guide-to-the-general-data-protection-regulation-gdpr/data-protection-impact-assessments-dpias/how-do-we-do-a-dpia/#how13 (last visited Feb.19 2023)
You must integrate the outcomes of your DPIA into your project plans. You should identify any action points and who is responsible for implementing them. You can use the usual project-management process to ensure these are followed through. You should monitor the ongoing performance of the DPIA. You may need to cycle through the process again before your plans are finalized.
[33] Id.
[34] Id.

In addition, as required by Article 35(4) of GDPR, ICO shall publish a list of processing operations that require a DPIA. The aforementioned regulation includes ' the use of the personal data of children or other vulnerable individuals for marketing purposes, profiling or other automated decision-making, or if you intend to offer online services directly to children.', which means that if the ISS is likely to be accessed by children, the operator should conduct a DPIA. In conclusion, information society services accessible by children, on most occasions, have to carry out DPIAs on the ground that children's best interests are of first priority.

III. PRACTICES OF TECHNOLOGY GIANTS IN CHILDREN'S PRIVACY PROTECTION

In response to the strict regulation of data compliance regarding children's privacy protection, several technology giants, Apple, and Google, to name just a few, have adopted measures to set forth privacy policies particular for children. However, tech corporations targeting different services are burdened with different responsibilities. Therefore, the author finds it necessary to look into the differences and similarities among different technology giants' children's privacy policies. In this part of the article, privacy policies for children issued by five corporations, Microsoft, Apple, Twitter, Instagram, and TikTok, will be analyzed and compared in depth. Afterward, a conclusion can be reached from the analysis and comparison results.

A. Microsoft and Apple

In Part A of this section, I would like to compare two corporations whose market domain consists of both hardware devices and software. Microsoft and Apple are two of the biggest companies dominating the world's technology market, and both have developed a relatively mature privacy protection system. Hence, their products can meet the requirements of data compliance in most jurisdiction regions worldwide.

Microsoft issued its latest version of the privacy policy for young people (the equivalent of children's privacy policy) in March 2023. As introduced by Microsoft, this policy targets helping young people understand how to use Microsoft products in a way that protects their privacy. In addition, the policy also stresses information that can be essential to parents and guardians of children.[35] Generally, this policy is comprised of eleven parts in all, which includes: (1) personal data to be collected; (2) the usage of personal data; (3) advertising; (4) parental consent and control; (5) resources for young people and families; (6) access and control of personal data; (7) using Microsoft products at school; (8) data safety; (9) personal data sharing; (10) the place where data is kept; (11) the period of data storage. Among which, several items can be applied not only to Microsoft services but also to other ISS providers.[36]

As for Apple, the Family Privacy Disclosure for Children provides its young users with a set of privacy protection mechanisms that differs from that of Microsoft on a large scale. As I will discuss, the children's data privacy policy centers on children's Apple IDs, enabling it to become one of the most distinctive characteristics. The Family Privacy Disclosure for Children is made up of ten parts, namely (1) Introduction to children's ID; (2) Controls for parents; (3) Screen time; (4) Restrictions; (5) Family Sharing and Ask to Buy; (6) Creating Your Child’s

[35] See Privacy for young people, last undated March 2023, https://privacy.microsoft.com/en-us/young-people (last visited March 7, 2023)
[36] Id.

Apple ID; (7) Collection of Information; (8) Use of Information; (9) Disclosure to Third Parties and (10) Consent to Apple's Collection, Use, and Disclosure of Your Child's Information.

Parental consent and control, data sharing or disclosure, collection, and use of data can be found in the privacy policies issued by both corporations. As far as the four aforementioned types of elements are concerned, the latter three can be found in privacy policies for adults as well, indicating that only parental consent and control are targeted at children exclusively. This is in line with the previous analysis on the ground that parental consent is the prerequisite for children's privacy protection.

As Microsoft states in 'parental consent and control', parents and guardians of children can create a Microsoft family account regardless of the place of residence. By way of the family account, what children are allowed to do via the account can then be determined by their parents or guardians. In general, the two main functions of this design are to help children get into good digital habits and enable children to explore the Internet world safely through content filters.[37] The former one sets limits on the devices adequate to use, the applications and games that children are accessible and the screen time. When a child's account runs out of time available, his or her parents shall be in place to decide whether additional time should be granted or else to cultivate children's manners. Furthermore, parents will be able to monitor the online activities through the family account as well, providing them with better insights into their children's usage of Microsoft applications. While the formerly designed aim is intended to restrict screen time on most occasions, the latter lays more emphasis on the contents accessible by children. In pursuit of safe online spaces, Microsoft advises supervisors to set content filters to eradicate improper content and games from children's reach. On condition that kids use Microsoft Edge on Xbox and Windows, inadequate websites shall also be banned.[38]

To exercise control over children's Internet access, Microsoft suggests that parents or guardians choose a parental control app to monitor their children when they are playing games or browsing websites. Effective control apps often serve the following five purposes: filtering inappropriate content, enforcing screen time limits, monitoring activities, blocking content, and creating activity reports.[39]

A similar mechanism exists in Apple. However, Apple itself boasts special features. Instead of setting up family accounts, children are eligible to set up their own Apple IDs. As demonstrated in the Family Privacy Disclosure for Children, children may keep a close connection with their families, such as data and document sharing, schedule sharing, etc. As far as the essential requirement of 'consent' is concerned, as I will discuss, Apple provides its users with a clearer insight by noting parents' consent of Family Privacy Disclosure for Children (referred to as 'Apple Disclosure' in this article) is the prerequisite for the successful creation of children's Apple IDs. Besides, the consent may be verified through additional steps in order that Apple would fully comply with COPPA or similar laws in other jurisdictions.[40]

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[37] See Microsoft Family Safety, https://www.microsoft.com/zh-cn/microsoft-365/family-safety?ocid=family_signin&rtc=1 (last visited March 8, 2023)

[38] Id.

[39] See Choosing a parental control app that works for you, https://www.microsoft.com/en-us/microsoft-365-life-hacks/privacy-and-safety/choosing-a-parental-control-app (last visited Mar 8, 2023)

[40] See Family Privacy Disclosure for Children, https://www.apple.com/legal/privacy/en-ww/parent-disclosure/ (last visited Mar 8, 2023)

In order to create an Apple ID for your child, we must first obtain your consent to this Family Privacy Disclosure for Children ("Disclosure") and to Apple's Privacy Policy, which is incorporated herein by reference. If there is a conflict between Apple's Privacy Policy and this Disclosure, the terms of this Disclosure will take precedence.

Nevertheless, such expression is not that evident in the policy issued by Microsoft, contributing to the conclusion that Apple has paid more attention to the consent of parents and guardians.

But how do Apple IDs for children under 13 (in US.) associate with their families? Apple explains that the children's Apple IDs cannot be independent of family, and family members are also not in the position to remove children from their family accounts until they are deleted or moved to another family account. In this way, the Apple IDs for children resemble those of Microsoft to a certain extent.

More importantly, Apple stated that its 'Disclosure' does not apply to any data collection practices of any third parties. As I maintain, this term can be of pivotal importance to such giant corporations as Apple because it provides brilliant platforms allowing third-party developers to post its apps. However, on condition that the third-party apps shall breach the regulations concerning privacy protection, the platform itself can be burdened with liabilities for inadequate supervision. In this regard, declaring its independence from third-party apps may be a sensible approach to avoiding possible penalties. On these occasions, it is the third-party app developers themselves that should pay attention to privacy protection and data compliance.

Besides screen time control, adult users of Apple are entitled to exercise control over young people through 'family sharing'. The 'Ask to buy' feature allows adults to review and approve the request of purchase and download of apps and in-app purchases, allowing parents to decide what apps kids will access. However, Apple noticed that purchases completed through methods other than iTunes or App Store might not apply to this function.[41]

As for screen time limits and restrictions on accessible types of apps, it is mostly the same as those of Microsoft. Therefore, I will not stress them once more.

In addition to the consent and control of accessible Internet services, other sections included in the privacy policies issued by Microsoft and Apple may also be intriguing. Regarding advertising, Microsoft announced that it would not demonstrate personalized advertisements to those under 18. This is to say, those under 18 will not receive ads that are presented based on the analysis of their online activities. Nevertheless, it should be noted that the threshold for personalized advertisement is 18 instead of 13 or similar age standards in other jurisdiction areas.[42] Therefore, hereby, I conclude that Microsoft's protective measure against possible risk aroused by characterized advertisements outweighs its protection against immature consents made by children. Regretfully, in the Apple Disclosure, Apple Inc. didn't include content of this sort. However, its credibility may lie in the superiority of Apple's operation systems' encapsulation, minimizing the possibility of violations in this respect.

As a corporation boasting hardware devices, operation systems, and software (applications), Microsoft also provides unique resources for young people and their families. These resources cover a variety of fields, from OS (windows) to browsers, from software for office (like Word and PowerPoint) to entertainment apps (Xbox).[43] In this article, I will mainly focus on Windows and Microsoft Edge, the popular Internet browser. Admittedly, the privacy policy for Windows itself can be defined as refined. However, few contents concentrate on children's protection. Cortana, an AI productivity assistant embedded into Windows, may harm

[41] Id.
[42] Privacy for young people, Last updated March 2023, https://privacy.microsoft.com/en-us/young-people (last visited Mar 9, 2023)
[43] Id.

kids if the talks between kids and the AI are accessible by other parties. It is understandable that young people may be unaware of the characteristics of artificial intelligence and may neglect the possible negative consequences it can contribute to. Whereas Microsoft indicates that it doesn't allow kids who are too young to access Cortana and measures are taken, neither has it clarified the age appropriate to use nor has it set forth the mechanism adopted to recognize the age of users.[44]

Comparatively, more protective policies are targeted at children when it comes to Edge. According to the official website, this browser has a built-in Microsoft Defender SmartScreen, protecting users against phishing or malware websites. Indeed, this feature is essential to everyone, but it is of primary importance for children since they are more vulnerable to malicious websites for lack of discernment. The 'shield' Edge possesses for special care of children's privacy safety is 'Kids Mood'. Parents or guardians may switch on the Kid's Mood, and this procedure won't be necessary to repeat since this mood will be activated whenever the browser is opened. However, children will be unable to switch the mood off since this operation requires inserting passwords. As introduced by Microsoft, passwords to exit kid's mood are the same as those of unlocking the computer.[45] In this regard, I propose that this mood can be altered for the better by differentiating the passwords of existing kids' mood from those unlocking the computer accounts. Shall children be allowed to log in to accounts independently or use the offline functions of computers without the supervision of parents, it is necessary for them to remember the passwords, disabling the restricted access to exit kids' mood.

Although one of the snapshots of kids' mood demonstrates that this mood is aimed at children whose ages range from five to twelve, which is in line with the practice in hosts of regions, this browser still failed to indicate to whom this mood shall be applied. The age-appropriate design of Edge is special in that children aged from 5 to 8, and those from 9 to 12 are entitled to different Internet resources. More specifically, even though they are only authorized to access resources under 'Strict Microsoft Bing SafeSearch, ' the elder ones will be provided with more interesting but safe content. In contrast, the younger ones will be blessed with more simplified browsers.

As the author maintains, the practice of Edge fully demonstrates how parents or guardians should supervise children's online behavior and provide kids with an age-appropriate online atmosphere. With the help of kids' mood, both children's due freedom and parents' power to consent are respected. Whereas aforementioned defects may exist, their merits and progressiveness shall not be ignored.

When it comes to the disclosure of information to third parties, Apple has provided a detailed introduction by illustrating the following aspects: family sharing, strategic partners, service providers, and other types of parties.[46] According to the 'Apple Disclosure', the purchase information, calendars, reminders, and photos may be shared among family members subject to the restrictions set by guardians and parents. Meanwhile, Apple warns that information of this kind may be accessed by unwanted people when children's Apple IDs are

[44] See Cortana and privacy, https://support.microsoft.com/en-gb/windows/cortana-and-privacy-47e5856e-3680-d930-22e1-71ec6cdde231 (last visited Mar 9, 2023)
[45] Learn more about Kids Mode in Microsoft Edge, https://support.microsoft.com/en-us/microsoft-edge/learn-more-about-kids-mode-in-microsoft-edge-4bf0273c-1cbd-47a9-a8f3-895bc1f95bdd (last visited Mar 10, 2023)
[46] See Family Privacy Disclosure for Children, https://www.apple.com/legal/privacy/en-ww/parent-disclosure/ (last visited Mar 8, 2023)

logged on to devices in possession of third parties.[47] Under this circumstance, it is parents that should be cautious of the possible leak of information and potential negative consequences.

In addition, Apple acknowledges that it may share children's information with service providers to serve the purposes of assessing young customers' interests, conducting customer satisfaction surveys, fulfilling customer orders, etc. Meanwhile, Apple has also promised that these providers are obliged to protect children's information. From the author's point of view, this data sharing can be doubtful on the ground that deeds such as conducting satisfactory surveys among children may breach the principle of minimum necessity. Additionally, the 'Apple Disclosure' hasn't indicated whether or how the children's supervisors may consent to the sharing of data. For lack of solid proof, I cannot conclude that disclosure between Apple and service providers may incur legal liabilities, but as I maintain, it is sensible if due attention can be paid to obtain parents' consent since children may not be aware of the consequences of allowing their information to be accessed by third parties.

Apart from sharing among family members and service providers, Apple has claimed that it may also transfer children users' information to strategic partners so as to improve its products and services or share kids' information when necessary. For the latter situation, Apple has mentioned that these circumstances include requests by law, legal litigation, public authorities or simply to complete a transaction.[48] Sharing information of this sort, whether the subjects are children or not, shall not lead to debates so long as the information subjects (children and their parents if necessary) are informed.

Above all, Microsoft and Apple serve the purpose of demonstrating how modern tech giants process children's data and what aspects they lay emphasis on. With the worldwide advent of strict regulation on children's privacy policies, corporations like Microsoft and Apple should be careful with every single product, from hardware to application. Through the analysis above, I admit that Microsoft has established a comparatively refined protective mechanism for children by providing 'kids mood', enabling parents to look over their kids' online behavior. However, as GDPR states, children should be granted due freedom to make decisions that they are able to fully understand. It is apparent that Microsoft has failed to follow this requirement as far as 'kids' mood' is concerned. Therefore, the extent of freedom to which children should be provided when they're discovering the Internet world is deemed as one of the critical problems that browser developers should think over. Problems of such kind may also appear in Apple's privacy-protective methods designed for children. As I understand, this can be a universal issue due to the technical difficulty in identifying children's ages, and the opaque and differed regulation among jurisdiction regions. To change the situation for the better, mutual efforts in technological advancement and clarity of legal regulation are necessary. Despite existing defects, including the aforementioned ones, the protective mechanism set up by Microsoft and Apple can still be regarded as progressive since they have set up examples for browser and application developers as well as hardware device manufacturers. Corporations possessing combined businesses can develop more comprehensive children's privacy protection systems since there will be comparatively fewer challenges in internal information transferring, and it's also likely to encounter conflicts between policies proposed by multiple operations.

B. Twitter and Instagram

[47] Id.
[48] Id.

Twitter and Instagram are two of the most renowned and widely used instant communication services worldwide. It is known to all that operators of these social network platforms may easily store or work on users' data, to analyze the active period of users, to look into the social circle of users with different characters, for instance. Whereas young children may be unable to identify the risk of their information's giving off to service providers, they can fall victim to target advertising and other potential hazards caused by privacy deprivation. Therefore, as I set forth, children should at least be capable of recognizing these risks until they are allowed to access these media. This article hereby will focus on how Twitter and Instagram design their privacy policies to meet the requirements of regulations in various jurisdiction regions.

Twitter did include content regarding children in the latest version of its privacy policy. However, by far can it be regarded as a detailed one. Article 5 of 'The Twitter Privacy Policy' contends that their services are not designed for those under the age of thirteen, and users must reach the ages allowed to consent to the processing of personal data.[49] It is apparent that the effort Twitter has devoted to protecting children's privacy mentioned above is not adequately in line with UK GDPR or similar regulatory requirements. Concluding Article 5 of the policy, Twitter, in essence, intends to ban children under 13 and those unable to give individual consent to enjoy their services. But it is worth noticing that no further details concerning how Twitter is going to prevent children under the age of 13 from accessing this platform, putting Twitter under related legal risks.

Despite there may exist apparent defects in Twitter's written form private policy for kids, its effort to obtain parental consent should be recognized. Twitter warns that accounts may be temporarily locked on the condition that the users may not meet the requirement of minimum ages. Under this circumstance, Twitter require that users' parents provide their identity information, their relationship with users, guardianship information, and more importantly, they have to agree on their children's access to Twitter.[50] Twitter also informs guardians that they are allowed to withdraw their confirmation on children's access on the same website page.

As for how Twitter may judge whether its users reach the minimum age of 13, it is essential to look into the registration process. Twitter provides its users with three approaches: register via Apple accounts, via Google accounts or create a new account with name, e-mail, and birth date.[51] The system will verify whether the user is appropriate to access Twitter services based on the date of birth filled in by the applicant. However, I doubt how Twitter is going to pick out those who have made false presentations at their ages.

Above all, the general method Twitter has adopted to comply with regulations concerning children's privacy protection is to prevent underage children from accessing their services. In this way, there's no further need for Twitter to refine its policies specially designed for children. Judging from the effect, Twitter's approach seems effective for in the past few years, it has been involved in a few lawsuits concerning violation of children's privacy.

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[49] See Twitter Privacy Policy, https://cdn.cms-twdigitalassets.com/content/dam/legal-twitter/site-assets/privacy-aug-19th-2021/Twitter_Privacy_Policy_EN.pdf (last visited Mar 11, 2023)

[50] See Request Review, https://help.twitter.com/en/forms/account-restoration/parental-consent (last visited Mar 11, 2023)

[51] The three methods mentioned in this passage is based on the author's experiment with iMac (M1, 2021) on March 11, 2023. There can be other approaches if similar experiments are conducted with Android devices.

Unlike Twitter, Instagram provides more detailed regulations on this issue. Basically, Instagram banned children below 13 from registering for an account and anyone who has reached 13 is considered an authorized account holder.[52] Therefore, parents and guardians are denied access to their kids' Instagram accounts, nor will they be allowed to take any action on authorized accounts. However, parents are still able to report to Instagram that children who are underage have successfully signed up for this service. Parents' denial to access their children's accounts may bring to our alert for, in many regions, children above 13 are still not capable of making consents individually, whereas Instagram generally neglects this situation.

It seems that Instagram has noticed the necessity of parental involvement in children's use of this service for Instagram has provided 'A parent's guide to Instagram' ('Instagram Parent's Guide' in brief) in various languages on its official website. As introduced by Instagram, this guide focuses on managing privacy, interactions, time, and security on Instagram. Additionally, open conversations between parents and teenagers on this topic are encouraged.[53] The following paragraphs will mainly emphasize how the 'Parent's Guide' instructs parents to supervise adequately.

This guide has been generally designed to help kids be smart and kind in their online digital habits.[54] In the first place, Instagram Parent's Guide introduces that Instagram's existence is to bring people together through passions and interests by way of sharing photos, videos and messages. Among all the instructions that Instagram wishes to bring parents to, this guide introduces the differences between the private and public mood of services in the first chapter. Instagram suggests that parents encourage their children to adopt a private mood so that only those following their children can view these young people's updates on their accounts, providing them with sufficient privacy protection. The preference for privacy mood recommendation is followed by the control of messages. As Instagram's parent's guide stresses, the ease of interaction among users is one of the social media's most outstanding points. However, interactions containing harmful content may also give rise to cyberbullying. Therefore, by reporting to the service providers, Instagram encourages parents to educate their kids in posting positive content while braving toxic content such as discrimination and hate speeches. Furthermore, comment columns are what Instagram considers to be pivotal in order to provide children with proper online spaces. In this regard, Instagram has provided parents with ample information concerning the management, filtering and warning of comments in the hope of parents' guidance of their kids. Not only do these guides include what to do with offensive comments and how to set restrictions on commenting, but also how young users are able to manage bulk comments at one time.[55]

Unlike the approach accepted by Microsoft and Apple, Instagram sets no compulsory limits on screen time. Instead, it encourages parents to reach agreements with their children on the appropriate amount of time to be spent on the platform. Specifically, Instagram set forth three aspects that could contribute to the cause: firstly, enable children to be aware of the time spent on the app by showing the average screen time; secondly, encourage children to participate in activities without digital devices; lastly, agree on a period of time regularly during

[52] See Tips for Parents, https://help.instagram.com/154475974694511/?helpref=hc_fnav (last visited Mar 11, 2023)
[53] Id.
[54] See A Parent's Guide to Instagram, https://scontent-hkt1-1.xx.fbcdn.net/v/t39.8562-6/10000000_383976253354575_5551535427345148474_n.pdf?_nc_cat=109&ccb=1-7&_nc_sid=ae5e01&_nc_ohc=1O_ByDjITbkAX_r7LwC&_nc_ht=scontent-hkt1-1.xx&oh=00_AfAAxUXEv8Lec_QDPx5fUOBF9K1FycyuI-qPR2rfGyQqWQ&oe=6410CBD8 (last visited on Mar 13, 2023)
[55] Id.

which family members switch off their digital devices to improve communication offline. It seems that these approaches can be practical, especially for those kids who are taking form of their digital habits. In contrast, I reserve my opinion on this part of the guide in that Instagram may have shifted the burden of responsibility to protect children users to their parents in seemingly lawful ways.

The reason why the aforementioned guide is looked into in detail in this note is that this can be regarded as an innovation put forward by Instagram. But I have to clarify that the innovative characters are not equivalent to the conclusion that Instagram outperforms other similar applications as far as children's privacy protection is concerned. In essence, the Instagram Parent's Guide is merely an advisory brochure, without producing any legal effects. This indicates that parents are still not in a position to supervise their children who are above 13 and children may be allowed to make consent on items that require permission from parents if they choose to use other media platforms. Therefore, the legal effects of 'Instagram mood' is questionable.

It was due to Instagram's ignorance of the regulation of children reaching 13 years old that led it to negative legal consequences. This can be exemplified by Irish Data Protection Commission's fining Instagram for violating the privacy of children and adolescents in late 2022. This penalty was decided according to GDPR (EU), and the fine reached 405 million Euros on the ground that Instagram had allowed users between the ages of 13 and 17 to operate business accounts on the platform that displayed users' phone numbers and email addresses.[56] Although this case is not that closely related to parents' consent on adolescents' online behaviors, it fully serves the purpose of demonstrating the existing method taken by Instagram is not refined and adolescents aged from 13 to 17 can still be regarded as 'children' under certain regulations.

C. TikTok

Going back to the Introduction part of this note, it is meaningful to look into TikTok's children's privacy policy in that it well reflects how live stream media service providers design policies in this respect. This part of the analysis is based on the version updated on January 1, 2023.TikTok Children's Privacy Policy is comprised of six sections: (1) What Information We Collect from Children; (2) How We Use Children’s Information; (3) How We Share Children’s Information; (4) Data Security and Retention; (5) Rights and Choices and (6) Privacy Policy Updates.[57]

As I maintain, there may be confusion about TikTok's attitude towards young users in that the two types of privacy policies, for children and parents, respectively, contradict each other to a certain extent. On the one hand, the general privacy policy states in 'Children and Teens' that TikTok is not directed at children, and shall the personal information be collected from a child be noticed by the platform, the information will be deleted, and the account will be suspended by TikTok.[58] However, TikTok hasn't explained the definition of children mentioned above yet. In addition, this platform has asked users to report via a link if children under the age of 13 are found to be TikTok users. If users click on the link, another page named

[56] See Ecuador: Instagram Fined 405 Million Euros For Violating The Privacy Of Children And Adolescents, https://www.mondaq.com/privacy-protection/1239506/instagram-fined-405-million-euros-for-violating-the-privacy-of-children-and-adolescents (last visited Mar 13, 2023)
[57] See Children's Privacy Policy, https://www.tiktok.com/legal/page/global/privacy-policy-for-younger-users/en (last visited Mar 13, 2023)
[58] See Privacy Policy, https://www.tiktok.com/legal/page/us/privacy-policy/en (last visited Mar 13, 2023)

'Submit a request' will appear. But as the author operates, this webpage includes only columns that collect the reporter's personal information and a column that allows the reporter to upload files, without mentioning the possible results of this report. But on the other hand, Children's Privacy Policy claims that the special version of the policy is committed to protecting the privacy of children.[59] Specifically, this policy clarifies how the platform collects, uses, shares, and otherwise processes the personal information of children under 13.[60] It seems that the TikTok Privacy policy has gone to great lengths to prevent children, even though the definition here is unclear, from accessing TikTok services; but the TikTok Children's Privacy Policy specifies TikTok's processing of youngsters' personal data. Since the two policies are valid simultaneously and can both be found on the official website of TikTok, I hereby reach the conclusion that there may exist a contradiction between TikTok's multiple privacy policies, and therefore, it remains unsettled whether children under 13 are allowed to access this platform and what special precautions or protective mechanism are set forth for the sake of children's privacy protection.

In pursuing the purpose of having insight into TikTok's children's privacy policy, the above-mentioned contradiction can be set aside temporarily. As far as the types of information collected from children's accounts are concerned, TikTok does not collect such information as detailed location as they do to normal users.[61] That is to say, TikTok mostly collects children's information out of necessity. Secondly, when it comes to how the platform uses and regulates children's private information, TikTok proposes that it will use it only for providing and supporting its own services and it will not allow children to publicize their personal information. However, TikTok stresses that it may use children's information to provide personalized contents, which indicates that there may exist automatic analysis directed to children. Thirdly, as TikTok introduces, the information collected may be shared with service providers so that internal operations of the TikTok service can be maintained. This method of sharing is common in recent tech corporations' practice and can be deemed as a rather safe approach on condition that local regulations or laws do not exert specialized requirements.[62] Moreover, TikTok has realized the risk of data leaking due to the unavoidable possibility of information transmission via the Internet. In response to the risk, TikTok proposes that it has appropriate measures to minimize the risk and the information will be stored only for the necessary period of time.[63] This part of policy, seemingly effective to children's privacy protection, cannot be regarded as indicating substantial advancement made by TikTok in this respect and it is, in essence, a repetition of concerning regulations (such as GDPR), as the author points out. Finally, what rights are parents granted are included in this policy? Despite the fact that what the term 'children' refers to is still not clear, parents are permitted to submit a request to know, access, delete, or correct the information collected from their children by TikTok.[64]

Summarizing the contents provided above, TikTok hasn't brought us much unique information regarding children's privacy protection except for the requesting mechanism that allows parents to supervise their kids' information collection and usage. In addition, the introduction of feedback on request can be adapted to many other applications as well. Admittedly, the present version of children's privacy protection policy remains to be specified

[59] Id. at 49.
[60] Id.
[61] Id.
[62] Id.
[63] Id.
[64] Id.

in that the subject to which the guidelines aim should be further clarified and the current contents are remotely connected with the characters of TikTok which features live stream media. Therefore, as the author considers, TikTok Children's Privacy Policy is more a combination of requirements set forth by legal authorities than a document being specified notice to users' attention.

D. Analysis

By examining the ISS services discussed above, the author hereby provides the following analysis:

I. Generally, the age of thirteen is a distinction standard for 'children', which means that a number of applications, such as Instagram, should not be accessed by young people who are less than 13 years old. However, this standard gives rise to different attitudes towards this group of children among service providers. Some providers grant parents and guardians of children to look over their kids' online space so that they may give consent when necessary or block offensive and negative behaviors and content for young users. This, in fact, is the requirement of regulations in certain jurisdiction regions, GDPR, for instance, when children are not mature enough to make individual consents. On the other hand, ISS providers may claim that so long as a child reaches thirteen, they should be deemed as an individual granted the full ability to access any services provided. In this regard, parents and guardians are in no authority to restrict children's access to full content or give comments. Such is the case with Instagram, but its defects can also be apparent: shall regional legislation require parental consent for children of 14 to 17 years old or protections different from that of adults' apply, negative legal consequences may arise.

II. The approach multiple ISS providers take to verify the users' ages varies as well. While several services looked into in this note haven't indicated how this verifying process is carried out in their children's privacy policies, several others inquire about users on their birth date so as to judge whether they are eligible to access the services. However, it is unneglectable that false information, whether deliberately provided or not, leads to the ineffectiveness of this mechanism. Therefore, in this regard, hosts of ISS providers have set up accesses to enable users to report clues when they discover unqualified users' attempts to enjoy the services. It is true that this method prevents young kids from taking advantage of applications that they shouldn't have accessed, but on no account can it be seemed as reliable for the report from adults can be random and incomplete. Referring to what Chinese game developers have done in the past few years on the same issue when it has been ordered that individuals under the age of 18 shall not spend over an hour on games on weekdays and three hours on weekends. To comply with the regulatory requirements, Chinese game developers request the users to provide their Identity Card numbers and adopt other technologies, such as biological verification, to guarantee that children's screen time is controlled. This can be a way out of the trouble, but it can also be a challenge for service providers because the introduction of ID verification requires refined data storage and protection systems, adding much to operating expenses.

III. For service providers boasting versatile areas of businesses like Apple and Microsoft, they tend to associate children's accounts with parents' accounts or family accounts so that parental control can be exercised. This can be essential for giant corporations whose businesses expand widely for excluding children from their customers may result in unwanted consequences. In fact, the combination of a hardware device, operation system and applications enables such providers to construct their privacy protection framework better. When young users try to sign up for services only available for adults, it is unnecessary for the apps

embedded into the OS to verify their identity since the information needed can be drawn from the family or parent account associated with these devices and OS. Moreover, parental supervision has been made more accessible since parents and guardians can access the browser history or online activities of children's accounts on their own devices since the information transformation should not be confronted with technological obstacles nowadays. Furthermore, the ample amount of funds possessed by service providers of this kind also entitles them to build up a more comprehensive and consistent system of children's data protection, eradicating the possibility of negative legal liabilities in the long run.

IV. Based on the aforementioned research into children's privacy policies, it is discovered that multiple corporations have included the following items in their policies: the users their services are directed to, parents' role in their children's accessing services, and how the children's information is collected, used, shared, as well as stored. However, a distinctive feature shared among these policies is that they seldom integrate the policy with their services. Taking TikTok as an example, although it has already notified its users of the sorts of information to be collected and used, little has it mentioned how the automatic suggestion works and what possible influence it will have on young users. In fact, the issue of automated algorithms and decisions is given priority nowadays for its involvement in artificial intelligence.

V. Based on the research mentioned above, the author predicts that public involvement may play a more frequent role in protecting children's privacy. Public adult users have now been encouraged to report clues indicating ineligible individuals are accessing certain services, and parents have been asked to report offensive or improper content when they discover it. These measures do help in mitigating the pressure exerted on ISS providers. However, as maintained before, public involvement cannot be regarded as the last resort since public users are not the subjects burdened with the liability to supervise the online environment. In essence, who should shoulder the responsibility remains unchanged, while corporations can still amend the present children's privacy policy for the better.

IV. CHANGING DPIA FOR THE BETTER

Now that we've learned how the aforementioned tech giants provide specialized care for children's privacy protection for the time being, we may conclude that at least presently, there has been no consensus on what ISS providers should do to avoid possible breaches of privacy protection regulations for kids. As is discussed previously, DPIA is not compulsory unless the service is hazardous, leading to the consequence that ICO may only be able to get a knowledge of a limited portion of service providers. This is equivalent to the fact that hosts of companies may be found to have breached the regulations only after the happening of hazardous consequences. Additionally, there can also be a number of service providers who have also breached the rules but are left undiscovered due to ICO's ignorant of their children's privacy policies. Provided that ICO has access to all providers that should submit DPIA reports, it can still be challenging for ICO to fully regulate on the ground that merely opaque guideline in filling the DPIA form has been provided for the ISS corporations. To change the situation for both regulators and ISS providers for the better, hereby, the author proposes the following guideline for reference.

A. About the Access of Children

Before clarifying whether children are the targeted customers of this information Society Service, service providers may first determine what 'children' refers to in line with local

regulations. British, for instance, mostly regard those under 13 as individuals who should be taken special care of since they are not allowed to make consents without parental control.[65] It should be noticed that what matters in the field of privacy protection is not whether an individual is able to bear legal liabilities fully but to what extent he is able to decide on his online activities. Going back to the current practice in the UK, whoever under 13 making a consent should be accompanied by parental consent, indicating that an adequate verification of age that fulfills this purpose is necessary. Nevertheless, ICO also requires that child should understand what they are consenting to. For example, where usually a teenager aged 16 can fully understand the item consenting to, the ISS provider should confirm that the user reaches the higher age level to be allowed to give individual consent. In this case, it is advisable to include the classification of age groups that may make a difference in Step 2 of DPIA tests.

Now comes the issue concerning target users. As surveyed by the author, most services have indicated the user groups entitled to access the service. But admittedly, few services have disclosed their verification method of age. Should the verification be ineffective, the service developer may be confronted with legal liabilities for violating concerning regulations or laws. Provided that the service is designed for users from all age groups, the author considers it necessary to address what approach has been adopted to identify the exact age, either by face recognition, Identity card verification, or any other approach. During this process, another problem should be handled with care. It is suggested that the service provider pay attention to the potential privacy protection problems associated with the verification process. How will the identity information be stored? How long will the data be stored? Are there any precautions that prevent the data from being illegally accessed? Is it necessary to collect the data? The answers to these questions can be pivotal since they determine whether the service providers have lawfully collected information. The reply to the safety problem may be included in Step 4 of DPIA, for it is highly linked to necessity and proportionality issues.[66]

The verification approach is also unneglectable for applications requiring children to reach a certain age threshold to access. The filling-in of the DPIA form can be similar to the situation mentioned above. The only difference is whether under-age children are restricted from consent or denied access to the service.

B. About Parental Control

It is often the case that parental control exists where children under the age of independent consent are granted access to the service. As for verifying parents' or guardians' identity, I will not explain it once more since it is highly similar to the mechanism introduced in Part A. What's new is how the relationship between parents and children can be established. So far, I have seen no specialized approach designed to recognize the adult user's rights to exercise control. As I propose, it can be impractical since requiring a 'birth certification' can be

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[65] See https://ico.org.uk/for-organisations/guide-to-data-protection/key-dp-themes/children/ (last visited Mar 20, 2023)
When offering ISS to UK children on the basis of consent, we make reasonable efforts (taking into account the available technology and the risks inherent in the processing) to ensure that anyone who provides their own consent is at least 13 years old.

[66] See Data protection impact assessments, https://ico.org.uk/for-organisations/guide-to-data-protection/ico-codes-of-practice/age-appropriate-design-a-code-of-practice-for-online-services/2-data-protection-impact-assessments/ (last visited Mar 20, 2023)
You need to explain why your processing is necessary and proportionate for your service. You must also include information about how you comply with the GDPR, including: your lawful basis for processing (see Annex C); your condition for processing any special category data; measures to ensure accuracy, avoid bias and explain use of AI; and specific details of your technological security measures (e.g., hashing or encryption standards).

weird and may lead to other privacy problems. This can be a theoretical problem to be discussed. Still, the author concludes that it's unlikely that legal liabilities will be contributed to since the ICO code merely rules that children are not in a position to give independent consent. When qualified adults approve their consent, the service provider still complies with the regulation.

In addition, a commonly neglected issue is whether children's access to services is over-restricted. That is to say, the author suggests that ISS providers examine whether they are depriving young users of their proper passage to the Internet world. Even though it is often neglected, the requirement for step 4 issued by ICO deems the loss of autonomy or rights as a specific type of risk.[67] Therefore, the author recommends that information Society Service providers include the justification for their restriction methods to avoid potential deprivation.

The contents and screen time have always been important for services closely related to instant messenger exchanges. Technically, screen time control is easier to achieve, for it can be attached to the identification verifying procedure. However, the control of contents can be more difficult. On the one hand, the difficulty is brought by the opaque standard of 'improper' since service providers may have trouble judging whether particular contents are harmful to children. Strict supervision of the contents may lead to poor user experience, whereas otherwise, ISS providers may violate the regulations. So far, parents and guardians have been involved in the process by encouraging them to report inappropriate content or behaviors. It has to be recognized that this approach may work for parents who tend to be more cautious on this issue, but the risk shouldn't be deemed as eradicated. Therefore, explaining the risks that may arise in this field in step 5 of DPIA tests shall be essential. Some developers have introduced artificial intelligence technology to screen our offensive content for children. In this case, the autonomous characters of AI should be taken special attention while corresponding risks should also be disclosed in DPIAs.

V. COPPA AND ICO ADC

ICO ADC and COPPA are two regulations that protect children's privacy in the UK and the US respectively. COPPA, also known as the Children's Online Privacy Protection Rule, has been in place for about 25 years. Although it has not been fully discussed in this note, it is still a regulation worth studying. While ICO ADC provides guidelines to service providers to help them set policies for children, COPPA is a US law enforced by the US Federal Trade Commission (FTC). In terms of legal status, COPPA outweighs ICO ADC. Despite differences in enforcement effectiveness, both regulations share similar goals.

COPPA is comprised of 13 sections in total (from Sec 312.1 to 312.13). In the first place, the definition of 'children' can be found in section 312.2: individuals under thirteen are regarded as children according to COPPA. This mitigates the space of argument since introducing the capability of making independent consent is no longer necessary. In addition, 'parent' in US law not only includes biological and adoptive parents but also refers to guardians. More importantly, COPPA has clarified that 'obtaining verifiable consent' is equivalent to service providers' making reasonable efforts to ensure that before personal information is collected from a child, a parent of the child receives notice of collection, use, disclosure and the parent notified has authorized the aforementioned actions.[68] As I maintain, this definition displays the advancement of legislation; because compared to the ICO ADC, COPPA

[67] Id.
[68] See 15 U.S.C. §§ 6501.

explained more clearly that due notice and authorization combined could compose effective parental consent. Section 312.2 is of great importance to this act in that it lays a solid foundation for the following sections by introducing the terms that show up frequently.

Section 312.3 reflects US regulations on unfair and deceptive acts concerning personal information from and about children on the Internet.[69] S312.3 is the leading part of the following sections, for it essentially only maintained that Sections 312.4 to 312.8 should be observed, or a service provider may violate the laws. The explanation of 'reasonable' can be tricky, for it comprises plenty of requirements. Firstly, the writing of the notice should be clear and understandable. Deliberate design to make the characters of notice difficult to recognize may lead to breaches. Secondly, the notice should be directly sent to parents as far as technology permits. The contents of the notice should contain the collection, use, and disclosure of children's information and material changes to the aforementioned items.[70]

Whereas S312.4 put forward detailed requirements for notice, S312.5 set forth what composes qualified parental consent. Parental consent is the prerequisite for children's access to the splendid Internet world; its superiority is self-evident. In response to the previously mentioned issue that it's hard to identify the relationship between young users and their parents, COPPA rules that any method to obtain consent should be reasonably calculated regarding available technology. Indeed, COPPA hasn't provided a fixed standard either, but so long as FTC can prove that service providers may do better in this respect, they may bear legal liabilities in practice. As a general requirement, the COPPA regulates that service providers shall require parents to consent to disclose information to third parties, bringing the principle of minimum necessity to practice. However, there is no law but has an exception. The parental consent may step backward on condition that (1) the collection of information is aimed at obtaining consent; (2) collecting parents' information for the sake of informing them of children's online participation; (3) collecting contact information for single-time uses; (4) children and parents' contact information are collected for multiple-time requests but won't be used for any other purposes; (5) the collection of information is for the safety of children; (6) the collection of information is allowed by judicial proceedings or else, legal basis can be found; (7) collecting information for internal and continual service providing; (8) operators only collect persistent identifier while no further information is collected.[71] Based on the eight situations in which parental consent is not compulsory, I hereinafter conclude that COPPA has tried to balance the safety of children's private information and service providers' operation efficiency. Compared with ICO ADC, it is undoubtedly that the US regulation provides operators with more explicit instructions as far as parental consent is concerned.

As is discussed, parents' right to get knowledge of their kids' participation in online activities shall be limited to grant adequate space for young users. COPPA S312.6 regulates that having certified the parent's identity, parents should have access to types of information collected from children, and they are in a position to refuse future information use and collection. Accordingly, the operators shall terminate the service provided on request.[72]

Under Section 312.11, COPPA has introduced the so-called 'safe harbor program' to the children's privacy protection field. This program, with no parallels in regulations such as ICO ADC, allows industry groups to apply for approvals of self-regulatory program guidelines

[69] Id.
[70] Id.
[71] Id.
[72] Id.

on condition that the protection standard promised by the proposed guidelines are substantially analogous to COPPA requirements, self-assessment shall be carried out, and mandatory disciplinary actions for non-compliance shall exist.[73]

Compared with the age-appropriate design set forth by ICO in the UK, COPPA can be regarded as more a regulatory framework than a guideline. On the one hand, instead of providing information to Internet Service providers with recommended approaches to comply with, COPPA mainly states standards and administrative procedures of privacy protection without telling operators how to reach these goals. While on the other hand, ICO ADC has gone to great lengths to give instructions on this issue. The effort devoted to DPIAs illustrates this difference, for ICO may even provide its official conclusion on the possible information risk. FTC will not supply these services in the United States. As I propose, however, COPPA provides more evident concepts and regulatory requirements when compared to the age-appropriate design in the UK. Section 312.2, which includes the definition of hosts of terms, such as 'children', 'parental consent,' etc. The illustration of these concepts eradicates the necessity to clarify legal procedures and practices further. In addition, it's impressive that COPPA has described that 'reasonable effort' refers to the most outstanding possible efforts made with presently accessible technologies. From the perspective of legal status and negative consequences, even though these two vary in compulsion, they point to similar legal responsibilities in that violation of each code results in insufficient protection of children's privacy.

VI. CONCLUSION AND DISCUSSION

With the rise of internet technology and the increasing need for young people to access the virtual world, potential dangers also arise. Digital natives may not be aware that their every move, such as registration, consent, and sharing, can lead to improper privacy disclosure, resulting in unexpected consequences. Even more concerning, information leaks in the online world can potentially spill over into children's real lives through the illegal collection of data. Therefore, it is clear that legislation on children's privacy is both necessary and urgent. In recent years, major nations have implemented regulations aimed at protecting children's privacy, whether in the form of laws, acts, or other measures. Additionally, internet service providers have developed their own privacy policies. After analyzing the efforts made by Internet service providers and regulatory practices in the US and UK, I have come to the following conclusions:

Operators of various scales tend to emphasize different aspects. For those who provide livestream or instant message services, their main business model is characterized by fast-spreading information. As a result, these corporations prioritize blocking inappropriate content to prevent it from reaching children. In addition, these types of services set strict age limits, often requiring individuals to be older than a certain age to use their platform. To prevent underage users from accessing their services, operators also introduce a reporting mechanism to detect them instantly.

Meanwhile, operators who offer a variety of services, such as Apple, may focus on data sharing among their services. Operating systems (OS) operators can provide one-stop identification for applications with users' permission for data sharing, which brings many advantages.

[73] Id.

Admittedly, mainstream ISS providers have made efforts to design the children's privacy policies that best suit their needs, the parental consent has always been an issue. In the first place, verifying parents' identities can be a dilemma. I've discovered no applications requiring users to upload or provide official relationship certification. Therefore, the 'parent' granting children's access to services may be elder siblings or even adult strangers who bear no responsibility to the children. While strict monitoring of the relationship provides children with a safer online atmosphere, operators are confronted with more significant challenges in that the consequence of unexpected and illegal data access is unaffordable and irreversible. Meanwhile, due to the complicated verification mechanism, the market occupation and economic effects are subject to suffering.

Operators have not yet developed a widely recognized standard for parental involvement when it comes to children's privacy. Some services exempt children from parental supervision once they reach a certain age (such as 13 in the UK and the US), while others believe that parents are still responsible for their children's participation as they may not fully understand the gravity of their decisions. Based on current legislation and regulations, I believe the latter approach is preferred as information security should be given priority. This brings up another issue that is often overlooked: to what extent should children be granted online freedom? While COPPA has yet to rule on this problem, ICO ADC requests that due space be provided. Therefore, there is no consensus on this issue at the legislative and practical level. Although there has been no evident sign indicating that the situation will change for the better shortly, I believe that advancements in regulation capability will help resolve this issue, as it primarily contributes to children's online experience.

Another problem worth discussing is that the latest versions of children's privacy policies are highly similar to the general ones applicable to adults. This means that the former ones also contain paragraphs introducing how information is collected, stored, shared, and disclosed. For example, storage is not a unique concern for children and there is no need to emphasize it in the privacy policies for children. It is feasible to separate the storage of children's and parents' information and keep them under different stages of security. Therefore, ISS providers need to work out a new version of a particular privacy policy that features children's unique needs to distinguish the protective measures between children and other groups of users.

Privacy protection is becoming a heated topic worldwide, but it is also becoming a double-edged sword that may be used for purposes other than protecting policy. For instance, the TikTok event has long been regarded as an approach adopted by the United States authority to restrain the development of Chinese technology, composing the puzzle of the Sino-American trade conflict. Regardless of any external factors, one idea is for sure: the protective umbrella for children's privacy should be held firmly with no exception. As kids' access to the Internet world is unavoidable and beneficial, regulators, operators, and guardians should work collaboratively to provide a safe environment for our future generations. Whatever unexpected and unwanted factors exists, we must amend the previous versions of policies and prepare them for future needs and challenges.

OIL AND GAS PATENTS: DO MULTINATIONAL CORPORATIONS IMPEDE THE GROWTH OF TECHNOLOGY IN DEVELOPING COUNTRIES?

Harini Varadarajan*

Abstract: 82% of the world's proven oil reserves are in the members of the Organization of Petroleum Exporting Countries which are predominantly developing countries. The international oil corporations (IOCs) otherwise known as the O&G (Oil and Gas) multinational corporations (MNCs) of the advanced nations develop the technology for extracting the hydrocarbons from the reserves and assist the developing oil-rich states in doing so. In exchange for the technology, developed nations have obtained access to the O&G resources that they lack. Because the technology required to extract oil is highly sophisticated and requires substantial research and development (R&D), the MNCs have secured them using patents. However, some of the strategic patenting practices and supplementary offensive methods employed by the MNCs of technologically superior countries over the past century have been criticised as being anticompetitive. Though these methods were employed to secure their own investments, they have inadvertently hindered technological development of some developing oil-rich nations and created a large technology gap between the Global North and South which I will present through the course of this paper. I conclude that oil-rich nations that lacked capital and technological infrastructure due to weak governmental support for Research & Development have been the ones to suffer in contrast to those oil-rich nations whose governments were committed to technology and advancement. Therefore, to overcome the technology gap, I urge host countries to have the political will and take proactive measures to develop their own technology. Reformation of International Intellectual Property Laws must also be considered if developed nations are indeed committed to helping the developing countries succeed, as encouraging innovation in all countries is indeed the very foundation of IP Law.

Keywords: Patents; Anti-Competitive; Anti-Trust; Oil and Gas; International Intellectual Property Law; Developing Countries; Multinational Corporations; Innovation; Technology

* University of Edinburgh, United Kingdom.

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INTRODUCTION

82% of the world's proven oil reserves are in the members of the Organization of Petroleum Exporting Countries who are predominantly developing countries. [1] The international oil corporations (IOCs) otherwise known as the O&G (Oil and Gas) multinational corporations (MNCs) of the advanced nations develop the technology for extracting the hydrocarbons from the reserves and assist the developing oil-rich states in doing so. In exchange for the technology, developed nations have obtained access to the O&G resources that they lack. Because the technology required to extract oil is highly sophisticated and requires substantial research and development (R&D), the MNCs have secured them using patents. However, some of the patenting practices and supplementary methods employed by the MNCs to secure their technology has at times been criticised as being anticompetitive and curtailing the innovation of the oil-producing states. Although the impact of petroleum operations conducted by IOCs to the environment and human rights of these states has been a highly debated issue for many years, their impact on their technological growth particularly from the patenting standpoint has not been a thoroughly explored subject. The situation thus begs the question 'Oil and Gas Patents: Do MNCs impede the growth of technology in developing countries?'

Though proponents of the patent system believe that patents are a vehicle of technology transfer, intended to facilitate technical exchange among users with common purposes,[2] this has not always been the case. Particularly in the oil industry, there have been instances in which oil-rich states have suffered a setback to their technology growth because of the strategic manner in which patents owned by the oil corporations have been wielded. And other than a handful, most oil-producing nations continue to be technologically deficient. Therefore, rather than limiting myself to a single jurisdiction, I focus on their general use in the international O&G industry. I examine oil-rich nations that have experienced technological growth as well as those who have experienced technological stagnation, explore the reasons for these and consequently determine what role if any, the patents owned by the O&G MNCs played in them. Because it is my intention that this paper be of use to oil-producing nations who wish to close the technology gap, my analysis culminates in a set of recommendations to develop suitable domestic and international reforms.

This paper is organized as follows. In chapter 2, I present the rationale behind Patent Law, the role of Antitrust Law and enumerate the corporate practices that affect the balance between these laws. In chapter 3, I demonstrate the presence of a technology gap between the advanced states who develop the oil technology and the oil-producing developing states. I will use country examples to demonstrate the usage of anticompetitive practices such as patent strategizing and restrictive patent licensing by MNCs and also present the adverse effects resulting from their use. In chapter 4, I present the counter argument by citing examples of oil-producing nations who have not only managed to escape the adverse effects of O&G MNC patenting, but in fact benefited from them and increased their technological level through technology initiatives, transfers, and collaborations. Having analysed both sides of the issue I suggest reforms to enable the technology deficient nations to increase their technological capability in chapter 5. Here I also detail the Shale technology revolution of the United States

[1] Organization of Petroleum Exporting Countries, https://www.opec.org/opec_web/en/data_graphs/330.htm (last visited 19 May 2023).

[2] Louis M. Lubango, *When can strong patent regimes boost countries' stocks of inventions and related trade? An analytical model tested in Brazil, Egypt, Nigeria and South Africa in the energy, environment and pharmaceuticals and related sectors* 42 TECH. in SOC'Y 150, 150 (2015).

as the ideal manner in which patents can be used to increase innovation. Because patenting is a good indicator of technology growth,[3] I will present patent statistics to illustrate my point throughout the course of this paper. Chapter 6 concludes this paper by summarizing both sides of the argument and presenting my position on the topic.

I. THE PATENT-ANTITRUST BALANCE AND RELATED ISSUES OF THE O&G INDUSTRY

A. The Rationale Behind Patent Law

Patents are a type of intellectual property rights (IPRs). A patent confers upon the inventor exclusive rights to commercialize the invention and obtain revenue from its sales during the duration of its validity. It also guarantees the inventor protection from another's exploitation of his invention through claims established in the patent application. Patent rights are typically territorial i.e. valid only in the country they are granted and can be renewed periodically[4] for about 20 years[5] allowing the inventor a temporary monopoly over that technology. The Patent Convention Treaty system allows an inventor to obtain patent rights in all its member states by filing a single application.[6] Currently 152 states are party to the PCT making it the main international patent granting authority.

In their current form, most patents are owned by companies that develop them for commercial applications through investment in R&D activities. In addition to securing protection for and exclusive use of the technology, the availability of a patent also allows firms to earn royalty income through licensing of that technology. Patents are thus closely linked with trade and commerce. Because patent rights are typically territorial, to enable smoother cross-border trade while ensuring adequate protection for them, the World Trade Organization has defined regulations in the Trade-Related Aspects of Intellectual Property Rights.[7] TRIPS provides a means of harmonizing the different national IP systems and allows developing nations with nascent IP laws to learn from those of the developed countries. However, TRIPS has received much criticism for being tilted towards the developed nations because it requires developing nations to guarantee minimum standards of protection for foreign patents by adopting a system that is predominantly western in nature. This has been attributed to the WTO being dominated by MNCs of developed countries who want to ensure that their technology is protected during trade with the developing world. Because 80% of the R&D takes place within the private MNCs of only ten of the advanced nations of the world, they have a greater say.[8]

Though proponents of patents consider them as a means for technology exchange unlike trade secrets where technology is undisclosed, they can sometimes be a "barrier to entry"[9] for other inventors, restrict competition and create a monopoly which ultimately leads to reduced innovativeness. This naturally defeats the purpose of Patent Law and hence in order to maintain

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[3] Kyungpyo Lee & Sungjoo Lee, *Patterns of Technological Innovation and Evolution in the Energy Sector: A Patent-Based Approach*, 59 ENERGY POL'Y 415, 415 (2013).
[4] Corinne Langinier, *Are patents strategic barriers to entry?* 56 J. ECON. & BUS. 349, 351 (2004).
[5] World Intellectual Property Organization, *Patents* (last visited 17 May 2023), https://www.wipo.int/patents/en/
[6] Patent Convention Treaty PCT available at: http://www.wipo.int/pct/en/ (last visited 15 May 2023).
[7] Trade-Related Aspects of Intellectual Property Rights available at: https://www.wto.org/english/docs_e/legal_e/27-trips_01_e.htm (last visited 17 May 2023).
[8] ALPER SÖNMEZ, MULTINATIONAL COMPANIES, KNOWLEDGE AND TECHNOLOGY TRANSFER: THEORETICAL FRAMEWORK. IN: MULTINATIONAL COMPANIES, KNOWLEDGE AND TECHNOLOGY TRANSFER. CONTRIBUTIONS TO MANAGEMENT SCIENCE 21 (1st ed. 2013) available at: https://doi.org/10.1007/978-3-319-02033-4_2.
[9] Nuno Pires De Carvalho, *The Primary Function of Patents*, 1 J. L., TECH. & POL'Y 63 (2001).

the balance between patent protection and healthy competition and to stimulate innovation, Antitrust Law has been developed.

B. The Role of Antitrust Law

Antitrust law is intended to regulate the conduct of business corporations and to promote fair competition in any market for the benefit of the consumers. But although international patent regulations and harmonization exists, antitrust issues have been largely left to national legislations.[10] To comprehend how antitrust law functions, the anticompetitive legislative provisions of a few countries are examined below.

In the United States, the Sherman Act,[11] the Clayton Act[12] and the Federal Trade Commission Act (FTC)[13] are the main means of antitrust control. The US verbiage for anticompetition is antitrust.[14] The Sherman Act of 1890 is the federal statute which authorizes the Department of Justice to bring suits against anticompetitive agreements or for market monopoly. The FTC Act of 1914 focuses on detecting and banning all unfair methods of restricting competition including but not limited to the Sherman Act. The Clayton Act of 1914 focuses on joint ventures, mergers and acquisitions which may unfairly create monopolies or reduce competition. These laws are limited to the jurisdiction of the US only and courts are usually reluctant to adjudicate foreign patent claims or interfere in antitrust issues outside its territory unless American consumers are affected.[15]

In Europe, antitrust control is established through two main regulations in the Treaty on the Functioning of the European Union and is enforced by the European Commission.[16] The first regulation is defined in article 101[17] of the Treaty which bans contractual agreements that restrain competition, and the second regulation is defined in article 102[18] which prohibits market abuse by corporations holding dominant positions. The EC requires these to be applied in conjunction with the national antitrust controls.[19]

In Australia, the welfare of the Australian consumer is ensured through the Competition and Consumer Act[20] which promotes competition and encourages fair-trade practices.

[10]Stephen Yelderman, *International Cooperation and the Patent-Antitrust Intersection* 19 TEX. INTELL. PROP. L.J. 193, 195 (2011).
[11] Sherman Antitrust Act, 15 U.S.C. §§ 1-7.
[12] Clayton Act 15 U.S.C. §§ 12-27.
[13] Federal Trade Commission Act 15 U.S.C. §§ 41-58.
[14] Raju KD, *Interface between Competition law and Intellectual Property Rights: A Comparative Study of the US, EU and India,* 2 INDIAN SOC'Y INT'L. L. 115 (2014).
[15] Kendra Robins, *Extraterritorial patent enforcement and multinational patent litigation: Proposed guidelines for US Courts,* 93 VIRGINIA L. REV. 1264 (2007).
[16] Treaty on the Functioning of the European Union (TFEU), 2010 O.J. (C 83) 47.
[17] Consolidated Version of the Treaty on European Union [2008] OJ C115/88.
[18] Consolidated Version of the Treaty on European Union [2008] OJ C115/89.
[19] European Commission, http://ec.europa.eu/competition/antitrust/nca.html (last visited May 2018).
[20] Australian Competition and Consumer Act 2010 (Cth), available at: http://www.australiancompetitionlaw.org/legislation/2010cca.html (last visited 16 May 2023).

The Competition Act[21] of Canada provides small and medium enterprises in Canada equal opportunities by regulating the competition in its economy while at the same time aiming to provide consumers with "competitive prices and product choices."[22]

Most of the advanced nations possess similar national antitrust legislation but in contrast, most developing nations only possess nascent antitrust laws having only recently acknowledged the need for anticompetitive control and enforcement. What we can gather from the antitrust laws of the advanced countries described above is that they are territorial, and their main focus is on the impact to the consumers in their own market. There is no international antitrust governing body for international activities. And because of this gap in the international antitrust regulation, many anticompetitive activities of O&G MNCs, who were often tougher than their developing state counterparts have continued unchecked for a long time. These are detailed in the next section.

C. Patent Usage in the O&G Industry

Patents are extensively used by firms in the O&G industry for two main reasons. The first reason is to acquire a competitive advantage[23] over other firms through the ownership of highly essential and sophisticated technology. The second reason for patent usage in the oil industry is that innovation is capital-intensive and commercializing a concept takes about 16 years.[24] Therefore in order to guarantee returns, patents are essential. With "easy oil"[25] having been used up, the need to secure technology to extract the maximum value of the reserves is imperative to the survival of MNCs and hence many of them have drastically increased their R&D budget and accumulated large patent portfolios.[26] O&G patents are not simply a means to safeguard proprietary technology, but are in fact a commodity for revenue generation from licensing technology.[27, 28] An increase in global patent litigation when oil prices started to drop is also indicative of the value of patents as revenue generators.[29] Patent settlements as high as C$52 million in Varco Canada v. Pason Systems[30] in 2013 confirms the importance of patent

[21] Canadian Competition Act, R.S.C., 1985, c. C-34, available at: https://laws.justice.gc.ca/eng/acts/C-34/PITIndex.html. (last visited 16 May 2023).
[22] Ibid 1.1.
[23] Brett Slaney & Dalton W. McGrath, *From Windfalls to Pitfalls: Intellectual Property in the Oil and Gas Industry*, Blakes (Nov. 5, 2013), https://www.lexology.com/library/detail.aspx?g=454d5e28-2894-4b94-9cf4-2f13a4130c20.
[24] *Facing the Hard Truths About Energy: A Comprehensive View to 2030 of Global Oil and Natural Gas*, National Petroleum Council (July 18, 2007), https://www.npchardtruthsreport.org/pdf/NPC_Facing_Hard_Truths.pdf.
[25] Robert K. Perrons, *How innovation and R&D happen in the Oil and Gas Industry: Insights from a global survey,* 124 J. PETROLEUM SCI. & ENGG. 301, 301 (2014).
[26] *The Increased Importance of Patents for Big Oil*, Intellectual Property Expert Group (July 10, 2007), https://www.ipeg.com/the-increased-importance-of-patents-for-big-oil/
[27] Benjamin S. Fernandez & John V. Hobgood, *Energy Sector Alert Series: As Oil Prices Descend, Patent Enforcement Litigation Increases Within Energy Industry*, Wilmer Hale (Mar. 3, 2016), https://www.wilmerhale.com/en/insights/client-alerts/2016-03-03-energy-sector-alert-series-as-oil-prices-descend-patent-enforcement-litigation-increases-within-energy-industry.
[28] Mark Prinsley, *Give It Some Gas*, Intellectual Property Magazine (May 2015), https://w Mark Prinsley, *Give It Some Gas*, Intellectual Property Magazine (May 2015), https://www.mayerbrown.com/-/media/files/news/2015/06/give-it-some-gas/files/art_prinsley_jun15_give-it-some-gas/fileattachment/art_prinsley_jun15_give-it-some-gas.pdf.
[29] Rashid Khan, *What is an Intellectual Property Strategy for Oil and Gas Industry?* 52 J. LICENSING EXECUTIVES SOC'Y 45, 45 (2017).
[30] Varco Canada Ltd. et al. v. Pason Systems Corp. et al., (2013) 437 F.T.R. 243 (FC).

litigation in the oil and gas industry, making it more lucrative than pharmaceutical litigation in Canada.[31]

Despite the many advantages of patents, the manner in which they have been wielded can sometimes be regarded as anticompetitive. For example, the use of wide claims in the patent application, blocking patents,[32] non-essential patents and claims of infringement are mainly intended to deter competition but can instead hinder innovation. Strategic practices like patent aggregation[33] both through development and acquisition of technology allows firms to accumulate large patent portfolios making them a "formidable adversary".[34] Because the cost of defending a patent infringement suit averaged around 2.2 million USD[35] in 2015, fear of such high costs from patent litigation can discourage smaller companies from innovating.[36] In the petroleum industry this has resulted in an inadvertent technological oligopoly by major oil corporations and created barriers to entries[37] for new entrants.

Another manner in which O&G MNCs have been known to deter competition is by 'patent pooling' in which firms form patent pools and cross-license when the rights of several patents are needed to develop a certain product or when they hold blocking patents.[38] Although patent pooling can have cost benefits for the consumer, it can also reduce competition and in the long term is not beneficial. The case of Standard Oil[39] described in the next section is one such instance.

Multinational oil corporations often hold patents for the same invention in multiple jurisdictions which makes it safe to license out their oil technology to the national oil companies (NOCs) of different oil-producing nations. However, they have at times used practices such as restricted licensing and non-compete clauses to stifle innovation and eliminate local competition in the host countries. Restricted licensing occurs using clauses when licensing technology to NOCs. Conditions like patent grant-backs require the licensee to grant back any improvements made to the licensed technology to the licensor.[40] Some clauses even

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[31] Brett Slaney & Dalton W. McGrath, *From Windfalls to Pitfalls: Intellectual Property in the Oil and Gas Industry*, Blakes (Nov. 5, 2013) https://www.lexology.com/library/detail.aspx?g=454d5e28-2894-4b94-9cf4-2f13a4130c20.

[32] Yibai Yang, *On the optimality of IPR protection with blocking patents,* 27 REV. ECON. DYNAMICS 205, 205 (2018).

[33] Oleg Milchenko, *Contemporary Anti-competitive Practices of Patents Usage* 8 J. INT'L COM. L. & TECH. 190, 194 (2013).

[34] Barry Barnett, *Antitrust Lessons for Patent Cases*, The Contingency (July 20, 2015), https://www.thecontingency.com/2015/07/antitrust-lessons-for-patent-cases/.

[35] Rashid Khan, *What is an Intellectual Property Strategy for Oil and Gas Industry?* 52 J. LICENSING EXECUTIVES SOC'Y 45, 46 (2017).

[36] Andreas Exarheas, *Teaming-Up in 2015: Collaboration Agreements by European Oil, Gas Firms*, Rigzone (Jan. 26, 2016), https://www.rigzone.com/news/oil_gas/a/142659/teamingup_in_2015_collaboration_agreements_by_european_oil_gas_firms/.

[37] Maryam Rashtchi et. al, *Patent Analysis in Research Institutes of Developing Countries*, Conference Paper (May 2005), https://www.researchgate.net/publication/267926517_Patent_Analysis_in_Research_Institutes_of_Developing_Countries.

[38] Joel E. Lutzker & Darren M. Franklin, *Patent Pools*, Sheppard Mullin (Apr. 21, 2008), https://www.sheppardmullin.com/media/article/532_Patent%20Pools.pdf.

[39] Standard Oil Co. v. United States, (1931).

[40] Srijit Mukherjee & Sudipta Bhattacharjee, *Technology Transfer and the Intellectual Property Issues Emerging from It – An Analysis from a Developing Country Perspective* 9 J. INTELL. PROP. RTS. 270 (2004).

outrightly ban the licensee from conducting any R&D.[41] Patent extensions through which the life of the patent is extended by patenting the improvements so that the technology is never free are also often used. In some cases, the receiver of the technology may be required to return all technical information and stop using the technology once the agreement has expired.[42] Non-compete agreements prevent NOCs from conducting research that might compete with the technology of the MNC partner. Because patenting can be a luxury[43] for some due to its high cost and because local firms and inventors are less familiar with and wary of the western patenting systems, many developing nations have been slow to adopt it.

Having developing states heavily reliant on their technology has allowed MNCs to charge large amounts in licensing and royalty fees. In 2002, the royalties earned from licensing patents internationally by the US alone was about 80 billion USD.[44] With the United States being the largest developer of oil technology,[45] it is no surprise that nearly 60% O&G patents produced in the US are deployed abroad.[46] MNCs also build defensive patent portfolios and accumulate patents through mergers and acquisitions. These are detailed in section 3.3.

D. Significant Antitrust Cases involving Patents in the O&G Industry

Despite the alleged use of patents as "anticompetitive weapons"[47] in the oil industry, only a few cases have been processed. This is because of the difficulty in detecting and classifying any of these acts as anticompetitive and due to jurisdictional limitations. Nonetheless, the cases described below will help us understand some of the antitrust issues within the oil industry.

The 1910 case of Standard Oil Co v United States[48] was the first antitrust case of the US oil industry. Standard Oil was known for developing and patenting a superior refining technology which was highly beneficial to the American consumer. However, over several years it went on to obtain monopoly in that sector by conducting a series of unfair anticompetitive acts through the use of 37 subsidiaries. These acts included but were not limited to the acquisition, use, sale, and grant of patent licenses across the world. Standard Oil was charged guilty under the Sherman Act for price fixing by restraining competition which increased cost to consumers and was subsequently dissolved.

A similar allegation of price fixing by Atlantic Richfield Company alleged by USA Petroleum Company was not held illegal because the act was actually advantageous to

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[41] Howard A. Kwon, *Patent Protection and Technology Transfer in the Developing World: The Thailand Experience*, 28 GEO. WASH. J. INT'K L. & ECON. 567, 575 (1995).
[42] Paul Kuruk, *Controls on Technology Transfer: an Analysis of the Southern Response to Northern Technological Protectionism*, 13 MD. J. INT'L L. 301, 310 (1989).
[43] Rashid Khan, *What is an Intellectual Property Strategy for Oil and Gas Industry?* 52 J. LICENSING EXECUTIVES SOC'Y 45, 47 (2017).
[44] Ashish Arora, *Intellectual Property Rights and the International Transfer of Technology: Setting Out an Agenda for Empirical Research in Developing Countries*, World Intellectual Property Organization, http://www.wipo.int/edocs/pubdocs/en/wipo_pub_1012-chapter2.pdf (last visited May 17, 2023).
[45] Hanne Berg Cortesi & Marianne Skanseng, *Subsea production and processing technology*, Norwegian Industrial Property Office Patent Landscaping Report (September 2017), https://www.patentstyret.no/globalassets/patent/filer/subseaproduction_and_processingtechnology.pdf.
[46] Robert K. Perrons, *How innovation and R&D happen in the Oil and Gas Industry: Insights from a global survey,* 124 J. PETROLEUM SCI. & ENGG. 301, 308 (2014).
[47] *The Increased Importance of Patents for Big Oil*, Intellectual Property Expert Group (July 10, 2007), https://www.ipeg.com/the-increased-importance-of-patents-for-big-oil/.
[48] Standard Oil Co. of N.J. v. United States, (1910).

consumers.[49] Likewise, in Kinnear-weed v. Humble Oil & Refining Co,[50] the court found that patent infringement even wilfully committed did not constitute a crime because it did not actually restrain commerce and because the public benefit. As we can see, benefit to the consumer is key in antitrust allegations.

The 1931 case of Standard Oil Co v United States[51] is the classic example of anticompetition through patent pooling. Four petroleum firms created a patent pool by cross-licensing 46 patents creating a market dominance. The acts displayed an intent of monopoly through the division of royalties and were held as violating the Sherman Act.[52]

The use of wide claims in patents is commonly used to foil competitors requiring them to invent around the patent or to charge infringement. But in Oil States Energy v Greene's Energy,[53] infringement of Oil States' patent by Greene's was dismissed and the patent was invalidated because its claims were found to be weak and lacking in novelty. The court wanted patent monopolies to be kept within their legitimate scope.

In a similar issue, misrepresentation of its patent claims by Unocal[54] harmed competition and lead to unfair monopoly. The FTC came down hard against Unocal for attempting to earn huge royalties for the use of its technology after making a fraudulent claim to California Air Resources Board. Unocal was subsequently found guilty.

Despite a handful of lawsuits in the US, the antitrust sensitivity of the oil industry is low.[55] In many jurisdictions, patent protection has priority over anticompetition. For example, in Korea patent abuse is extremely hard to prove because of the occurrence of "sham" litigations and in Brazil and Spain the burden of proof for anticompetitive acts falls on the claimant who can be held liable if the claim is determined to be in bad faith.[56]

II. THE CASE AGAINST O&G MNC PATENTS – EVIDENCE OF THE TECHNOLOGY GAP

Petroleum operations are divided into three portions: upstream, midstream and the downstream sectors. The midstream sector focuses on the storage and transport of oil and gas, whilst the downstream sector includes oil refineries and distribution plants. The upstream sector where the exploration and production (E&P) occurs is the most innovative sector. Here, technologies to extract oil efficiently and maximise production using conventional and unconventional methods are developed and patented by O&G corporations. But in order to increase the competitiveness among themselves, the petroleum industry has resorted to closed

[49] Richfield v. Petroleum, (1990).
[50] Corp v. Humble Oil & Ref. Co, (5th Cir. 1954).
[51] Standard Oil Co. v. United States, (1931).
[52] Joel E. Lutzker & Darren M. Franklin, *Patent Pools*, Sheppard Mullin (Apr. 21, 2008), https://www.sheppardmullin.com/media/article/532_Patent%20Pools.pdf.
[53] Oil States Energy Servs. LLC v. Greene's Energy Grp. LLC, (2017).
[54] Union Oil Co. of Cal. v. CHEVRON U.S.A., INC., Exxon Corp., Mobil Oil, Shell Oil Prods. Co. & Texaco Ref. & Mktg., Inc. Defendants., (C.D. Cal. 1998).
[55] Ronald W Davis, *Antitrust Analysis of Mergers, Acquisitions, and Joint Ventures in the 1908s: A Pragmatic Guide to Evaluation of Legal Risks*, 11 DEL. J. CORP. L. 25, 44 (1986).
[56] World Intellectual Property Organization, *Study on the Anti-Competitive Enforcement of Intellectual Property (IP) Rights: Sham Litigation*, Committee on Development and Intellectual Property (CDIP) Meeting Report (May 7-11, 2012), http://www.wipo.int/edocs/mdocs/mdocs/en/cdip_9/cdip_9_inf_6_rev.pdf.

innovation methods[57] and patent strategizing which have morphed into their use as an "offensive competitive weapon"[58] with repercussions beyond borders. This can be clearly observed in the technology dichotomy between the developed countries like US, Europe and Japan which possess the oil technology and the developing oil-producing countries.

A. The Technology Gap[59]

An ideal and balanced scenario of the petroleum industry would have comprised of MNCs of advanced states sharing their technology with developing host states in exchange for petroleum for use in their home state. But, because many O&G MNCs were often stronger than the developing countries and were motivated purely by commercial gains, they closely safeguarded their technology and used it as leverage to obtain access to the reserves and in some instances completely exploited the nations and damaged their environments.[60, 61] The MNCs felt justified in guarding the technology they licensed to the host state NOCs because they spent considerable time and resources to develop them and the NOCs did not take initiatives to innovate. In fact, prior to the 1980s more than 80% of R&D expenditure was borne by only eleven of the main oil companies.[62]

However, patent protectionism took an ugly turn when MNCs started to place restrictions on the users of their technology such as patent grant-backs,[63] non-compete clauses and restricting innovation of the licensee including outright bans on their R&D. These restrictive clauses were included in the licensing or technology agreements between the IOC and the NOC and have previously been described in section 2.3. I refer to these clauses as anticompetitive practices because they would not have met the standards of the US antitrust laws had they been within its jurisdiction.[64] Because the oil industry is mainly a process-based industry,[65] a large part of the proprietary technology is retained in the "know-how"[66] of the personnel. Therefore, to prevent technology leakage, MNCs employed expatriate technical personnel in crucial technical areas and limited the local workforces' access to them. Some MNCs also "colluded" with corrupt host governments "against the best interests of the local population".[67] Often two foreign firms engage in a competition to gain market share through their patented technology, which creates a sort of duopoly deterring the local firms.[68] These

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[57] Kyungpyo Lee & Sungjoo Lee, *Patterns of Technological Innovation and Evolution in the Energy Sector: A Patent-Based Approach*, 59 ENERGY POL'Y 415, 425 (2013).
[58] *The Increased Importance of Patents for Big Oil*, Intellectual Property Expert Group (July 10, 2007), https://www.ipeg.com/the-increased-importance-of-patents-for-big-oil/
[59] Daniel Benoliel, *The International Patent Propensity Divide*, 15 NC J. L. & TECH., 49, 49 (2013).
[60] Elisa Giuliani, *Multinational Corporations, Technology Spillovers and Human Rights Impacts on Developing Countries*, LEM Paper Series (2010), https://www.ec.unipi.it/documents/Ricerca/papers/2013-158.pdf.
[61] The example of Nigeria to prove this point will be discussed in the next section.
[62] Economides M, Oligney R, *The Color of Oil: The History, the Money, and the Politics of the World's Biggest Business* (Round Oak Publishing Company, 2000).
Cited in Robert K. Perrons, *How innovation and R&D happen in the Oil and Gas Industry: Insights from a global survey,* 124 J. PETROLEUM SCI. & ENGG. 302 (2014).
[63] Paul Kuruk, *Controls on Technology Transfer: an Analysis of the Southern Response to Northern Technological Protectionism*, 13 MD. J. INT'L L. 301, 311 (1989).
[64] Daniel R. McGlynn, *Technology Transfer and Industrial Property Law in Developing Countries*, 8(2) U. MIA INTER-AM. L. REV. 394, 396 (1976).
[65] Alexey Bereznoy, *Catching-up with the supermajors: the technology factor in building competitive power of national oil companies from developing economies,* INDUSTRY & INNOVATION, 127, 143 (2019).
[66] Srijit Mukherjee & Sudipta Bhattacharjee, *Technology Transfer and the Intellectual Property Issues Emerging from It – An Analysis from a Developing Country Perspective* 9 J. INTELL. PROP. RTS. 263 (2004).
[67] John M. Kline, 'MNCs and Surrogate Sovereignty' (2006) 13 Brown Journal of World Affairs 123, 128.
[68] Corinne Langinier, *Are patents strategic barriers to entry?* 56 J. ECON. & BUS. 349, 349 (2004).

acts have collectively reduced the technology transfer into the host state, created barriers for new entrants, reduced competition, effectively constrained domestic innovation and created 'foreign dependency'.

Much pressure has been applied on developing states keen to receive Foreign Direct Investment (FDI) to adopt certain "good policies"[69] to guarantee the minimum standards of protection for developed countries' technologies defined by TRIPS. TRIPS has thus resulted in large implementation costs[70] for the developing countries and also led to higher royalty payments for licensing patented foreign technology.[71] TRIPS was also not easily assimilated by inventors in the developing states because of its high cost and a lack of trust in the patent system leading them to conduct their research in secret to avoid being copied. This unfamiliarity with the western patent system, a "culture of secrecy" and the high cost of patenting deterred many inventors in Africa.[72] TRIPS's main flaw was in assuming that MNCs would freely transfer their patented technology and assist in the capacity building of the host states in exchange for patent protection.[73] Though art.7[74] did outline these requirements on the part of the developed nations, they have not been enforced. Other intrinsic limitations of the oil-producing states such as poor legislation, enforcement, corruption, lack of innovative capability and poor technological absorption worked to the advantage of the O&G MNCs and resulted in the creation of a substantial technology gap. By prioritizing international IP protection over endogenous economic and technology transfer incentives, TRIPS failed the developing countries![75]

For several decades, the NOCs of developing countries have consistently shown lower patent growth than the IOCs of developed states evidencing the technology gap. In recent years there has been an increase in the number of filings from NOCs of China, Brazil and Norway.[76] However, many NOCs still lag behind their IOC counterparts. Another way to ascertain the internal technological capability of a country is to analyse the number of resident patent filings. By examining the patent filings in WIPO in 2017 we can see that in developed countries like the US, Japan and Europe, resident filings are high whereas in developing oil-producing nations like Brazil, South Africa, Malaysia and Mexico, the non-resident filings account for more than half of the patent applications.[77] In addition to showing evidence of the technology gap, what this tells us is that foreign MNCs in those countries still hold a monopoly.

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[69] Gabriel Marcuzzo Cavalheiro et al., *Strategic patenting in the upstream oil and gas industry: Assessing the impact of the pre-salt discovery on patent applications in Brazil*, 39 WORLD PAT. INFO. 58, 58 (2014).
Clete D Johnson, *A Barren Harvest for the Developing World? Presidential "Trade Promotion Authority" and the Unfulfilled Promise of Agriculture Negotiations in the Doha Round*, 32 GA. J. INT'L & COMP. L. 437, 464 (2004).
[71] Daniel Benoliel, *The International Patent Propensity Divide*, 15 NC J. L. & TECH., 49, 61 (2013).
[72] Helen Nyambura-Mwaura, *Inventors Struggle to Protect Patents in Africa*, REUTERS (July 17, 2014, 1:25 AM), https://www.reuters.com/article/us-africa-investment/inventors-struggle-to-protect-patents-in-africa-idUSKBN0FM0HQ20140717.
[73] Rod Falvey & Neil Foster, *The Role of Intellectual Property Rights in Technology Transfer and Economic Growth: Theory and Evidence,* 10 REV. DEV. ECON. 700, 719 (2006).
[74] TRIPS Article 7, available at: https://www.wto.org/english/docs_e/legal_e/27-trips_03_e.htm (last visited 17 August 2018).
[75] Daniel Benoliel, *The International Patent Propensity Divide*, 15 NC J. L. & TECH. 49, 62 (2013).
[76] Osvaldo, Amaral*, Energy Reform Promises Tech Transfer and Patent Boom*, Managing IP (Aug. 31, 2014), https://www.managingip.com/article/2a5cjj2edmcwlstcb7u9s/energy-reform-promises-tech-transfer-and-patent-boom.
[77] World Intellectual Property Organization, *World Intellectual Property Indicators 2017*, http://www.wipo.int/edocs/pubdocs/en/wipo_pub_941_2017-chapter2.pdf (last visited 17 May 2023).

Nigeria is one such oil-producing state whose resident patent filings for several years was as low as 1%.[78] Nigeria and the other country examples presented below will demonstrate the incidence of anticompetitive patent practices by O&G MNCs and their adverse impact on the technology growth of the host nation.

B. Nigeria and Other Countries that did not Sustain Technology Growth

Foreign MNCs that brought their technology to extract oil in Nigeria have not only destroyed the ecosystem of the Niger Delta[79] but may have also impeded its technology growth. During the 1970s and 80s, a large volume of foreign technology was brought into Nigeria through FDI, contracts and licensing. But growth of domestic technology did not occur as a consequence of extrinsic and intrinsic factors and for several years, the ownership of patents in the Nigerian patent office by Nigerians was consistently only about 1%. Intrinsic factors included a lack of capital, poor technological infrastructure, lack of government support for R&D, lack of trust in the patent system, and other political and economic reasons. But the main extrinsic reasons were the private foreign companies that operated in Nigeria. Although the Nigerian patent office was created with the primary intention of enabling an inflow of foreign technology from MNCs which would lead to knowledge 'spillovers'[80] to their subsidiaries or links which in turn would kindle local inventiveness, the reality was far from it.[81] The MNCs in Nigeria which conducted the petroleum operations, actively patented their technology in the Nigerian patent office to obtain market share. Because of their considerably high resources and experience in comparison to the local inventors, they dominated not only the patent office but also the market effectively eliminating local competition.[82] Often, a mismatch between the technology being transferred and the domestic capability also hindered technology absorption. During this period, the foreign MNCs also used a few anticompetitive means to restrict local innovation. 43.7% of the license agreements included clauses for patent grant backs and 64.3% of the contracts banned R&D of the domestic licensee.[83] Although Nigeria did make changes to its legislation such as the "local content development programme" which required inclusion of Nigerians in technology transfers, the ultimate outcome was merely the production of good Nigerian "workers in a process tightly controlled by foreign expertise, without any transfer of technology".[84] Even after 50 years of oil industry operations Nigeria could not overcome its

[78] Owen T. Adikibi, *The multinational corporation and monopoly of patents in Nigeria*, 16 WORLD DEV., 511, 513 (1988).
[79] Elisa Giuliani, *Multinational Corporations, Technology Spillovers and Human Rights Impacts on Developing Countries*, LEM Paper Series (2010), https://www.ec.unipi.it/documents/Ricerca/papers/2013-158.pdf.
[80] ALPER SÖNMEZ, MULTINATIONAL COMPANIES, KNOWLEDGE AND TECHNOLOGY TRANSFER: THEORETICAL FRAMEWORK. IN: MULTINATIONAL COMPANIES, KNOWLEDGE AND TECHNOLOGY TRANSFER. CONTRIBUTIONS TO MANAGEMENT SCIENCE 21 (1st ed. 2013).
[81] Owen T. Adikibi, *The multinational corporation and monopoly of patents in Nigeria*, 16 WORLD DEV., 511, 516 (1988).
[82] Femi Aribisala, *Nigeria and the Multinationals*, Financial Nigeria (Aug. 28, 2013), http://www.financialnigeria.com/nigeria-and-the-multinationals-blog-5.html.
[83] Owen T. Adikibi, *The multinational corporation and monopoly of patents in Nigeria*, 16 WORLD DEV., 511, 519 (1988).
[84] Femi Aribisala, *Nigeria and the Multinationals*, Financial Nigeria (Aug. 28, 2013), http://www.financialnigeria.com/nigeria-and-the-multinationals-blog-5.html.

intrinsic limitations[85] and has consequently been technologically stunted. The anticompetitive patenting practices of 'resource-seeking'[86] oil corporations have been partly to blame.

Brazil is another nation whose oil technology was under foreign dominance for a long time. Foreign MNCs in Brazil had significant freedom in conducting petroleum operations and actively used anticompetitive methods to eliminate the domestic competition.[87] Despite being aware of the abusive market dominance by the foreign MNCs, Brazil's NOC Petrobras[88] did not intervene because it needed them to conduct its operations. Instead, it focussed on developing its internal innovative potential by remaining close to the MNCs and learning from them. This strategy paid off when Brazil's oil reserves were discovered in 2007 allowing Petrobras to grow into a self-sufficient technology producer.[89] Petrobras's success story is detailed in section 4.3 as a nation whose technology growth was not stifled by the O&G MNC patenting practices.

However, this has not been the case in African nations like Ghana. Ghana's non-development can be attributed to a corrupt and dysfunctional political system that conducted petroleum operations through agreements with foreign MNCs, some under the table, with the state always at the losing end.[90] Ghana has since made changes to its policies, mandated "local content" inclusion in petroleum agreements with foreign companies and also undertaken technology collaborations with them. It has also chosen to form a partnership with Norway in an effort to emulate the success of Norway's oil industry in developing its technology.[91] Whether Ghana will be successful in breaking free of foreign technological domination is yet to be seen.

Many Less Developed Countries (LDCs) in Africa such as Zimbabwe, suffered a fate like that of Ghana and Nigeria. Even in Asia and South America despite the presence of large FDI, technology spill over was actually found to be negative.[92] These cases illustrate how the anticompetitive practices of MNCs in an oil-rich state already rife with internal limitations, can technologically cripple it.

Another manner in which IOCs have continued to maintain their technology dominance in the oil industry is through mergers and acquisitions (M&As). These are described in the next section.

C. M&As in the O&G Industry

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[85] Offiong I. Akpanika, *Technology transfer and the challenges of local content development in the Nigerian Oil Industry*, 11 GLOBAL J. ENGG. RES. 123, 129 (2013).
[86] ALPER SÖNMEZ, MULTINATIONAL COMPANIES, KNOWLEDGE AND TECHNOLOGY TRANSFER: THEORETICAL FRAMEWORK. IN: MULTINATIONAL COMPANIES, KNOWLEDGE AND TECHNOLOGY TRANSFER. CONTRIBUTIONS TO MANAGEMENT SCIENCE 33 (1st ed. 2013) available at: https://doi.org/10.1007/978-3-319-02033-4_2.
[87] Alexey Bereznoy, *Catching-up with the supermajors: the technology factor in building competitive power of national oil companies from developing economies,* INDUSTRY & INNOVATION, 127, 148 (2019).
[88] Petróleo Brasileiro S.A., http://www.petrobras.com.br/en/ (last visited 19 May 2023).
[89] Alexey Bereznoy, *Catching-up with the supermajors: the technology factor in building competitive power of national oil companies from developing economies,* INDUSTRY & INNOVATION, 127, 148 (2019).
[90] Kow Kwegya & Amissah Abraham, *Contractual Agreements in Ghana's Oil and Gas Industry: In Whose Interest?* 8 MCGILL INT. J. SUSTAINABLE DEV. L & Policy, 186, 202 (2017).
[91] *Ghana to Emulate Norwegian's Management of Oil and Gas*, Ghana Web (Apr. 12, 2011), https://www.ghanaweb.com/GhanaHomePage/economy/Ghana-to-emulate-Norwegian-s-management-of-oil-and-gas-206805.
[92] Elisa Giuliani, *Multinational Corporations, Technology Spillovers and Human Rights Impacts on Developing Countries*, LEM PAPER SERIES (2010), https://www.ec.unipi.it/documents/Ricerca/papers/2013-158.pdf.

Mergers or "amalgamation of undertakings"[93] among corporations are common in the oil industry due to their many benefits predominantly cost savings. The 1999 merger between Exxon and Mobil resulted in cost savings of over 7 Billion USD and the ConocoPhillips merger of 2004 resulted in a saving of 1.9 Billion USD within sixteen months.[94] Mergers also enable firms to undertake large scale projects and capacity expansions, manage the risks associated with E&P and improve their efficiency.[95] Some mergers are conducted in order to increase the scope of R&D and to enable better management of innovation capabilities in a larger scale.[96] Mergers are one way through which oil corporations gain monopoly or market share.

Acquisitions on the other hand take place when O&G corporations purchase or acquire smaller firms who possess key technology in order to increase their business portfolio. This can be advantageous to obtain market share in a specific sector, and even lead to cost savings for the consumer. Because the O&G industry is a conservative industry, the buyers of technology have preference for well-known names and newer firms struggle to get market acceptance. In such instances, the new technology companies prefer to be acquired by larger better-known firms.[97]

But although the benefits of M&As are many, they possess another side. Sometimes O&G corporations acquire smaller firms who are their competitors and or to build a large defensive patent portfolio. Nowadays even small oil MNCs from developed states have started to develop defensive patent portfolios to deter competition and to become more attractive for acquisition.[98] Such M&As reduce competition and allow for the concentration of technology in a few hands.[99]

Hence, governments of developed nations closely scrutinize M&As for antitrust issues that might adversely affect the consumers within their market. For example, the merger of Halliburton and Baker Hughes in 2016 that would have allowed greater than 50% ownership in 3 markets[100] and led to monopoly was challenged by the U.S. Department of Justice on antitrust grounds. Mobil Corporation's intended hostile takeover of Marathon Oil Co in 1981 raised anticompetitive concerns due to concentration of power and ownership of oil reserves.[101] Although mergers in the oil industry are challenged more often than those in other industries particularly in the US,[102] many anticompetitive issues remain because the IP issues are often

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[93] Adebayo G. Adaralegbe, *Mergers in the international petroleum industry: Legal aspects on the operations of Petroleum Development Companies in Nigeria*, 21 J. ENERGY & NAT. RESOURCES L. 325, 327 (2003).
[94] Timothy J. Muris & Richard G. Parker, *A Dozen facts you should know about antitrust and the oil industry,* US Chamber of Commerce (2007), https://www.uschamber.com/sites/default/files/legacy/reports/070625oilreport.pdf.
[95] ibid 62.
[96] ibid 79.
[97] Sam Veasna, *Patents and Competitive Advantage in the Oil & Gas Industry*, the Case of Oil Country Tubular Goods (OCTG) (2016) (Master's Thesis) (on file with https://hdl.handle.net/20.500.12380/237479).
[98] Benjamin S. Fernandez & John V. Hobgood, *Energy Sector Alert Series: As Oil Prices Descend, Patent Enforcement Litigation Increases Within Energy Industry*, Wilmer Hale (Mar. 3, 2016), https://www.wilmerhale.com/en/insights/client-alerts/2016-03-03-energy-sector-alert-series-as-oil-prices-descend-patent-enforcement-litigation-increases-within-energy-industry
[99] Mergers are discussed in detail in section 3.3
[100] *Antitrust Update*, PATTERSON BELKNAP (Apr. 15, 2016), https://www.pbwt.com/antitrust-update-blog/antitrust-lessons-oil-giants-proposed-merger.
[101] Ron Scherer, Mobil-Marathon Outcome May Shape Oil Industry Future, The Christian Science Monitor (Dec. 3, 1981), https://www.csmonitor.com/1981/1203/120340.html.
[102] Timothy J. Muris & Richard G. Parker, *A Dozen facts you should know about antitrust and the oil industry,* US Chamber of Commerce (2007), https://www.uschamber.com/sites/default/files/legacy/reports/070625oilreport.pdf.

overlooked. In my opinion, cost savings resulting from mergers that are ultimately passed on to the consumer are often prioritized over patent aggregation.

In the international level M&As are not regulated and developing nations have been impacted by mergers which may result in cost savings for consumers in the home country of the MNC but creates technology monopoly in the host state. The Baker-GE merger significantly increased its technology portfolio, and Schlumberger-Cameron merger increased its market share by 45% in 25 international markets.[103] The sheer size of these corporations and their substantial patent portfolio can deter new and smaller entrants into the market. International mergers have so many far-reaching consequences that improved regulation and stringent enforcement is essential.[104] Hence, some African nations such as Nigeria have put into place committees and measures to regularize mergers.[105]

In chapters 2 and 3, I presented my case against the manner in which patents are wielded by O&G MNCs and how they impeded the technological growth of some countries. In the next chapter, I present the counterargument.

III. THE CASE SUPPORTING O&G MNC PATENTS

A. Evidence of Technology Transfers and Collaborations

In this chapter, I examine the technological growth of a few oil-producing states and analyse what role if any the MNC patents played in them. I will pay particular attention to the technology transfers and technology collaborations between MNCs and host states as these provide evidence of MNC facilitating their technological growth. But before launching into these examples, it is important to understand how the ownership of technology among the O&G MNC has evolved over time.

1. Evolution of Technology Ownership in the Oil Industry

Through the many geo-political upheavals and oil crises, major oil corporations have recognised the importance of continuous innovation in the oil industry. By substantial investments in R&D, oil corporations accumulated large patent portfolios in order to maintain their competitive advantage. But the oil crisis of the 1980s was worse than the previous ones and caused oil corporations to reduce innovation expenditure and divest their R&D segments.[106] It was during this window that the NOCs of developing nations and the oilfield service companies gained a technology foothold in the industry.[107] The newly formed oil service companies' main business was the development of oil technology. During this period and since then oilfield service companies invested heavily in R&D and have consequently

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[103] *Will Schlumberger Continue to Be an Industry Leader in 2017?* Forbes (Jan. 4, 2017), https://www.forbes.com/sites/greatspeculations/2017/01/04/will-schlumberger-continue-to-be-an-industry-leader-in-2017/#3f6a8c7e7bc5.

[104] Timothy J. Muris & Richard G. Parker, *A Dozen facts you should know about antitrust and the oil industry,* US Chamber of Commerce (2007), https://www.uschamber.com/sites/default/files/legacy/reports/070625oilreport.pdf.

[105] Adebayo G. Adaralegbe, 'Mergers in the International Petroleum Industry: Legal Aspects on the Operations of Petroleum Development Companies in Nigeria' (2003) 21 Journal of Energy and Natural Resource Law 325, 325.

[106] Alexey Bereznoy, *Catching-up with the supermajors: the technology factor in building competitive power of national oil companies from developing economies,* INDUSTRY & INNOVATION, 127, 138 (2019).

[107] ibid.

grown to become the new technology MNCs. The 2014 global survey of oil and gas patents clearly shows the oilfield service companies as the leaders.[108] These oilfield service companies[109] have also assisted several NOCs in building their technological competence.[110] Having ceded technology control to the oil service companies in the 1980s, the oil majors over time needed new partners to share R&D costs and subsequently opened up to collaborations.[111] Despite previously preferring to conduct R&D activities in their home country, factors like reduced cost and the improved technical capability of some host states have led MNCs to also internationalise their R&D.[112] Technology transfers have also become important to the oil corporations due to the benefits of higher returns resulting due to the effective use of technology,[113] and reduced costs due to use of local workforce.[114] Despite the advantages of collaborations and technology transfers, many intrinsic factors of the host state influence the attitude of the MNC in adopting these methods. These are described in the next section.

B. Technology Transfers and Collaborations among MNCs and Host States

Petroleum operations are normally conducted using concession contracts, joint ventures, production sharing contracts or service contracts.[115] Knowledge of petroleum operation is especially important to oil-producing states because foreign firms might exit the oil fields and future operations need to be addressed.[116] But in most petroleum operations only the importation of high-technology tools and expatriate personnel results without any real technology transfer. Real technology transfer involves not merely the exchange of explicit information stored in patents, manuals, procedures and blueprints, but also exchange of tacit know-how through training and collaboration.[117] The basic factors which affect whether and what technology the O&G MNC transfers into the state are strength of its patent regime, the technical capacity of its oil industry, and other government incentives for the MNC.

The first factor affecting MNC technology policy is the strength of the host state's patent regime. In evaluating the strength of a patent regime, the features that MNCs look for are, membership in an international treaty, sufficient duration of patent protection and strong enforcement for patent infringement.[118] Therefore, nations keen to benefit from technology exchange and transfer tend to comply with the TRIPS regulations and provide a reasonably

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[108] ibid 142.
[109] By Oilfield service companies I refer to the oil technology service providers including but not limited to Schlumberger, Weatherford, Baker Hughes, Petrofac, Geophysical and Weatherford.
[110] Alexey Bereznoy, *Catching-up with the supermajors: the technology factor in building competitive power of national oil companies from developing economies,* INDUSTRY & INNOVATION, 127, 138 (2019).
[111] ibid 139.
[112] Floortje Alkemade et al., *Tracking the internationalization of multinational corporate inventive activity: National and sectoral characteristics*, 44 RES. POL'Y 1763, 1764 (2015).
[113] Tony Wood, *The Natural Wealth of Nations: Transformation of Oil- and Gas-Producing Economies*, Cisco, https://www.cisco.com/c/dam/en_us/about/ac79/docs/wp/Transforming_Energy_0629b.pdf, (last visited May 17, 2023).
[114] Harrie Vredenburg H & Percy Garcia, *Technology transfer in international business: the role of the multinational corporation in building capacity in developing countries,* 7 INT'L.J. BUS. STRATEGY (2007).
[115] Kow Kwegya & Amissah Abraham, *Contractual Agreements in Ghana's Oil and Gas Industry: In Whose Interest?,* 8 MCGILL INT. J. SUSTAINABLE DEV. L & Policy, 186, 189 (2017)..
[116] Reginald I. Chima et al., *Technology Transfer and Acquisition in the Oil Sector and Government Policy in Nigeria*, Africa Portal (Jan. 1, 2002), https://www.africaportal.org/publications/technology-transfer-and-acquisition-in-the-oil-sector-and-government-policy-in-nigeria/.
[117] Alexey Bereznoy, *Catching-up with the supermajors: the technology factor in building competitive power of national oil companies from developing economies,* INDUSTRY & INNOVATION, 127, 135 (2019).
[118] Andréanne Léger, 'Intellectual Property Rights and Innovation in Developing Countries: Evidence from Panel Data' (International Association of Agricultural Economists Conference, Australia, August 2006) 1, 6.

strong patent protection and enforcement schemes for foreign-owned patents. In states with strong IP regime, foreign MNCs do not hesitate to license their patents,[119] transfer technology and collaborate because they have no reason to fear imitation. Norway is the perfect example of such a nation which as a result of its internal initiatives circumvented restrictive patenting practices and grew technologically. I will discuss Norway in detail in section 4.4.

In nations with weak IP regimes, only indirect technology spill overs are possible because MNCs prefer to conduct their activities through their direct subsidiaries, use expat personnel in key technical areas and avoid licensing their patents in order to restrict the flow of knowledge.[120] Weak patent rights also lead to reduced exports or FDI[121] from countries like the US.[122] Countries with weak IP regimes and weak imitative capabilities like the African countries, continue to be technologically monopolised by foreign MNCs.[123] Countries that have weak IP regimes but have high absorptive capability such as China, have a high risk of imitation. Although imitation played a large part in the manner in which the United States built its technological competence, it is less tolerant of its own technology being copied. Nonetheless, using this imitative strategy China has surpassed Japan and closed in on the US in the number of international patents filed.[124]

The United Nations has acknowledged that technology collaborations are the best way to transfer or exchange technology[125] and the sharing and exchange of patents is known to increase global innovation and technology.[126]

But aside from the strength of its patent regime, the technical capability of a country determines whether MNCs undertake technology transfers and collaborations with it. Studies show that steps taken by the developing countries towards building internal technical competence were taken as a positive sign by MNCs.[127] Building internal competence within a state increases competitiveness among local firms, which in turn induces MNCs to transfer

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[119] Ashish Arora, *Intellectual Property Rights and the International Transfer of Technology: Setting Out an Agenda for Empirical Research in Developing Countries*, WORLD INTELLECTUAL PROPERTY ORGANIZATION, http://www.wipo.int/edocs/pubdocs/en/wipo_pub_1012-chapter2.pdf (last visited May 17, 2023).
[120] ALPER SÖNMEZ, MULTINATIONAL COMPANIES, KNOWLEDGE AND TECHNOLOGY TRANSFER: THEORETICAL FRAMEWORK. IN: MULTINATIONAL COMPANIES, KNOWLEDGE AND TECHNOLOGY TRANSFER. CONTRIBUTIONS TO MANAGEMENT SCIENCE 24 (1st ed. 2013) available at: https://doi.org/10.1007/978-3-319-02033-4_2.
[121] Ashish Arora, *Intellectual Property Rights and the International Transfer of Technology: Setting Out an Agenda for Empirical Research in Developing Countries*, WORLD INTELLECTUAL PROPERTY ORGANIZATION, http://www.wipo.int/edocs/pubdocs/en/wipo_pub_1012-chapter2.pdf (last visited May 17, 2023).
[122] Pamela J. Smith, *Are weak patent rights a barrier to U.S. expor*ts*?* 48 J. INT'L ECON. 151, 151 (1999).
[123] ibid.
[124] World Intellectual Property Organization, *China Drives International Patent Applications to Record Heights; Demand Rising for Trademark and Industrial Design Protection* (Mar. 21, 2018), https://www.wipo.int/pressroom/en/articles/2018/article_0002.html.
[125] United Nations Department of Economic and Social Affairs, *Climate change: Technology development and technology transfer*, Conference Report (Nov. 7-8, 2008), https://sdgs.un.org/sites/default/files/publications/tec_technology_dev.pdf.
[126] Tomoya Yanagisawa & Dominique Guellec, *The Emerging Patent Marketplace*, OECD Science, Technology and Industry Working Papers (22 Dec 2009), https://doi.org/10.1787/21841315225.
[127] ALPER SÖNMEZ, MULTINATIONAL COMPANIES, KNOWLEDGE AND TECHNOLOGY TRANSFER: THEORETICAL FRAMEWORK. IN: MULTINATIONAL COMPANIES, KNOWLEDGE AND TECHNOLOGY TRANSFER. CONTRIBUTIONS TO MANAGEMENT SCIENCE 16 (1st ed. 2013) available at: https://doi.org/10.1007/978-3-319-02033-4_2.

high quality technology to their subsidiaries.[128] When host states increased their technology level independently, MNCs were even open to conducting R&D operations with them.

The examples given below show evidence of the above. These oil-producing states successfully engaged in technology collaborations with MNCs and benefited from increased technology transfers once they strengthened their patent regime and improved their internal technological competence. The exchange of patented information and absence of patent strategizing in these collaborative efforts proves that O&G MNCs did not stifle the technology growth in these instances.

C. The case of Petrobras

Brazil had for the longest time imported oil to meet its energy needs. But all that changed with the discovery of the oil and gas reserves in the country's South-eastern coast in 2007. The discovery of this ultra-Deepwater reserves by its NOC Petrobras created the possibility of turning Brazil into a substantial oil producer.[129] Having worked closely with MNCs over the previous decades and tolerated their anticompetitive behaviour, Petrobras had quietly developed its internal technological capability. But, despite having the technical knowledge in Deepwater exploration, the harsh environment of its ultra-Deepwater reservoirs could not be conquered without substantial R&D, because the technology to do so simply did not exist.[130] Therefore, Brazil's federal government put together new long-term development goals prioritizing R&D for a dynamic and strong technology-based oil industry.[131] The country focussed on independently increasing its technological level in the oil sector by using an open-innovation method and collaborating with universities, vendors and other industry counterparts.[132] Petrobras also collaborated with other O&G MNCs and formed strategic alliances with those possessing relevant technology.[133] As a result, it has grown into a highly regarded technology NOC self-sufficient in the area of ultra-Deepwater exploration.[134] Petrobras has also gained access to resources of other countries through operating licenses and become a competitor to other O&G MNCs.[135]

A noteworthy increase in its patent filings at the Brazilian patent office between 2001 and 2010 is evidence of its technological growth.[136] A corresponding increase in O&G patent

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[128] Elisa Giuliani, *Multinational Corporations, Technology Spillovers and Human Rights Impacts on Developing Countries*, LEM Paper Series (2010), https://www.ec.unipi.it/documents/Ricerca/papers/2013-158.pdf.
[129] Eduardo Haddad et al., *Economic impacts of pre-salt on a regional economy: the case of Espírito Santo, Brazil,* ERSA conference papers (2014), available at: RePEc:wiw:wiwrsa:ersa10p156.
Cited in Gabriel Marcuzzo do Canto Cavalheiro, *Examining the influence of the pre-salt on patent applications related to drilling fluids in Brazil*, 10 RECENT PAT. IN ENGG. 3, 11 (2016).
[130] Alexey Bereznoy, *Catching-up with the supermajors: the technology factor in building competitive power of national oil companies from developing economies,* INDUSTRY & INNOVATION 127, 147 (2019).
[131] Gabriel Marcuzzo Cavalheiro et al., *Strategic patenting in the upstream oil and gas industry: Assessing the impact of the pre-salt discovery on patent applications in Brazil*, 39 WORLD PAT. INFO. 58, 60 (2014).
[132] Christopher E Gay , *Why Is Patent Production So Comparatively Low at Petrobras* 5 (2014) (Master's Thesis) (on file with http://hdl.handle.net/10438/13312).
[133] Alexey Bereznoy, *Catching-up with the supermajors: the technology factor in building competitive power of national oil companies from developing economies,* INDUSTRY & INNOVATION 127, 148 (2019).
[134] Christopher E Gay , *Why Is Patent Production So Comparatively Low at Petrobras* 5 (2014) (Master's Thesis) (on file with http://hdl.handle.net/10438/13312).
[135] Seyed K. Bagheri & Alberto Di Minin, *The changing competitive landscape of the global upstream petroleum industry*, 8 J. WORLD ENERGY L. & BUS. 1, 14 (2015).
[136] Gabriel Marcuzzo Cavalheiro et al., *Strategic patenting in the upstream oil and gas industry: Assessing the impact of the pre-salt discovery on patent applications in Brazil*, 39 WORLD PAT. INFO. 58, 61 (2014).

filings at the USPTO[137] support the technological significance of these patents.[138] Although the technological growth of Brazil was at one time impeded by the anticompetitive practices of O&G MNCs, it broke free of foreign domination in two phases. The first phase consisted of it improving its intrinsic technical capabilities through domestic initiatives, and the second phase involved it making strategic alliances and collaborations with O&G partners to advance to the next level of technological self-sufficiency. Although not all oil-rich states who increased their technology followed the same path, many similarities can be seen. These are presented in the next section.

D. Other NOCs and their Technology Growth Path

Norway has already been highlighted as the shining example of an oil-producing nation that transformed itself into a competitive oil technology producer within 20 years.[139] By examining the steps Norway undertook to build its technical competence, we can develop a path for other oil-producing states that hope to do the same. When oil was discovered in Norway in the 1950s, the tremendous impact it would make on its economy was not expected.[140] The Norwegian personnel had no experience in operating and managing petroleum operations and for that reason, foreign MNCs were allowed to carry out these operations under the precondition of training the Norwegian counterparts. Subsequent collaborations with foreign companies caused a transfer of knowledge into the country and resulted in the ultimate strengthening of its intrinsic technical capabilities. Norway's story supports the theory that O&G MNCs did not impede its technology growth but instead enabled them to share their technology when assured of patent protection.

The Malaysian NOC Petroliam Nasional Berhad[141] did not exist when oil was discovered in the country and foreign IOCs were the ones who developed its oil industry.[142] However, two decades later the production rates started to decline and the country had to take control.[143] Malaysia's newly formed NOC Petronas achieved this by moving its technical operations abroad in order to avoid governmental interference, focussed on innovation and subsequently developed enhanced oil recovery methods for the wells back home.[144] Petronas also adopted new policies and formed strategic alliances with MNCs in order to increase domestic innovation and has subsequently built itself into a technology superpower.[145]

Venezuela's NOC Petróleos de Venezuela, S.A.[146] had also broken free of foreign dominance and built itself up to be a technology leader similar to the path of Petrobras. However, the recent political upheavals have allowed its technical competence to deteriorate.

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[137] United States Patent and Trademark Office, https://www.uspto.gov/ (last visited 19 May 2023).
[138] Gabriel Marcuzzo Cavalheiro et al., *Strategic patenting in the upstream oil and gas industry: Assessing the impact of the pre-salt discovery on patent applications in Brazil*, 39 WORLD PAT. INFO. 58, 61 (2014).
[139] Mahdi Asghari & Mohammad Ali Rakhshanikia, *Technology transfer in oil industry, significance and challenges*, 75 PROCEDIA – SOC. & BEHAV. SCI. 264, 271 (2013).
[140] *Norway's Petroleum History*, Norwegian Petroleum, https://www.norskpetroleum.no/en/framework/norways-petroleum-history/ (last updated May 11, 2023).
[141] Petroliam Nasional Berhad, http://www.petronas.com.my/Pages/default.aspx (last visited 19 May 2023).
[142] Alexey Bereznoy, *Catching-up with the supermajors: the technology factor in building competitive power of national oil companies from developing economies,* INDUSTRY & INNOVATION 127, 150 (2019).
[143] ibid.
[144] ibid.
[145] ibid.
[146] Petróleos de Venezuela, S.A, http://www.pdvsa.com/index.php?option=com_content&view=article&id=6541&Itemid=888&lang=en (last visited 19 May 2023).

Venezuela's story highlights the need to continuously prioritise innovation or else short-sighted governmental polices could result in technological setbacks.[147]

Other reasons for the poor technology growth of NOCs from certain oil-rich nations are the availability of easy oil and the reliance on their "monopolistic position"[148] leaving little need to innovate. A prime example of this is the Kingdom of Saudi Arabia.[149] For decades, the Saudi Arabian NOC Saudi Aramco[150] did not aggressively accumulate patents allowing foreign oil companies to have a technology monopoly. But in recent years, the country has prioritized innovation with autonomous Saudi Aramco at its forefront and drastically increased its patent filings.[151] By adoption of an open innovation model,[152] the creation of strategic alliances with foreign countries advanced in oil technology, collaborations with educational institutions, oil service companies and other technology providers, increased investment in R&D and funding of start-up ventures, Saudi Arabia has attempted to emulate the Western innovation and patenting model.[153] As a result of these initiatives, the ownership of patents by Saudi Aramco in the Saudi Arabian patent office has grown to the level of the super majors.[154] The forward citation of patents owned by Saudi Aramco is further proof of its technological advancement.[155]

The technology growth path of Brazil, Norway, Malaysia, and Saudi Arabia show that O&G MNCs share their patents through collaborations, licensing and technology transfer so long as they are protected from infringement and provided the states take initiatives to increase their technology independently. As a result, these countries are technologically self-sufficient and among the leaders of oil technology. Among state-owned firms, Equinor and Petrobras are among the largest patent producers of today.[156]

The factors which led to the technological growth of these countries and those that led to the absence of it in others have been identified in the last two chapters. Based on these, I suggest reforms for other nations to adopt and attain technological independence in the next chapter.

IV. THE FUTURE OF THE O&G INDUSTRY AND WAYS TO DECREASE THE TECHNOLOGY GAP

Prior to launching into the recommended reforms, I touch upon the subject of patenting within the Shale operations because it will have a significant impact on the future of the O&G industry.

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[147] Alexey Bereznoy, *Catching-up with the supermajors: the technology factor in building competitive power of national oil companies from developing economies,* INDUSTRY & INNOVATION 127, 151 (2019).
[148] ibid 130.
[149] ibid 148.
[150] Saudi Aramco, http://www.saudiaramco.com/en/home.html (last visited 19 May 2023).
[151] Alexey Bereznoy, *Catching-up with the supermajors: the technology factor in building competitive power of national oil companies from developing economies,* INDUSTRY & INNOVATION, 127, 148 (2019).
[152] Saudi Aramco, http://www.saudiaramco.com/en/home.html (last visited 19 May 2023.
[153] Alexey Bereznoy, *Catching-up with the supermajors: the technology factor in building competitive power of national oil companies from developing economies,* INDUSTRY & INNOVATION, 127, 149 (2019).
[154] ibid 141.
[155] ibid 149.
[156] Osvaldo, Amaral*, Energy Reform Promises Tech Transfer and Patent Boom*, Managing IP (Aug. 31, 2014), https://www.managingip.com/article/2a5cjj2edmcwlstcb7u9s/energy-reform-promises-tech-transfer-and-patent-boom.

A. The Shale Technology Revolution

The presence of hydrocarbon in earth's shale formations has been known to man for a long time. But tapping into the formation to extract the oil and gas had been a technological challenge for many years. The extraordinary way in which this was achieved in the US illustrates the proper way to foster innovation.[157] Although many factors contributed to the shale revolution, most of it has been credited to the unwavering effort of George Mitchell. Mitchell collaborated with the US government and other industry counterparts using an open innovation method. By risking millions of dollars over two decades synthesised a new method of 'fracking' the shale formations by combining the technology of horizontal drilling and 'slickwater' fracturing and adapting it for shale gas extraction.[158] These efforts paid off in the late 1990's resulting in the Shale Boom of 2001. During the course of its development Mitchell and his successor Devon Energy did not patent any of their technology, which enabled others in the industry to use it freely. Despite not patenting their technology or gaining any royalty payments, the company made significant profits. The story of the US shale fracking revolution is the perfect instance where "restraint in patenting"[159] and use of open innovation and collaboration enabled a technological transformation. As a result, the US has grown to be one of the largest producers of hydrocarbons and a world leader in shale gas technology.

The socio-economic impact of shale technology to the developing world will be minimal because nearly 43% of the world reserves are in highly developed countries, 33% in the MDCs and only 3% in the LDCs.[160] For developing countries like Algeria, South Africa and Bulgaria which possess a few shale gas reserves, the technology may possibly even be detrimental due to weak regulatory systems leading to environmental consequences from fracking.[161] The US and China are the top two applicants for patents in shale technology, the only difference being that private companies own the technology in the US which is already in the commercial domain, but in the case of China, the patents are not yet close to commercialization.[162] Despite the technical ingenuity of Chinese innovators in exploring for oil abroad,[163] they lack the cutting edge technologies to tap their own shale formations which are more complex than those present in the US.[164] And though China has larger reserves than the US,[165] without collaboration with US companies and technology transfer from the US they cannot tap their reserves because much of the tried and tested shale gas technology is held captive in patents owned by the major oil corporations in the United States.[166] But US firms

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[157] John M. Golden & Hannah J. Wiseman, *The Fracking Revolution: Shale Gas as a Case Study in Innovation Policy*, 64 EMORY L. J. 955, 958 (2015).
[158] For definition of the terminology used in Shale technology refer to: Luca Gandossi, *An overview of hydraulic fracturing and other formation stimulation technologies for shale gas production*, European Commission Technical Report, (December 19, 2013), https://publications.jrc.ec.europa.eu/repository/handle/JRC86065.
[159] John M. Golden & Hannah J. Wiseman, *The Fracking Revolution: Shale Gas as a Case Study in Innovation Policy*, 64 EMORY L. J. 955, 1022 (2015).
[160] Adrian Paylor, *The social–economic impact of shale gas extraction: a global perspective* 38 THIRD WORLD Q. 340, 343 (2017).
[161] ibid 341.
[162] Woo Jin Lee, & So Young Sohn, *Patent analysis to identify shale gas development in China and the United States*, 74 ENERGY POL'Y. 111, 112 (2014).
[163] Danelle Gagliardi, *Made in America: Why the Shale Revolution in America is Not Replicable in China and Argentina*, 14 WASH. U. GLOBAL STUD. L. Rev. 181, 190 (2015).
[164] Woo Jin Lee, & So Young Sohn, *Patent analysis to identify shale gas development in China and the United States*, 74 ENERGY POL'Y. 111, 114 (2014).
[165] Danelle Gagliardi, *Made in America: Why the Shale Revolution in America is Not Replicable in China and Argentina*, 14 WASH. U. GLOBAL STUD. L. Rev. 181, 182 (2015).
[166] Woo Jin Lee, & So Young Sohn, *Patent analysis to identify shale gas development in China and the United States*, 74 ENERGY POL'Y. 111, 114 (2014).

hesitate to collaborate with China because of risk of imitation in a weak IP regime. China has amended its IP laws after the US exerted pressure in the WTO, but there are still concerns.[167] The Chinese "Bamboo Capitalism"[168] which involves operating outside the bounds of legal rules is also a deterrent to importing technology. The Chinese instance highlights the need for a strong patent regime for increased technology transfers and collaborations.

In Europe, the recoverable shale reserves small and are present in complex formations making them difficult to extract.[169] Hence despite the presence of oil corporations like Total,[170] BP[171] and Equinor[172] with decades of technical experience in conventional techniques, the lack of experience in unconventional hydrocarbons makes them dependent on the US.[173] Likewise, most MDCs and LDCs possessing shale reservoirs will also have to rely on US technology. In a sense, there already exists a technology gap between the US and the rest of the world regarding patents in shale technology.[174] Because concentration of technology causes a technological monopoly and can bring up anticompetitive issues, steps must be taken to avoid a repeat of the technology dichotomy of the past oil industry.

B. Recommendations and Reforms to Close the Technology Gap

Despite nearly 100 years of oil industry,[175] MNCs of developed countries still hold most of the advanced technologies through "technical imperialism"[176] as described in the previous chapters. Although NOCs of oil-producing states now have 90% ownership of the hydrocarbons whereas in the 1970s they only controlled 10%, the petroleum technology is still controlled by the MNCs.[177] Only a few oil-producing countries like Norway have closed the technology gap and a few others like Brazil and Malaysia have gained technological independence. But many other oil-producing nations are still technologically deficient. Although this can be attributed to the intrinsic limitations of the state and an inherent lack of absorptive capability,[178] one cannot dismiss the effect of anticompetitive methods practiced by MNCs as being partly to blame.

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[167] Danelle Gagliardi, *Made in America: Why the Shale Revolution in America is Not Replicable in China and Argentina*, 14 WASH. U. GLOBAL STUD. L. Rev. 181, 190 (2015).
[168] *China's Economy: Bamboo Capitalism*, The Economist (Mar. 10, 2011), http://www.economist.com/node/18332610.
[169] Minh-Thong Le, *An assessment of the potential for the development of the shale gas industry in countries outside of North America*, 4 HELIYON (February 2018), https://doi.org/10.1016/j.heliyon.2018.e00516.
[170] Total, https://www.total.com/en (last visited 19 May 2023).
[171] British Petroleum, https://www.bp.com/ (last visited 19 May 2023).
[172] Equinor, https://www.equinor.com/en.html (last visited 19 May 2023).
[173] Minh-Thong Le, *An assessment of the potential for the development of the shale gas industry in countries outside of North America*, 4 HELIYON (February 2018), https://doi.org/10.1016/j.heliyon.2018.e00516.
[174] Woo Jin Lee, & So Young Sohn, *Patent analysis to identify shale gas development in China and the United States*, 74 ENERGY POL'Y. 111, 114 (2014)
[175] Mahdi Asghari & Mohammad Ali Rakhshanikia, *Technology transfer in oil industry, significance and challenges*, 75 PROCEDIA – SOC. & BEHAV. SCI. 264, 271 (2013).
[176] Offiong I. Akpanika, *Technology transfer and the challenges of local content development in the Nigerian Oil Industry*, 11 GLOBAL J. ENGG. RES. 123, 123 (2013)
[177] Alexey Bereznoy, *Catching-up with the supermajors: the technology factor in building competitive power of national oil companies from developing economies,* INDUSTRY & INNOVATION 127, 127 (2019).
[178] Harrie Vredenburg H & Percy Garcia, *Technology transfer in international business: the role of the multinational corporation in building capacity in developing countries,* 7 INT'L.J. BUS. STRATEGY (2007).

In the past, oil corporations were mainly "resource-seeking" [179] or "efficiency-seeking" [180] and had no compunction for local development. In contrast, the "market-seeking"[181] corporations like the oil service companies of have positively contributed to the technology development in nations like Brazil. But in recent years, even major oil corporations have realised the advantages of teaming up with NOCs to benefit from reduced costs and higher returns.

Innovation is essential for the host state if it wants to take control of its technology, break free of foreign domination, to diversify because oil will run out and also to close the technology gap. This can be achieved by independently developing and patenting technology, through transferring or purchasing technology and through technology collaborations. MNCs play a significant role in the second and third way of bringing developing nations to the standards of developed nations through the sharing of patented technology. This is especially crucial for states whose internal capability is limited and cannot achieve technological growth without significant support from the MNCs. But this requires a convergence of attitudes among developed and developing countries and result in reforms for co-operation, collaboration and technology transfer intended to bring maximum benefit for a larger group of people as opposed to prioritizing economic returns for MNCs. The Newly Industrialized Countries [182] whose NOCs have become the MNCs of today also provide a basis for developing reform to stimulate innovation and technology growth.

Some such reforms are presented below. Although the list of dos and don'ts is not comprehensive, the suggestions made in here should be useful in developing a potential road map for developing nations wishing to close the technology gap. They are grouped under seven subheadings.

1. Strong but Flexible Patent Regime

Evidence of increased technology transfer from the US to countries that pose a limited threat of innovation or possess strong IP regimes was observed in the empirical models evaluated by Smith.[183] The strengthening of IP rights also allowed NOCs from Brazil, Malaysia, Saudi Arabia, and Norway to build their technical competence through collaborations and technology exchanges with the IOCs.[184] Thus, oil-producing nations must improve the strength of their patent laws and comply with TRIPS. However, a more flexible and efficient IP system, or as I like to call it the 'TRIPS-minus' that allows technologically deficient states an opportunity to

[179] ALPER SÖNMEZ, MULTINATIONAL COMPANIES, KNOWLEDGE AND TECHNOLOGY TRANSFER: THEORETICAL FRAMEWORK. IN: MULTINATIONAL COMPANIES, KNOWLEDGE AND TECHNOLOGY TRANSFER. CONTRIBUTIONS TO MANAGEMENT SCIENCE 33 (1st ed. 2013) available at: https://doi.org/10.1007/978-3-319-02033-4_2.
[180] ALPER SÖNMEZ, MULTINATIONAL COMPANIES, KNOWLEDGE AND TECHNOLOGY TRANSFER: THEORETICAL FRAMEWORK. IN: MULTINATIONAL COMPANIES, KNOWLEDGE AND TECHNOLOGY TRANSFER. CONTRIBUTIONS TO MANAGEMENT SCIENCE 34 (1st ed. 2013) available at: https://doi.org/10.1007/978-3-319-02033-4_2.
[181] Elisa Giuliani, *Multinational Corporations, Technology Spillovers and Human Rights Impacts on Developing Countries*, LEM Paper Series (2010), https://www.ec.unipi.it/documents/Ricerca/papers/2013-158.pdf.
[182] Daniel Benoliel, *The International Patent Propensity Divide*, 15 NC J. L. & TECH., 49, 76 (2013).
[183] Pamela J. Smith, *Are weak patent rights a barrier to U.S. export*s*?* 48 J. INT'L ECON. 151, 151 (1999).
[184] Robert A. James, *Program on Energy and Sustainable Development Stanford, Strategic Alliances Between National and International Oil Companies*, Working Paper #104 (October 2011), https://www.pillsburylaw.com/images/content/1/0/103639.pdf.

"catch-up"[185] like the case of India and Korea[186] is recommended. The patent system should offer foreign and domestic patents sufficient protection from infringement, while at the same time reducing the cost of patent application and term of protection from 20 to fewer years. In many LDCs the cost of patenting is a huge deterrent. Therefore, patenting costs must take into consideration the affordability of the local inventors, in order to encourage the inventiveness of domestic firms and academic institutions. Shorter patent protection term can encourage additional new entrants into a market.

2. Increased Collaborations

Malaysia, Brazil, Saudi Arabia, and Norway have increased their technology through collaborations and strategic alliances with foreign MNCs and other countries. Other oil-rich states must apply the same methods and increase their external collaborations. Because oilfield service companies have been known to make the most technology collaborations,[187] and own the most technology and maximum number of patents,[188] it is recommended that NOCs form partnerships with them. Collaborations are needed to extend the life of the oil-producing wells, enable cost and time savings in production, improve production efficiency, create lesser environmental impact, create a sustainable growth and significantly improve the profit margins.[189] MNCs also benefit from collaborations due to improved efficiency from the effective use of technology,[190] reduced production costs due to use of local workforce and even reduced R&D costs. But although collaborations can be mutually beneficial, MNCs have at times been criticised as desiring to collaborate only if the resulting technology is of benefit to them. For example, 90% of the patents in the upstream sector of the Brazilian oil industry some of which may have resulted from collaborative efforts are owned by private foreign companies.[191] Despite the technical progress achieved by Petrobras, the fewer patents in comparison to the foreign the MNCs could be indicative of the dominance of foreign MNCs in technology collaborations or merely a slow adoption of the Brazilian patent system by the domestic inventors. Nonetheless, it is highly crucial that collaborative agreements between firms clearly capture the non-disclosure terms and the terms of any resulting IP.

3. Mandated Technology Sharing

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[185] ALPER SÖNMEZ, MULTINATIONAL COMPANIES, KNOWLEDGE AND TECHNOLOGY TRANSFER: THEORETICAL FRAMEWORK. IN: MULTINATIONAL COMPANIES, KNOWLEDGE AND TECHNOLOGY TRANSFER. CONTRIBUTIONS TO MANAGEMENT SCIENCE 17 (1st ed. 2013) available at: https://doi.org/10.1007/978-3-319-02033-4_2

[186] Cheikh Kane, *The Relationship Between Ip, Technology Transfer and Development*, IP Watch, http://www.ip-watch.org/2010/08/30/the-relationship-between-ip-technology-transfer-and-development/ (last visited Aug. 17, 2018).

[187] Hanne Berg Cortesi & Marianne Skanseng, *Subsea production and processing technology*, Norwegian Industrial Property Office Patent Landscaping Report (September 2017), https://www.patentstyret.no/globalassets/patent/filer/subseaproduction_and_processingtechnology.pdf.

[188] Robert K. Perrons, *How innovation and R&D happen in the Oil and Gas Industry: Insights from a global survey,* 124 J. PETROLEUM SCI. & ENGG. 301, 306 (2014).

[189] Hossein Hassani et al., *The role of Innovation and Technology in sustaining the petroleum and Petrochemical Industry*, 119 TECH. FORECASTING & SOC. CHANGE 1, 13 (2017).

[190] Tony Wood, *The Natural Wealth of Nations: Transformation of Oil- and Gas-Producing Economies*, Cisco, https://www.cisco.com/c/dam/en_us/about/ac79/docs/wp/Transforming_Energy_0629b.pdf, (last visited May 17, 2023).

[191] Gabriel Marcuzzo Cavalheiro et al., *Strategic patenting in the upstream oil and gas industry: Assessing the impact of the pre-salt discovery on patent applications in Brazil*, 39 WORLD PAT. INFO. 58, 62 (2014).

In the upstream and the oil refining sector, states can directly purchase technology from technology suppliers, engineering contractors and through licensing.[192] In such contracts and in all petroleum contracts, the NOC must make technology sharing a precondition. Simply requiring inclusion of local personnel in petroleum operations may not help technology transfers as we saw in the instance of Nigeria, therefore the training and technology transfer requirements must be properly defined. Norway mandated the training of Norwegians by the IOCs who conducted its petroleum operations in exchange for patent protection.

4. Independent Technology Initiatives

Opponents of the patent system believe that patents are not means to transfer technology, but only a means to control technology[193] and are not the main way to increase the technology level of a state. Instead, this can be achieved through independent technology growth initiatives such as the creation of high-quality centres of higher education, encouraging start-ups, increasing R&D funding and methods of open innovation. These methods have been known to function better when a solid patent protection regime is in place. But governments can adopt a few additional measures to encourage local innovation. For example, in Brazil, companies are required to consult with the national patent bank before acquiring foreign technology.[194]

5. Open Innovation Models

The development of Shale in the US has been attributed to an open innovation model. Although the O&G industry has traditionally been known as a closed innovation system, some openness must be accepted in order to enable increased collaborations so as to enhance the technological level of the complete industry. Saudi Arabian NOC has adopted this path to enhance its technological competence and has since then shown a substantial increase in its patenting.[195]

6. Anticompetitive Controls

Many LDCs and MDCs[196] have suffered as a result of restrictive licensing practices and patent strategizing. Lack of international antitrust regulation and enforcement has left these issues in the hands of national legislation.[197] This system has been ineffective in weak nations with poor enforcement capabilities and because many MNCs are substantially stronger than the host state counterparts. Requiring MNC subsidiaries to be made into separate entities from their parent can make them answerable to the local government. As mentioned in section 3.2, Nigeria has recently enacted legislation to do so, and this has been useful in regulating MNC activities. However, strong domestic antitrust regulation and enforcement is extremely

[192] Ashish Arora, *Intellectual Property Rights and the International Transfer of Technology: Setting Out an Agenda for Empirical Research in Developing Countries*, WORLD INTELLECTUAL PROPERTY ORGANIZATION, http://www.wipo.int/edocs/pubdocs/en/wipo_pub_1012-chapter2.pdf (last visited May 17, 2023).
[193] Srijit Mukherjee & Sudipta Bhattacharjee, *Technology Transfer and the Intellectual Property Issues Emerging from It – An Analysis from a Developing Country Perspective* 9 J. INTELL. PROP. RTS. 271 (2004).
[194] Paul Kuruk, *Controls on Technology Transfer: an Analysis of the Southern Response to Northern Technological Protectionism*, 13 MD. J. INT'L L. 301, 314 (1989).
[195] Discussed previously in section 4.4.
[196] Less Developed Countries LDCs and More Developed Countries MDCs.
[197] Stephen Yelderman, *International Cooperation and the Patent-Antitrust Intersection* 19 TEX. INTELL. PROP. L.J., 195 (2011).

necessary. For example, Mexican anticompetitive laws[198] expressly prohibit the use of clauses restricting local R&D and even prohibits companies from entering into agreements for technology already available in the state.[199] Brazil's antitrust regulation prohibits the use of non-compete clauses, limits the term of a licensing contract to less than 10 years and reduces the obligations of the licensee. Subsequently, the licensee is free to use the technology after having paid 10 years' worth of royalties.[200] The Competition Act[201] of Zimbabwe prevents horizontal and vertical restraints of competition, abuse of dominant position and anticompetitive mergers.

The very need for these acts in these nations is proof that MNCs used anticompetitive practices in the past.

7. International Legislative Reforms

On the international front, though TRIPS[202] and the OECD[203] demand technology benefits for the host nation, there is no regulation or enforcement of these requirements. And though the rights to regulate and supervise the activities of a foreign MNC belong to the sovereign state under international law,[204] these have not been enforced because many MNCs are richer than the countries. The efforts of organizations like the Intergovernmental Commission on Transnational Corporations and the UN Center of Transnational Corporations to regulate the international activities of MNCs have also not succeeded[205] mainly because of the probable harm to the developed countries' economies.[206] Because developed nations such as the US prioritize their strategic needs[207] and the impact to their own commerce above fairness,[208] the international regulation for anticompetition has not developed. The US supreme courts' reluctance to extend illegality into the case of the US being involved in international cartels with the middle east and British participants since 1920[209] serves to prove this point. Thus, in the absence of international regulatory enforcement, the anticompetitive practices of MNCs have continued unchecked. However, moving forward, such international anticompetitive harmonization efforts must be renewed and standards complementary to

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[198] Mexico: Regulation of the Federal Law of Economic Competition , available at: http://www.diputados.gob.mx/LeyesBiblio/regley/Reg_LFCE.pdf (last visited 17 May 2023).
[199] Paul Kuruk, *Controls on Technology Transfer: an Analysis of the Southern Response to Northern Technological Protectionism*, 13 MD. J. INT'L L. 301, 315 (1989).
[200] Normative Act. No. 015 Establishing Basic Principles and Norms for the Registration of Contracts Involving the Transfer of Technology and Related Agreements, September 1975. Cited in Paul Kuruk, *Controls on Technology Transfer: an Analysis of the Southern Response to Northern Technological Protectionism*, 13 MD. J. INT'L L. 301, 313 (1989).
[201] Competition Act of Zimbabwe [Chapter 14:28], available at: http://www.wipo.int/wipolex/en/text.jsp?file_id=214717 (last visited 18 May 2023).
[202] TRIPS Article 7, available at: https://www.wto.org/english/docs_e/legal_e/27-trips_03_e.htm (last visited 17 May 2023).
[203] Przemyslaw Kowalsk et al., *International Technology Transfer Measures in an Interconnected World*, O.E.C.D (Nov. 20, 2017), https://www.oecd-ilibrary.org/trade/international-technology-transfer-measures-in-an-interconnected-world_ada51ec0-en.
[204] United Nations General Assembly Resolution, Declaration on the Establishment of a New International Economic Order 3201 (S-VI) (1 May 1974) Part g., available at: http://www.un-documents.net/s6r3201.htm.
[205] CYNTHIA DAY WALLACE, THE MULTINATIONAL ENTERPRISE AND LEGAL CONTROL: HOST STATE SOVEREIGNTY IN AN ERA OF ECONOMIC GLOBALIZATION 1082 (1st ed. 2002).
[206] Paul Kuruk, *Controls on Technology Transfer: an Analysis of the Southern Response to Northern Technological Protectionism*, 13 MD. J. INT'L L., 301, 323 (1989).
[207] Jim Manzi, *Joint Ventures Abroad and United States Antitrust,* 4 FLETCHER F. 49, 57 (1980).
[208] ibid 63.
[209] ibid 57.

TRIPS must be developed.[210] These standards must regularize M&As, ban the use of anticompetitive clauses in international contracts and also provide a means for states to bring forward their grievances against MNCs. In international contracts, MNCs must focus not only on the core business and commercial gains, but on the whole social aspect of the host country which would lead to prospective opportunities.[211] Although the initiatives and reforms proposed in this section can be incredibly useful, states must be aware that it is not merely enough to insert clauses into legislation and agreements, but they must also have methods to enforce them.

CONCLUSION

During the course of this paper, I have analysed two groups of oil-producing countries, one that experienced significant technological advancement and another that experienced no technological growth as a result of dealings with O&G MNCs. Having done so, I have identified the factors leading to both circumstances and also determined whether patents of the O&G MNCs played any role in these. Therefore, my response to the question "***Oil and Gas Patents: Do MNCs impede the growth of technology in developing nations?"*** is ***Yes, in selected instances***. These are the instances in which the host countries did not take proactive measures to improve their technical capabilities, possessed weak regulation and enforcement and were wholly constrained by their internal limitations. Although the states themselves are liable for being unable to overcome their limitations, in having taken advantage of their situations and in being purely driven by commercial gains, sometimes even wielding patents anticompetitively, MNCs have brought a portion of the culpability upon themselves.

It is an absolute fact that resource-rich developing states that lacked the capacity to innovate would not have been able to tap their reserves without the technology from the MNCs of developed nations. However, it is also equally true that not only did oil-rich states have to pay a form of "patent tax"[212] to the MNCs in order to obtain access to this technology, but that they in fact paid a much greater price in some instances. While on one hand, the growth of technology in countries such as Norway, Brazil and Malaysia have been accomplished as a result of collaborations with MNCs and through the licensing and transfer of patented technology. But on the other hand, Nigeria, Ghana and other oil-producing LDCs have been unable to grow their technical competence. This can be equally attributed to intrinsic country specific and extrinsic industry and organization specific factors. Nevertheless, the intent of this paper is to raise awareness of the extrinsic factors such as patent strategizing and restrictive licensing practiced by the O&G MNCs which are at times anticompetitive and have impeded the technology growth and created foreign dependence in some host nations. These have ultimately resulted in the formation of a technology gap between the oil-producing nations and the oil technology producing nations.

Because it is my intent that this paper is of use to those nations wishing to close the technology gap, I have made certain recommendations after having evaluated the reasons for the technology growth and stagnation of different countries. These recommendations will aid the technologically backward countries to independently increase their innovation and technology. Innovation is crucial to the petroleum industry. Despite declining oil prices, firms

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[210] Stephen Yelderman, *International Cooperation and the Patent-Antitrust Intersection* 19 TEX. INTELL. PROP. L.J. 193, 196 (2011).
[211] Harrie Vredenburg H & Percy Garcia, *Technology transfer in international business: the role of the multinational corporation in building capacity in developing countries,* 7 INT'L.J. BUS. STRATEGY (2007).
[212] Gabriel Marcuzzo Cavalheiro et al., *Strategic patenting in the upstream oil and gas industry: Assessing the impact of the pre-salt discovery on patent applications in Brazil*, 39 WORLD PAT. INFO. 58, 58 (2014).

that have prioritized innovation have managed to maintain their competitive advantage and successfully survive.[213] However, the use of anticompetitive practices must not be tolerated because that defeats the entire foundation of intellectual property law due to its adverse effects on innovation albeit in foreign nations. The benefits of innovation and intellectual property rights belong to everyone and not just the few who know how to practise them! Just as a transformation in the ownership and control of the oil reserves came about through increased awareness of the issue, and culminated in pressure from the OPEC, it is my wish that a transformation in the control of the oil technology will also come about. The suggested international and domestic reforms will regulate the dominant behaviour of O&G MNCs and facilitate the technology catch-up of the developing states.

[213] Hossein Hassani et al., *The role of Innovation and Technology in sustaining the petroleum and Petrochemical Industry*, 119 TECH. FORECASTING & SOC. CHANGE 1,6 (2017).

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