BLOCKCHAIN, REGTECH, AND THEIR APPLICATION TO TRANSFER PRICING ACTIVITIES IN THE CLOUD

*Dr. George Tian**

---

* *Dr George Yijun Tian is a Senior Lecturer of Faculty of Law at the University of Technology Sydney (UTS), an external HDR supervisor of the University of Sydney Business School, and a UDRP Neutral appointed by World Intellectual Property Organization (WIPO) Arbitration and Mediation Center, Geneva.* *The author is grateful to Professor Jason Harris of University of Sydney Law School for providing useful comments and detailed feedback for the final draft. The author would also like to thank both Professor Jill McKeough, former Law Dean of UTS and Commissioner for Australian Law Reform Commission (ALRC)'s Inquiry into Copyright Law, for her valuable comments through the article writing, and Mr. Cyrus Thistleton, Tax Specialist, Australian Taxation Office (ATO) for providing useful materials on Australian Transfer Pricing laws and Policies during the writing process. The early draft of the article was presented at the Conference on Legal Problems with the Application of Smart Contracts and the Way Forward at the City University of Hong Kong Law School, on 24 May 2018; the Law Tech Talks - Seminar on Blockchain & IP related Transfer Pricing Arrangements at the University of Hong Kong Law School on 28 May 2018; and at the Conference of Blockchain, FinTech and Rule of Law at Faculty of International Finance at the China University of Political Science and Law on 25 Dec 2018. The author would like to thank conference and seminar participants as well for their useful comments. Finally, the author is grateful to Alyssa Allen, Cortnee Sabio, Meredith Yuan, Megan Grace, and the other editors of the Houston Business and Tax Law Journal for their thoughtful and supportive engagement.*

ABSTRACT

This article examines the recent development of transfer pricing (T.P.) activities by Multi-National Enterprise (MNE) groups in the cloud. In particular, this article explores both the risks and opportunities arising from using blockchain-based regulatory technology (RegTech) to regulate T.P. activities in the cloud. It provides an overview of the main forms of cloud-related T.P. activities and highlights key challenges for implementing T.P. rules in the cloud. It explores key features and potential limits of distributed ledger technology (DLT), blockchain, and smart contracts. It also discusses how blockchain smart contracts can be used as RegTech for implementing T.P. rules. Some have suggested that blockchain and other DLT could provide a solution to the practical challenges posed by the widespread use of cloud systems to facilitate T.P. This article critiques this proposed solution and ultimately concludes that such a solution would face significant practical and legal obstacles. The article draws on insights from some recent developments in China, including decisions of the Chinese Internet Court, Supreme Court interpretations, and recently launched judicial blockchain platforms in China. It contends that, although technology measures may serve as an important supplement for T.P. rules enforcement, the advantages of blockchain smart contracts should not be overstated and potential risks must be addressed. The success of blockchain-based RegTech requires the cooperation of all stakeholders and even-development of the capacity to use blockchain technology across different sectors of society.

PART I. INTRODUCTION

The global tax system was originally established on the basis of physical transactions and trade. Emerging technologies, however, have upended this regime. Technology companies, particularly cloud-related companies, have been at the "forefront of multinationals operating in a developing new global tax environment. Their ever-evolving and increasingly borderless cloud-based business models have set off a scramble among companies and governments around the world to grasp cloud taxation issues and impacts."[1]

The world's top cloud service providers, such as Amazon, Microsoft, Google, and IBM,[2] have been common targets of regulatory scrutiny by taxation authorities. These companies have been involved in many disputes arising from cross-border tax evasion, particularly transfer pricing (T.P.). For example, in 2011, the Australian Tax Office (ATO) successfully sued IBM in federal court for failure to pay transfer taxes on revenue earned under a software licensing agreement. Despite IBM's claim that the payments made were not royalties (and thus, the company was not liable for withholding tax), the court ordered IBM to pay both the back taxes and the ATO's legal fees.[3] In 2016, IBM won a JPY400 billion tax litigation involving T.P. issues brought by the National Tax Agency in Japan.[4] In the "first major case concerning cross-border tax evasion" in China in 2014, China's State Taxation Administration charged Microsoft $140 million in back taxes and interest.[5] In January 2019, Microsoft won a T.P. case in the Danish

---

1. ERNST & YOUNG, CLOUD TAXATION ISSUES AND IMPACTS 4 (2015), http://www.ey.com/Publication/vwLUAssets/EY-cloud-taxation-issues-and-impacts/$FILE/EY-cloud-taxation-issues-and-impacts.pdf.

2. Larry Dignan, *Top Cloud Providers 2019: AWS, Microsoft Azure, Google Cloud; IBM Makes Hybrid Move; Salesforce Dominates SaaS*, ZDNET (Aug. 15, 2019, 2:30 PM), https://www.zdnet.com/article/top-cloud-providers-2019-aws-microsoft-azure-google-cloud-ibm-makes-hybrid-move-salesforce-dominates-saas/.

3. *See* Mary Swire, *IBM Loses Australian Transfer Pricing Case*, TAX-NEWS.COM (Apr. 19, 2011), https://www.tax-news.com/news/IBM_Loses_Australian_Transfer_Pricing_Case48854.html ("IBM's argument was that the Australian subsidiary had signed a software licensing deal in 1987 that entitled it to use and distribute software that had been designed in the US in return for 40% of the revenue it received. The case hinged on whether these monies were 'royalties' under the double taxation agreement between the US and Australia.").

4. Toshinori Uneki (@Toshinori (Toshi) Uneki), LINKEDIN (Mar. 30, 2016), https://www.linkedin.com/pulse/ibm-wins-jpy400-billion-tax-litigation-brought-national-uneki.

5. Bill Rigby, *Microsoft to Pay China $140 Million for 'Tax Evasion,'* REUTERS (Nov. 25, 2014, 3:41 PM), https://www.reuters.com/article/us-microsoft-china-tax/microsoft-to-pay-china-140-million-for-tax-evasion-idUSKCN0J92DD20141125; *see also* Charles

Supreme Court, in which the taxation authorities claimed that the T.P. documentations were not prepared on time.[6] In 2017 the Internal Revenue Service lost a $1.5 billion T.P. dispute, "a complex transfer pricing case involving a cost-sharing agreement between Amazon.com Inc [sic] and its Luxembourg subsidiary."[7]

Like the game of cat and mouse, the pursuit of these I.T. giants by tax authorities is never-ending. In recent years "taxing authorities all over the world . . . have become more and more aggressive in their pursuit of multinationals [in order] to tax as much of their global profits as they can."[8] With ever-improving digital technology, some taxation authorities have started to set up powerful "profit monitoring mechanism[s]" by adopting blockchain, A.I., and "big data analysis to carry out risk assessments so that more targeted administrative action can be taken" against large taxpayers.[9]

This article examines the recent development of T.P. activities by Multi-National Enterprise (MNE) groups in the cloud, exploring both obstacles and feasibilities of using blockchain-based Regulatory technology (RegTech) to address the current T.P. issues in the cloud.

Part II of this article provides an overview of background concepts of cloud computing technology and T.P. rules. Part III explores the main forms of cloud-related T.P. activities by MNE groups and main challenges for implementing arm's length principle in the cloud environment. Part IV introduces basic concepts, key features, and potential limits of distributed ledger technology (DLT), blockchain, and smart contracts, and explores how blockchain smart contracts can be used as RegTech for implementing T.P. rules. Part V explores potential obstacles and feasibilities of using blockchain-based RegTech to improve the efficiency and effectiveness of the T.P. rule compliance, including potential technological, judicial and policy obstacles, and possible solutions. In order to explore possible solutions, the article draws

---

Clover, *China 'Fines' Microsoft $140m for Tax Evasion*, FIN. TIMES (Nov. 26, 2014, 10:48 AM), https://www.ft.com/content/db5b55e6-752c-11e4-b1bf-00144feabdc0.

6. *Microsoft Wins Danish Supreme Court Case*, DELOITTE (Apr. 4, 2019), https://www2.deloitte.com/content/dam/Deloitte/global/Documents/Tax/dttl-tax-global-transfer-pricing-alert-19-014-4-april-2019.pdf.

7. Joanna Mather, *Lessons for the ATO in Amazon Win*, AUSTRALIAN FIN. REV., https://www.afr.com/policy/tax-and-super/lessons-for-the-tax-office-in-amazons-transfer-pricing-win-20170329-gv8nvk (last updated Apr. 9, 2017, 4:35 PM).

8. *Id.*

9. Cheng Chi et al., *Now That China Has Data, What Is It Going Do with It?*, INT'L TAX REV. (Jan. 29, 2019), https://www.tpweek.com/articles/now-that-china-has-data-what-is-it-going-do-with-it/aruzdqdc.

on insights from some recent development in China. This includes recent decisions by the Chinese Internet Court on blockchain evidence (e.g., *Huangzhou Huatai Yimei Culture Media Ltd. v. Shenzhen Daotong Technology Development Ltd.*),[10] as well as recent Supreme Court interpretations (e.g., *Provisions of the SPC on Several Issues in the Hearing of Cases by Internet Courts* (Fa Shi [2018] No. 16)).[11] The article also considers the recently launched judicial blockchain platform by the Chinese Internet Court and the recently launched blockchain-based invoice platform established by the Chinese taxation authority in Shenzhen. The article contends that although technology measures may serve as an important supplement for T.P. rule enforcement, the advantages of blockchain smart contracts should not be overstated and potential risks must be addressed. The eventual success of blockchain-based RegTech requires the cooperation of all stakeholders and even-development of the capacity to use blockchain technology across different sectors of society.

PART II. CONCEPTUAL OVERVIEW OF CLOUD COMPUTING & TRANSFER PRICING RULES

A. Defining Cloud Computing

There are many competing conceptions of what cloud computing is. Different countries, and even different stakeholders in the same country, may have different definitions of cloud computing.[12] In the U.S. alone, more than twenty competing

---

10. *See infra* Part V.B. (discussing that the Internet Court in Hangzhou, China admitted evidence authenticated by blockchain technology for the first time).

11. Zuigao Renmin Fayuan Guanyu Hu Lianwang Fayuan Shenli Anjian Ruogan Wenti De Guiding (最高人民法院关于互联网法院审理案件若干问题的规定) [Provisions of the Supreme People's Court on Several Issues on the Hearing of Cases by Internet Courts] (promulgated by the Supreme People's Court of the People's Republic of China., Sept. 3, 2018, effective Sept. 7, 2018), http://www.court.gov.cn/zixun-xiangqing-116981.html (China); *see also* Wolfie Zhao, *China's Supreme Court Recognizes Blockchain Evidence as Legally Binding*, COINDESK (Sept. 7, 2018, 8:00 AM), https://www.coindesk.com/chinas-supreme-court-recognizes-blockchain-evidence-as-legally-binding ("The court released new rules on Friday–that take immediate effect–clarifying various issues relating to how internet courts in China should review legal disputes.").

12. *See* Steven Rosenbush, *The Morning Download: Cloud Computing Hazy Meaning Creates Confusion for CIOs*, WALL ST. J.: CIO J. (Oct. 8, 2016, 7:40 AM), https://blogs.wsj.com/cio/2016/10/18/the-morning-download-cloud-computings-hazy-meaning-creates-confusion-for-cios/ ("In many ways we're nowhere nearer understanding what cloud is . . . ."); *Defining Cloud Computing*, N.Z. L. SOC'Y (July 4, 2014), https://www.lawsociety.org.nz/lawtalk/lawtalk-archives/issue-845/defining-cloud-computing ("While the term [cloud] is circulated widely, it is often not well understood.");

definitions of cloud computing have been proffered.[13] Nevertheless, the most widely accepted definition is one provided by the U.S. National Institute of Standards and Technology, which defines cloud computing as a "model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction."[14] Furthermore, based on the nature of cloud computing services, cloud computing is often categorized into three different modes: Software as a Service (SaaS), Platform as a Service (PaaS), and Infrastructure as a Service (IaaS).[15] SaaS is software provided by the cloud service provider to the user, allowing users from different locations to use the software without actually installing it on their devices. Users can simply use an Internet browser to interact with the SaaS software. Some typical examples of SaaS include Microsoft Office 365 and Adobe Photoshop. PaaS is a platform for software developers, including web servers, development tools, and operating systems.[16] Atypical examples include the new release of IBM Blockchain, which enables developers to quickly build and host security-rich production blockchain networks on the IBM Cloud.[17] IaaS is the provision of third-party server space for users to process or store files. This means that users do not need to buy or build their own data centers or hold servers any longer. For example, both Dropbox and Baidu Wangpan (Baidu Web Drive) provide their users with online storage spaces hosted on Dropbox and Baidu Wangpan data centers accessible anywhere via the Internet,

---

Lizhe Wang et al., *Scientific Cloud Computing: Early Definition and Experience*, 10TH IEEE INT'L CONF. ON HIGH PERFORMANCE COMPUTING & COMM. 825 (2008), https://ieeexplore-ieee-org.ezproxy.lib.uh.edu/stamp/stamp.jsp?tp=&arnumber=4637787("There are still no widely accepted definition[s] for Cloud computing albeit Cloud computing practice has attracted much attention.").

13. LEIGH ANN RAGLAND ET AL., CTR. FOR INTELLIGENCE RES. & ANALYSIS, RED CLOUD RISING: CLOUD COMPUTING IN CHINA (Sept. 5, 2013). https://www.uscc.gov/sites/default/files/Research/DGI_Red%20Cloud%20Rising_2014.pdf.

14. PETER MELL & TIMOTHY GRANCE, NAT'L INST. OF STANDARDS & TECH., THE NIST DEFINITION OF CLOUD COMPUTING 2 (2011), http://nvlpubs.nist.gov/nistpubs/Legacy/SP/nistspecialpublication800-145.pdf.

15. Christian Solmecke, *The Legal Aspects of Cloud Computing Under Copyright Law*, WILDE BEUGER SOLMECKE (Sept. 13, 2013), https://www.wbs-law.de/allgemein/the-legal-aspects-of-cloud-computing-under-copyright-law-15944/.

16. SAMUEL YANG, REGULATION OF CLOUD COMPUTING IN CHINA, PRACTICAL LAW UK PRACTICE NOTE W-007-4744.(last updated Aug. 2019).

17. Press Release, IBM, IBM Launches Industry's Most Secure Enterprise-Ready Blockchain Services for Hyperledger Fabric v 1.0 on IBM Cloud (Mar. 20, 2017) (on file with author).

which enables their users to store files on remote cloud servers and have the ability to share files within a synchronized format on different devices.[18]

Put simply, cloud computing technology has two key features: (1) elasticity and (2) borderless operation. On the one hand, computational resources of cloud computing technology are elastic. They not only can be shared simultaneously by numerous remote users, but can also be scaled up or down with demand.[19] Such elasticity provided by cloud technology may significantly reduce the operational costs. On the other hand, cloud-computing technology permits cross-border data transmissions. The locations of data processing activities are based on data load capacity, time of day, and other factors.[20] Data processing activities may be conducted in various locations and in different countries.[21] The borderless feature of cloud computing technology has further increased the difficulty of data control and the uncertainty of legal compliance, including compliance with T.P. rules.

B. Transfer Pricing & Arm's Length Principle

What is T.P.? Generally speaking, T.P. occurs when a commercial transaction transpires between companies that are controlled by the same entity. Consequently, the price for such a transaction is not determined by market supply and demand but by the entity controlling the two companies.[22] For example, a transaction between a parent and subsidiary requires T.P. analysis. [23]

Why use T.P.? A main motivation for MNE's to use T.P. is tax efficiency. MNEs conduct business around the world and their resources are often deployed across different taxing jurisdictions. The mismatch of income tax rates in different jurisdictions

---

18. *See Dropbox*, TECHOPEDIA, http://www.techopedia.com/definition/26850/dropbox (last updated Feb. 9, 2017); *see also The Easiest Way to Transfer/Copy/Sync Baidu to Google Drive*, MULTCLOUD (Dec. 12, 2018), https://www.multcloud.com/tutorials/baidu-to-google-drive-5566.html.

19. *See* Nikolas Roman Herbst et al., *Elasticity in Cloud Computing: What It Is, and What It Is Not*, 10TH INT'L CONF. ON AUTONOMIC COMPUTING 23 (2013), https://www.usenix.org/system/files/conference/icac13/icac13_herbst.pdf (citation omitted).

20. Paul M. Schwartz, *EU Privacy and the Cloud: Consent and Jurisdiction Under the Proposed Regulation*, 2013 PRIVACY L. WATCH (BNA) NO. 84, at 718, 718 (May 1, 2013).

21. *Id.*

22. *See* DEZAN SHIRA & ASSOCIATES, TRANSFER PRICING IN CHINA 2, https://leaglobal.com/thought_leadership/transfer-pricing-in-china.pdf .

23. *Id.*

naturally becomes a key driving force, especially for any MNE, [24] to pursue T.P. as a tax planning strategy in order to move profits between high and low tax jurisdictions.[25]

Although such a tax efficient method itself is not per se illegal, it is often looked at with suspicion by taxation authorities.[26] T.P. may result in significant tax revenue losses for the affected countries, creating a "transfer pricing problem."[27] A study conducted by the United Nations Conference on Trade and Development in 2015 showed that company profit shifting and tax avoidance practices result in an estimated $100 billion tax revenue loss per year for developing countries.[28]

In the current globalization and digitization environment, an increasing number of companies, particularly technology companies, have adopted T.P. activities as "a tool for tax avoidance."[29] For example, a 2016 investigation conducted by the European Commission found that "selective treatment" by Ireland allowed Apple to pay a tax rate of only 0.005% in 2014.[30] As a result, Ireland became home to more than one-third of Apple's global revenue. From this example it is clear that T.P. activities

---

24. Manish Jain, *Transfer Pricing Issues in Intangibles (Intellectual Property): An Analysis of Problems and Possible Solutions*, 1 RGNUL STUDENT L. REV. 13, 13 (2014) (citing ORG. FOR ECON. CO-OPERATION & DEV., TRANSFER PRICING GUIDELINES FOR MULTINATIONAL ENTERPRISES AND TAX ADMINISTRATIONS G-6 (2001)).

25. "By taking advantage of these foreign tax rates and exemptions, multinational corporations are lowering their international tax rates and reporting higher profits." *Id.* at 15 (citation omitted). "MNE Groups can minimize their taxes through three types of activities: tactical (profit shifting activities), operational (financial restructuring), and tax planning (MNE Group structure reorganisation)."*Id.* at 15–16 n.34.

26. *Id.* at 13.

27. *Id.* at 13. Moreover, some estimates indicate losses from income shifting by multinational corporations are nearly $100 billion USD per year. JANE G. GRAVELLE, CONG. RESEARCH SERV., R40623, TAX HAVENS: INTERNATIONAL TAX AVOIDANCE AND EVASION 19 (2015).

28. U.N. CONF. ON TRADE & DEV., WORLD INVESTMENT REPORT 2015 – REFORMING INTERNATIONAL INVESTMENT GOVERNANCE 200 (2015), https://unctad.org/en/PublicationsLibrary/wir2015_en.pdf; *see also* Petr Janský & Miroslav Palanský, *Estimating the Scale of Profit Shifting and Tax Revenue Losses Related to Foreign Direct Investment* 4 (U.N. U. WORLD INST. FOR DEV. ECON. RES., Working Paper 2018/21), https://www.wider.unu.edu/sites/default/files/Publications/Working-paper/PDF/wp2018-21.pdf.

29. *Overview of Transfer Pricing in Hong Kong and China*, KING & WOOD MALLESONS (Nov. 26, 2015), https://www.kwm.com/en/us/knowledge/insights/overview-of-transfer-pricing-in-hk-and-china-20151126.

30. *Commission Says Ireland Granted Undue Tax Benefits of up to 13bn to Apple*, RTÉ , https://www.rte.ie/news/2016/0830/812819-apple-tax-ireland/ (last updated Aug. 30, 2016, 11:55 PM).

by MNEs may pose a serious risk to the fairness and the integrity of international tax system.[31]

To prevent MNEs from shifting profits to obtain tax benefits, many countries have adopted T.P. tax laws to "ensure that the amount charged between related parties, when they transact, is fair."[32] This is known as the Arm's Length principle (ALP). Both the United Nations Practical Manual on Transfer Pricing for Developing Countries (2017) and the OECD Transfer Pricing Guidelines (2017) provide that an ALP should be adopted to establish the price of transactions between related companies.[33] That is, the price of the related companies should be the same as the price for unrelated companies;[34] thus, a valid transaction between two unrelated companies must be the "product of genuine negotiation."[35] It is clear that accurately determining a market price is crucial for the success of the application of ALP. ALP naturally also applies to cloud service providers, including any MNEs which have moved to the cloud. Nevertheless, as introduced above, the unique features of cloud computing technology bring challenges for the implementation of ALP for both MNEs and taxation authorities. After all, the traditional tax systems were established on the basis of physical transactions of tangible assets rather than intangible assets.

---

31. *See What is BEPS?*, ORG. FOR ECON. CO-OPERATIONS & DEV., http://www.oecd.org/tax/beps/beps-about.htm (last visited Jan. 25, 2020) ("BEPS refers to tax planning strategies that exploit gaps and mismatches in tax rules to artificially shift profits to low or no-tax locations where there is little or no economic activity . . . *Although some of the schemes used are illegal, most are not*. This undermines the fairness and integrity of tax systems because businesses that operate across borders can use BEPS to gain a competitive advantage over enterprises that operate at a domestic level. Moreover, when taxpayers see multinational corporations legally avoiding income tax, it undermines voluntary compliance by all taxpayers.") (emphasis added).

32. JOHN HENSHALL, GLOBAL TRANSFER PRICING: PRINCIPLES AND PRACTICE 1 (3rd ed. 2016).

33. UNITED NATIONS, PRACTICAL MANUAL ON TRANSFER PRICING FOR DEVELOPING COUNTRIES 34 (2017), https://www.un.org/esa/ffd/wp-content/uploads/2017/04/Manual-TP-2017.pdf ; ORG. FOR ECON. CO-OPERATION & DEV., OECD TRANSFER PRICING GUIDELINES FOR MULTINATIONAL ENTERPRISES AND TAX ADMINISTRATIONS 2017 33–34 (2017) [hereinafter OECD GUIDELINES].

34. *Arm's-Length Principle*, USTRANSFERPRICING.COM, http://www.ustransferpricing.com/arms_length_principle.html (last visited Jan. 13, 2020) ("The 'arm's-length principle' of transfer pricing states that the amount charged by one related party to another for a given product must be the same as if the parties were not related."); *see also* INTERNAL REVENUE SERVICE, ARM'S LENGTH STANDARD (2014), https://www.irs.gov/pub/int_practice_units/ISI9422_09_06.PDF.

35. *Transfer Pricing*, TAX JUST. NETWORK, https://www.taxjustice.net/topics/corporate-tax/transfer-pricing/ (last visited Jan. 9, 2020) ("[M]arket price . . . generally result[s from] . . . 'arm's-length' trading, because it is the product of genuine negotiation in [the] market. This arm's length price is usually considered to be acceptable for tax purposes.").

PART III. CLOUD-RELATED TRANSFER PRICING ACTIVITIES & CHALLENGES FOR LAW ENFORCEMENT

A. Cloud-related Transfer Pricing Activities

MNEs may adopt various cloud computing related strategies to conduct or facilitate their T.P. activities. MNEs may conduct T.P. activities through Cloud Service Provider Relocation strategies. MNEs can seek a tax deduction by relocating an affiliated Cloud Service Provider from a high tax jurisdiction to a low tax jurisdiction. As noted above, due to the borderless and flexibility features of CC, MNE groups can easily relocate their I.T. infrastructure, such as cloud servers and data centers, without affecting the quality of their business performance.[36]

MNEs can also use Cloud Service Agreements (CSA) to facilitate T.P. activities. Due to the ALP compliance obligations, the pricing of cloud service fees between related companies cannot be unreasonably high.[37] However, the application of CSA may help to justify a high price for cloud services provided between related companies. For example, the scope of CSA may not only cover the basic cloud services such as the rights to use cloud-based software, but also other technical services such as software maintenance services and other value-added services.[38]

Additionally, MNEs may use Cost Sharing Arrangement/Cost Contribution Arrangement (CCA) to facilitate their cloud-related T.P. activities. "As value chains of multinational companies become increasingly dispersed . . . owners of valuable intangible assets may emerge in multiple tax jurisdictions."[39] CCAs are

---

36. Orly Mazur, *Transfer Pricing Challenges in the Cloud*, 57 B.C. L. REV. 643, 671, 675 (2016).

37. As discussed above, the tax laws in many countries require that the transfer pricing arrangements between related enterprises comply with the Arm's Length principle, that is, the price of the associated parties should be the same as the price for the non-related party. *See Arm's-Length Principle*, *supra* note 34; INTERNAL REVENUE SERVICE, *supra* note 34.

38. *The SAAS Company that Grew from 0 to 4M Subscribers in 2.5 Years*, TOMASZ TUNGUZ (Mar. 22, 2015), https://tomtunguz.com/adobe-saas-growth/. For example, in regard to Adobe Photoshop software, Adobe has successfully transited from the traditional "Licensed Software Model" to the current "SaaS Subscription Model." In addition to using its main website to provide cloud-based Photoshop software services to its subscribers (basic cloud service), it provides registered Adobe members with access to all of Adobe's photography, design, video, and web apps on all their desktop and mobile devices (other related technical services).

39. Nobuo Mori et al., *Cost Sharing Agreements May Allow Multinational Companies to Reap the Benefits of Intangible Asset Investment*, TP WEEK (Mar. 25, 2009), https://www.nera.com/content/dam/nera/publications/archive1/PUB_Cost_Sharing_Apr2009.pdf.

contractual arrangements between related companies "to share the contributions and risks involved in either (1) the development, production, or acquisition of intangible or tangible assets, or (2) the execution of services, with an expectation that the parties will enjoy the anticipated benefits to be derived from their contributions equitably."[40]

More specifically, related companies may adopt CCA to allocate their research and development costs for creating intangible assets, such as cloud-based software patents.[41] Companies can also re-allocate market risk. Since both high-tax and low-tax affiliates contribute to the final income generated from the subject intangible, MNE groups may artificially make the low-tax affiliate generate the majority of the income.[42] In doing so, the low-tax affiliates reduce the overall global tax liability of the MNE group.[43]

B. Cloud Challenges for ALP Application

As introduced above, the key for the application of ALP is to determine the accurate market value of the relevant transactions.[44] Unfortunately, it is not an easy task to accurately assess the value of transactions involving intangible assets.[45]

From the beginning it is difficult to find the data needed to conduct a T.P. analysis.[46] Potentially comparable transactions are effectively not analogous because of the uniqueness of intellectual

---

40. JACQUELINE DOONAN & RAMÓN LÓPEZ DE HARO, DELOITTE, COST CONTRIBUTION ARRANGEMENTS 1 (2015), https://www2.deloitte.com/content/dam/Deloitte/us/Documents/Tax/us-tax-beps-changes-transfer-pricing-cost-contribution-arrangements.pdf; *see also* Mori, *supra* note 39, at 1 (stating that "[c]ost sharing arrangements may become useful to establish a proper compensation of the affiliates responsible for intangibles development, provide a mechanism for sharing the risk of intangible development activities among affiliates, improve the cash position of the intangible-developing entities, and establish more efficient intercompany transaction structures.").

41. Jain, *supra* note 24, at 17.

42. For example, the high tax affiliate may bear more research and development costs, but may make the low tax affiliate become the major receiver of the royalty incomes generated from the subject intangibles (e.g., registering IPR in low-tax country). *See id.* at 27–28.

43. *Id.* at 17.

44. *See* Part II; *see also* OECD GUIDELINES, *supra* note 33, at 33.

45. OECD GUIDELINES, *supra* note 33, at 248–49.

46. *See The Platform for Collaboration on Tax Delivers a Toolkit to Help Developing Countries Address the Lack of Comparables for Transfer Pricing Analyses and Better Understanding Mineral Product Pricing Practices*, ORG. FOR ECON. CO-OPERATION & DEV. (June 22, 2017), http://www.oecd.org/tax/pct-delivers-toolkit-to-help-developing-countries-address-lack-of-comparables-for-transfer-pricing-analyses.htm (noting that the toolkit was designed to overcome a lack of data).

property.[47] The same is true for cloud-related transactions since each cloud computing related product and service usually has its own unique features, thereby making it difficult to find comparables for one product or service to another. Developing countries are particularly vulnerable to these challenges.[48] Unlike developed countries, which usually have a much larger number of public companies, developing countries usually only have a small number of public companies and the information available on domestic private companies is either lacking or inadequate.[49] "This [directly] limits the amount of publicly available information on domestic companies that can be used for transfer pricing analysis."[50]

Additionally, there is a lack of detailed understanding of the operation of MNE's business structures and their global value chain as a whole. In practice, intangibles are often transferred in combination with tangible assets or associated services.[51] Buyers may want to acquire a product package that relies on a combination of intangible assets and other services, such as a combination of software patents, I.T. infrastructure, and technical support services.[52] For example, when buyers purchase Adobe's cloud-based Photoshop software, the product package they acquire not only includes a license to use the Photoshop software online, but also associated services on software updates and cloud platform maintenance.[53] Because of this, it is not always easy to identify an accurate separate value for the subject intangible asset, such as the value of cloud-based Photoshop software, in the subject transaction. The situation becomes even more difficult when a cloud-related product package is provided by related

47. *See* Richard Schmidtke et al., *The Hypothetical Arm's-Length Test: Germany's Way of Calculating the ALP for IP*, INT'L TAX REV. (Aug. 28, 2018), https://www.internationaltaxreview.com/article/b1f7n0vs4krwbn/the-hypothetical-arms-length-test-germanys-way-of-calculating-the-alp-for-ip.

48. UNITED NATIONS, PRACTICAL MANUAL ON TRANSFER PRICING FOR DEVELOPING COUNTRIES, 375 (2013), https://www.un.org/esa/ffd/wp-content/uploads/2014/08/UN_Manual_TransferPricing.pdf [hereinafter U.N. PRACTICAL MANUAL 2013] (highlighting the challenges for developing countries in relation to identification and valuation of intangibles).

49. *Id.*

50. *Id.*

51. *See* Richard L. Doernberg, *Taxation Silos: Embedded Intangibles and Embedded Services*, 110 TAX NOTES, 1189, 1189–90 (2006) (indicating that the combination of intangible assets with tangible assets or associate services is also known as "embedded intangibles").

52. *See infra* Part IV.B.3 for a discussion on product packages.

53. *Creative Cloud Maintenance Scheduled for Friday Night*, ADOBE CREATIVE CLOUD (Jan. 9, 2014), https://blogs.adobe.com/creativecloud/creative-cloud-maintenance-scheduled-for-friday-night/.

enterprises located in different tax jurisdictions. Because the parent companies or service centers of most of MNEs are located overseas, the local taxpayers—also known as domestic enterprises—may only be able to provide information in relation to their own operations rather than provide "an overall understanding of the entire intra-group services structure."[54]

Further, there is a lack of information on intangible transactions in financial statements. Generally speaking, the traditional model of financial reporting is not able to provide relevant information about a company's intangible assets.[55]

Commenters opine that this is because most intangibles, other than patents, are not usually reported in MNE's financial statements, making them difficult to detect.[56] For example, common technology payments—including things like royalties, licenses, and management fees—are actually intra-group payments between parent firms and their subsidiaries.[57] As a consequence, intangible-based transactions are not disclosed on the financial statements of MNE group.[58] This creates further challenges for taxation authorities in their efforts to identify comparable pricing information for intangibles.

In order to address these challenges, many countries have taken action to reform their laws on tax evasion. In particular, the OECD Base Erosion and Profit Shifting (BEPS) Project not only released its final report (the BEPS Report) in 2015, [59] it also revised the *OECD Transfer Pricing Guidelines for Multinational Enterprises and Tax Administrations*.[60] The BEPS Report contains

---

54. Comm. of Experts on Int'l Cooperation in Tax Matters, ¶ 39, U.N. Doc. E/C.18/2015/CRP.12 (Oct. 20, 2015).

55. Jovan Krstić & Milica Đorđević, *Financial Reporting on Intangible Assets – Scope and Limitations*, 7 FACTA UNIVERSITATIS, SERIES: ECON. & ORG. 335, 335 (2010) ("Lack of relevant information on intangible assets (intellectual capital and the like) in the financial statements disables the possibility for external users to perceive real value of the company and adequate decision making.").

56. Jain, *supra* note 24, at 21.

57. *See* Lorraine Eden et al., *The Production, Transfer, and Spillover of Technology: Comparing Large and Small Multinationals as Technology Producers*, *in* SMALL AND MEDIUM SIZED ENTERPRISES IN THE GLOBAL ECONOMY 121, 122 (Zoltan J. Acs & Bernard Yeung eds., 1999).

58. *See* Jain, *supra* note 24, at 22 ("IP appears only as 'goodwill because the accounting standards in most countries allow internally-generated IP to be expensed rather than capitalized as investments. IP is generally not recorded or disclosed in an MNE Group's financial statements or its footnotes.'") (citation omitted).

59. ORG. FOR ECON. CO-OPERATION & DEV., OECD/G20 BASE EROSION & PROFIT SHIFTING PROJECT, ALIGNING TRANSFER PRICING OUTCOMES WITH VALUE CREATION, ACTIONS 8-10: 2015 FINAL REPORTS 3–4 (2015), http://dx.doi.org/10.1787/9789264241244-en.

60. *Id.* at 13–14.

detailed recommendations, which have been widely adopted by OECD countries, to help address these T.P. issues with intangibles.[61] Although potential ramifications of these OECD recommendations have been thoroughly analyzed in scholarship,[62] few scholars focus on how technology, including blockchain technology, can be used to facilitate the enforcement of T.P. rules on intragroup transactions in relation to intangibles. This article next examines both the challenges and feasibilities of using blockchain smart contact as RegTech to address T.P. issues.

PART IV. BLOCKCHAIN SMART CONTRACTS AS REGTECH FOR TRANSFER PRICING REGULATIONS

A. Defining Distributed Ledger Technology, Blockchain and Smart Contract

Before exploring possible blockchain-based solutions for T.P. activities, it is necessary to explore the blockchain basics.

1. Evolving Definitions of Distributed Ledger Technology and Blockchain

As noted in a recent World Bank report, the terminology in this area is "still evolving and universal definitions have not yet been formalized."[63] DLT is a new and quickly evolving method to record and exchange data across many repositories, also known as ledgers.[64] This technology allows for transaction data to be

---

61. *Id.* at 75–77 (outlining key principles for the transfer pricing determination in relation to intangibles and providing that the ownership of the intangible itself "does not confer any right ultimately to retain returns derived by the MNE group from exploiting the intangible").

62. *E.g.*, Ranjana Gupta, *Analysis of Intellectual Property Tax Planning Strategies of Multinationals and the Impact of the BEPS Project*, 33 Austl. Tax F. 185 (2018); Madelein Kleyn, *BEPS Project and Intangibles: Impact on IP Tax Structures*, LES NOUVELLES, June 2018, at 148; Yariv Brauner, *Changes? BEPs, Transfer Pricing for Intangibles, and CCAS* (Univ. of Fla. Levin Coll. of Law Legal Studies Research Paper Series, Paper No. 16-14, 2016), https://ssrn.com/abstract=2744730; Carlo Garbarino, *The Tax Treaty Implications of the Remuneration as Royalties of Intellectual Property and Intangibles*, 29 EUR. BUS. L. REV. 345 (2018); Andrés Báez & Yariv Brauner, *Taxing the Digital Economy Post BEPS . . . Seriously* (Univ. of Fla. Levin Coll. of Law Legal Studies Research Paper Series, Paper No. 19-16, 2019), https://ssrn.com/abstract=3347503.

63. HARISH NATARAJAN ET AL., WORLD BANK, DISTRIBUTED LEDGER TECHNOLOGY (DLT) AND BLOCKCHAIN, at iv (2017), http://documents.worldbank.org/curated/en/177911513714062215/pdf/122140-WP-PUBLIC-Distributed-Ledger-Technology-and-Blockchain-Fintech-Notes.pdf.

64. *Id.*

recorded, managed, and sustained by different network participants, also known as nodes.[65]

"Blockchain" is defined by the World Bank as "a particular type of data structure used in some distributed ledgers which stores and transmits data in packages called 'blocks' that are connected to each other in a digital 'chain.'"[66] It uses encryption methods known as cryptography and a set of specific mathematical algorithms to record and synchronize data across a network in an immutable manner—that is, data records can only be added, not removed.[67] In plain language, some tax practitioners simply define blockchain as a "decentralised ledger, or list, of all transactions across a peer-to-peer network."[68]

Despite the facts not all distributed ledgers use blockchains and that blockchain technology has other uses, the terms blockchain technology and DLT are often used synonymously.[69]

2. Different Types of Blockchains

In practice, the structures of blockchains are not always the same. The two main types of blockchain, permissioned and permissionless, can be differentiated by two main factors: (1) the level of openness or transparency (who has the authority to join and access the data lodged on the blockchain);[70] and (2) the level of authorization.[71]

---

65. ROBBY HOUBEN & ALEXANDER SNYERS, CRYPTOCURRENCIES AND BLOCKCHAIN: LEGAL CONTEXT AND IMPLICATIONS FOR FINANCIAL CRIME, MONEY LAUNDERING AND TAX EVASION 15 (2018); NATARAJAN ET AL., *supra* note 63, at iv. *See also* Ibrahim Shehata, *Three Potential Imminent Benefits of Blockchain for International Arbitration: Cybersecurity, Confidentiality & Efficiency*, 31 YOUNG ARB. REV. 32, 33 (2018)(providing a more generalized definition of DLT and defining blockchain as "[a] database that stores digital information in a highly secure manner through (1) using cryptographic functions to encrypt such information and (2) distributing the database across a number of networks.").

66. NATARAJAN ET AL., *supra* note 63, at iv.

67. *See* HOUBEN & SNYERS, *supra* note 65, at 15 (defining blockchain as "a mechanism that employs an encryption method known as cryptography and uses (a set of) specific mathematical algorithms to create and verify a continuously growing data structure – to which data can only be added and from which existing data cannot be removed – that takes the form of a chain of 'transaction blocks,' which functions as a distributed ledger") (citations omitted).

68. PRICEWATERHOUSECOOPERS, Q&A: WHAT IS BLOCKCHAIN? 1 (2016); *see also* Lin W. Cong & Zhiguo He, *Blockchain Disruption and Smart Contracts*, 32 REV. FIN. STUD. 1754, 1754, 1787 (2019) (illustrating that blockchain provides "decentralized consensus and potentially enlarges the contracting space through smart contracts" with tamper-proofness and algorithmic executions).

69. NATARAJAN ET AL., *supra* note 63, at 2.

70. Shehata, *supra* note 65, at 33 (exploring who has authority to join and access the data lodged on the blockchain).

71. *Id.*

Blockchains can separate into the following four categories:[72]

Public Permissionless	**Public Permissioned**	**Private Permissionless**	**Private Permissioned**
Anyone Can Join & Read the Data (Anonymous Identity)	Anyone Can Join & Read the Data (Anonymous Identity)	Only Participants with Known Identities Can Join & Read the Data	Only Participants with Known Identities Can Join & Read the Data
All of Participants Can Write the Data	Only Pre-Designated Participants Can Write the Data	All of Participants Can Write the Data	Only Pre-Designated Participants Can Write the Data
Data is Transparent	Data is Transparent	Data is Confidential	Data is Confidential
Requires Native Assets (Cryptocurrency)	Requires Native Assets (Cryptocurrency)	Does not Require Native Assets	Does not Require Native Assets
Low Scalability	Moderate Scalability	High Scalability	Very High Scalability

Public permissionless blockchain refers to blockchain that anyone is able to access and use to complete transactions.[73] Bitcoin, a type of cryptocurrency, is a popular example.[74]

A public permissioned blockchain, one type of consortium blockchain, refers to the blockchain where "only pre-designated participants can write the data."[75] There are no limits to who can view this type of blockchain and its associated data.[76] But unlike public permissionless blockchains, only a few trusted parties are authorized to write data in order to achieve faster processing.[77] This type of blockchain is commonly used in the banking industry.[78]

---

72. *Id.*

73. *See* JOSEPH J. BAMBARA & PAUL R. ALLEN, BLOCKCHAIN: A PRACTICAL GUIDE TO DEVELOPING BUSINESS, LAW, AND TECHNOLOGY SOLUTIONS 13 (Sean T. McKeough ed., 2018).

74. *See* Shehata, *supra* note 65, at 34.

75. *Id.* at 33.

76. *Id.*

77. *See* Laurette von Grambusch & Ariana Kosyan, *INSIGHT: Blockchain Relevance for Tax and Transfer Pricing Purposes*, 37 TAX MGMT. WKLY. REP. (BNA) No. 29, at 21 (explaining there is no need to wait for a consensus of all or a majority of those participating).

78. *Id.*

A private permissionless blockchain, the other type of consortium blockchain, refers to the blockchain that is created by companies that want a smaller network. This type of blockchain can only be accessed and read by a few trusted parties with limited authorized parties to write data.

A private permissioned blockchain refers to blockchains where "write permissions are kept centralized to one organization."[79] They are "read only, limited transactions . . . [as in a] traditional corporate database," created by the companies that need a smaller network.[80] Only select participants, as opposed to anyone with access to the network, can engage with these kinds of blockchain.[81] Because they are private, authorized users must be added individually.[82] Despite the difficulty with getting access, these are still utilized because companies enjoy many recordkeeping benefits when using them, including increased accuracy.[83] Theoretically, this structure could also allow for real-time auditing by regulators.[84]

In practice, the most commonly used blockchain structures are public permissionless blockchains and private permissioned blockchains.[85] Private permissioned blockchains particularly have the potential to be used as RegTech to audit companies' activities, including T.P. activities conducted by MNEs.

3. Common Features of Blockchain: Advantages & Risks

a. Advantages of Blockchain Technology

There are several key advantages of DLT, or blockchain, that bring significant potential for use in tax planning.[86] Among these

---

79. *See* Shehata, *supra* note 65, at 33 (citing BAMBARA & ALLEN, *supra* note 73, at 31).

80. *See* Grambusch & Kosyan, *supra* note 77, at 21.

81. *See* Shehata, *supra* note 65, at 33.

82. *See* Grambusch & Kosyan, *supra* note 77, at 21.

83. *Id.*

84. *Id.; see also infra* Part IV.B.5 for further discussion on real-time auditing.

85. *See* Shehata, *supra* note 65, at 33 (comparing these two structures to the others by using the number of projects and user).

86. *How Blockchain Technology Could Improve the Tax System*, PRICEWATERHOUSECOOPERS, https://www.pwc.com.tr/en/sektorler/teknoloji/yayinlar/blockchain-teknolojisi-vergi-sistemini-nasil-gelistirebilir.html (last visited Jan. 16, 2020).

are: (1) transparency,[87] (2) control,[88] (3) real-time information,[89] and (4) security.[90] Security is based on the consensus mechanism used by the particular blockchain. Particularly for public and private permissioned blockchains, "[i]nformation can be added onto a [b]lockchain only if all, or a defined number of participants in the network[,] agree on the correctness of information."[91] Because of this fraud is less likely and more easily detected.[92] Furthermore, the distributed structure of a blockchain eliminates the single point of failure.[93] As a blockchain is spread over several computers of blockchain or DLT participants (nodes) on the Internet, a single system crash or failure (failure of a single node) will not result in loss of transaction records. Even if one part of the network goes down, the blockchain will continue to function.[94] This further improves the security of the blockchain.

It is clear that the application of blockchain may improve the transparency of supply chains and ensure robust internal controls of MNEs.[95] More details on potential applications of blockchain technology will be introduced in Part IV.B.

b. Potential Risks of Blockchain Technology

Every coin has two sides. Before adopting blockchain technology to develop RegTech applications for T.P. management,

---

87. *Id.* "[C]reated Blocks are cryptographically locked into [a] chain, meaning that the Blockchain record is immutable–it is impossible to delete or alter the information stored in the block. . . . Blockchain is a chain of blocks, each one storing data on a wide range of information. Each one is linked to the previous block, forming a chronological chain of the data uploaded onto the Blockchain." DELOITTE, BLOCKCHAIN TECHNOLOGY AND ITS POTENTIAL IN TAXES 7 (Dec. 2017), https://www2.deloitte.com/content/dam/Deloitte/pl/Documents/Reports/pl_Blockchain-technology-and-its-potential-in-taxes-2017-EN.PDF.

88. *See How Blockchain Technology Could Improve the Tax System*, *supra* note 86. But public permissionless blockchains do not have such a feature because they have been designed to enable the access from anyone. Shobhit Seth, *Public, Private, Permissioned Blockchains Compared*, INVESTOPEDIA, https://www.investopedia.com/news/public-private-permissioned-blockchains-compared/ (last updated Apr. 10, 2018).

89. *See How Blockchain Technology Could Improve the Tax System*, *supra* note 86.

90. *Id.*

91. DELOITTE, *supra* note 87, at 7.

92. *Id.* at 7, 9. Nevertheless, the range of crypto frauds in the past three years suggest this may not be true because it fails to distinguish between frauds involving cryptocurrencies and fraudulent changes to blocks. *See infra* Part V.A. for a discussion on these risks.

93. *See* Dirk A. Zetzsche et al., *The Distributed Liability of Distributed Ledgers: Legal Risks of Blockchain*, 2018 U. ILL. L. REV. 1361, 1370–72 (2018) (providing a comparison of centralized, decentralized and distributed ledger structures).

94. *See* DELOITTE, *supra* note 87, at 6–7.

95. Bhavya Bhandari, Supply Chain Management, Blockchains and Smart Contracts 6, 18 (June 28, 2018) (unpubished manuscript), https://ssrn.com/abstract=3204297.

it is important to understand the potential risks. Both academia and international institutes have explored potential technological and legal risks of blockchain applications.[96] Certain characteristics of blockchain could be misused and result in "undesirable data distribution, data loss, or data manipulation."[97] This could lead to liability issues and may increase concerns surrounding data privacy, insider trading and market abuse,[98] competition and consumer protection,[99] and shared liabilities of blockchain participators.[100]

Among these various risks, at least three should be taken into account when applying blockchain technologies to RegTech applications.[101] First, cybersecurity issues should be considered.[102] On the one hand, in relation to data manipulation, the consensus mechanism may help to improve the security of the blockchain platform since there is no consensus or alternation of data records on the blockchain.[103] On the other hand, this brings the risks of a "51% attack."[104] This occurs when a "bad actor" obtains control of 51% of the network. That actor then can trick the network permissions into functioning in a way that harms other users.[105] This risk is particularly serious for public permissionless blockchain.[106] Since everyone can register as a user of the blockchain anonymously, it is very possible for a bad actor with sufficient computing power to obtain control on the majority of blockchain nodes (network participants).[107] Some recent incidents of standard distributed Denial of Services attacks on multiple Ethereum nodes indicate that "traditional cyberattack techniques can be successfully applied to DLT systems."[108]

---

96. *See* Zetzsche et al., *supra* note 93, at 1369; NATARAJAN ET AL., *supra* note 63, at ix; HOUBEN & SNYERS, *supra* note 65, at 9–10.

97. Zetzsche et al., *supra* note 93, at 1374–75.

98. *Id.* at 1374–75, 1379.

99. *Id.* at 1397–98, 1402 ("[M]arket participants involved in a distributed ledger system must keep this and other conduct-related legislation (such as data protection, copyright laws, consumer protection laws, tax laws, AML/CFT, landlord-tenant laws etc.) in mind.") (citations omitted).

100. *Id.* at 1400–02 (exploring distributed liabilities issues).

101. *Id.* at 1375.

102. *Id.*

103. *Id.* at 1374; *see also* DELOITTE, *supra* note 87 and accompanying text.

104. *Id.* at 1379 (citation omitted).

105. NATARAJAN ET AL., *supra* note 63, at 18.

106. *Id.*

107. *Id.*

108. *Id.*

Second, protection of data privacy may be compromised when using blockchain due to its transparency.[109] The data transactions on permissionless blockchains are often visible to all network participants. Although some transaction information can be encrypted, the metadata underlying that information is still publicly accessible. Thus, "pseudonym data" can actually be repersonalized by attackers seeking to "estimate the number of active entities" of a particular data set.[110] Because of this, a user can sometimes be identified just by looking at transaction patterns and other similar indicia.[111] Distribution of personal data via blockchain, however, violates data protection laws enacted in many jurisdictions which could result in severe ramifications.[112] For example, under the European General Data Protection Regulation (GDPR), companies may face pecuniary penalties of up to €20,000,000 or four percent of their total global turnover if they breach these rules.[113] More importantly, the GDPR consequences also "appl[y] to entities with no physical E.U. presence if they control or process covered personal information of E.U. residents."[114] Because of this, entities adopting blockchain technology must consider their data privacy obligations and react accordingly.[115]

Third, the absence of a centralized infrastructure and a central entity may lead to concerns about effective governance of the blockchains and relevant jurisdiction issues. Particularly for public permissionless blockchain, since "no legal entity is in control of the distributed ledger,"[116] it is often "unclear to whom governance arrangements apply."[117] By contrast, private permissioned blockchain has more straight-forward regulation because there is usually an administrator or owner that is subject to specific governance.[118]

---

109. Zetzsche et al., *supra* note 93, at 1375.

110. *Id.*

111. NATARAJAN ET AL., *supra* note 63, at 20.

112. Zetzsche et al., *supra* note 93, at 1376.

113. *See* Council Regulation 2016/679, art. 83, 2016 O.J. (L 119) 83 (EU).

114. *See* Barmak Nassirian, *The General Data Protection Regulation Explained*, EDUCAUSE REV. (Aug. 28, 2017), https://er.educause.edu/articles/2017/8/the-general-data-protection-regulation-explained.

115. Zetzsche et al., *supra* note 93, at 1376.

116. NATARAJAN ET AL., *supra* note 63, at 19.

117. *Id.* at 18.

118. *Id.* at 18. *But see id.* at 18–19 ("[D]epending on the nature of the particular DLT system, the administrator may not in all cases have adequate means to enforce these arrangements among network participants.").

4. Blockchain with Smart Contracts - Excel Spreadsheets with Macros

"Smart contracts," when discussing DLT and blockchain, are "programs that are written on the underlying distributed ledger," or blockchain, "and are executed automatically by nodes on the network."[119] Although they can be used to execute digital contracts, smart contracts are programs rather than digital format contracts.

To facilitate the public's understanding of the nexus of smart contract and blockchain, I.T. practitioners have explained that "[b]lockchain and smart contracts can be loosely compared to Excel spreadsheets and macros."[120] This is evident in many ways. First, Excel spreadsheets are a type of ledger which can store data such as text, numbers, images, and math formulas. Macros are pieces of Visual Basic for Applications code that are stored in an Excel spreadsheet and can automate certain tasks.

Second, "[i]n a similar way, smart contracts are pieces of code that are stored in a blockchain, and which automatically take certain actions" if predefined conditions are met.[121] These predefined conditions, smart contract triggers, are often directly related to certain transactions or data. Generally speaking, transactions or data recorded on the distributed ledger/blockchain will trigger the smart contract and the actions taken will be in turn recorded in the ledger/blockchain.[122] For example, consider this scenario. A seller is selling a product online via its blockchain-based sale platform at a price of $1,000 (the trigger of smart contract). Using smart contract programs, we can facilitate the selling transaction. If a buyer has deposited $1,000 into a seller's bank account and uploaded the bank receipt to the blockchain, then the seller's blockchain system will automatically dispatch the product that the buyer has ordered. Following dispatch, an invoice will be generated and stored in the blockchain for the buyer to

---

119. *Id.* at 29 ("Another way of putting this is that smart contracts 'allow for logic to be programmed on top of the blockchain transaction.'" Broadly speaking, "any instruction that could be executed by a computer could theoretically be run by a smart contract.").

120. Rick Martin, *Will Smart Contracts Fuel the Growth of Blockchain?*, IGNITE (Nov. 29, 2018), https://igniteoutsourcing.com/blockchain/blockchain-smart-contracts/.

121. *Id. See also* NATARAJAN ET AL., *supra* note 63, at 15 ("DLT enables programming pre-agreed conditions that are automatically executed once certain conditions hold. This is referred to as 'smart contracts' . . . .").

122. Martin, *supra* note 120.

download and all transactions will be recorded in the blockchain/ledger.[123]

Third, Excel spreadsheets do not contain Macros unless users write and store Macros codes into that spreadsheets. Likewise, blockchains do not contains smart contracts unless blockchain owners/developers use them. Thus, blockchains serve as a "platform" for smart contracts that developers can use to automate certain functions.[124]

Overall, since smart contracts are based on blockchain platforms, the advantages and risks that apply to blockchains also apply to smart contracts. For example, due to the security and transparency characteristics of blockchain, smart contracts stored in the blockchain have to "be verifiable by each node on the network" and "all nodes on the network must see the same data."[125] Some commenters have argued that this requirement generates a positive impact, specifically on the value chain of many MNEs,[126] by making it easier to audit and regulate blockchain transactions.[127]

B. Using Blockchain Smart Contract as RegTech for Implementing Transfer Pricing Rules

As the number of blockchain users continues to grow, some practitioners and scholars believe that these networks may become a game-changing tool in the area of regulatory reporting.[128]

---

123. This is public permissioned blockchain, which is open for the public to registered as a customer, but only authorized consumer can access the classified information (such as invoice).

124. *See* NATARAJAN ET AL., *supra* note 63, at 29 ("DLT systems provide a platform that allows for smart contracts, written in computer code, to actually control real-world assets, such as real estate, shares, land titles, or escrows, without the need for a third party that controls the release of the assets, such as a broker, a land title administrator or an escrow agent, for example.").

125. *Id.* at 29.

126. Bhandari, *supra* note 95, at 3–4, 7.

127. *See also* WU GLOBAL TAX POLICY CENTER, BLOCKCHAIN 101 FOR GOVERNMENT: A NOTE PREPARED FOR THE COMMITTEE OF EXPERTS ON INTERNATIONAL COOPERATION IN TAX MATTERS 8 (2017) ("Multinationals transacting within themselves using blockchain and thereby allowing *real-time generation* of local files for audit review, may be relying on the blockchain-based applications to target an intrinsic problem of the transfer pricing–lack of information about comparable transaction between unrelated parties necessary to determine the transfer price.").

128. *See* DANIEL MÜNCH & NOAH BELLON, EUR. MONEY & FIN. F., DLT AS A GAME CHANGER IN REGULATORY REPORTING? (2020), https://www.suerf.org/docx/f_1415fe9fea0fa1e45dddcff5682239a0_9393_suerf.pdf ; *see also* Douglas W. Arner et al., *FinTech, RegTech, and the Reconceptualization of Financial Regulation*, 37 NW. J. INT'L L. & BUS. 371, 377 (2017) ("The mass of new postcrisis regulation has dramatically increased the compliance burden on financial institutions, in

Using blockchain technology, such as smart contracts, RegTech may help to speed up compliance and simplify the law enforcement process.[129]

The same holds true for applying blockchain-based RegTech to T.P. activities reporting. As some practitioners observed, DLT "offers the possibility to strongly improve regulatory reporting by providing high data granularity, high data quality and a transparent view on live transactions."[130] Blockchain smart contracts can be used as information carriers to facilitate the reporting and law enforcement processes in various ways.[131]

1. Self-Check Tools for Taxpayers & Hypothetical Example

Blockchain smart contract technology can be use by taxpayers as a self-check tools for T.P. rule compliance. At a basic level, blockchain-based RegTech can be used to help an MNE group (taxpayer) strengthen its control on inter-company T.P. activities and ensure the transaction price is in line with ALP under T.P. rules. More specifically, as introduced above, once an MNE group moves its entire business operation to a blockchain platform, the blockchain's smart contract function allows the blockchain to operate on a 'if, then' basis. This means that any intra-group contracts, those between associated companies within the MNE groups, can only be executed when the 'if, then' condition is satisfied. Since it is a private blockchain, the MNE group is free to program the blockchain in a way that ensures the intra-group transaction reflects business logic and functions in accordance with pre-determined T.P. policy.[132]

Consider the following example to illustrate this situation. Company A is a software developer and Company B is cloud platform and network infrastructure service provider. Both of these companies belong to a same MNE group, Group X. Company

---

addition to the direct cost of regulatory penalties (over $200 billion globally since the crisis).").

129. *See* REETU KHOSLA, FINEXTRA & PEGASYSTEMS, BUILDING REGTECH INTO YOUR FINTECH STRATEGY 21 (2017), https://www.pega.com/system/files/resources/2018-12/Building-Regtech-Into-Your-Fintech-Strategy.pdf.

130. *DLT as a Game Changer in Regulatory Reporting?*, BEARINGPOINT SOFTWARE SOLUTIONS (last visited Jan. 13, 2020), https://www.reg.tech/en/knowledge-hub/insights/dlt-distributed-ledger-technology-as-game-changer-in-regulatory-reporting/.

131. *See id.*

132. *See* Sagar Wagh (@Sagar Wagh), *Potential Application of Blockchain in Multinational Transfer Pricing*, LINKEDIN (Mar. 26, 2017), https://www.linkedin.com/pulse/potential-application-blockchain-multinational-transfer-sagar-wagh/.

A has developed a cloud-based software (SaaS) that competes with Adobe's photoshop software. When commercializing its software product, Company A needs a cloud platform that can accommodate more than one million users simultaneously. This allows Company A to provide its subscribers with reliable software maintenance and updating services (IaaS and PaaS). Company B claims it can offer the services which Company A requires so Company A enters a cloud service contract with Company B.

Assuming Group X has established a private blockchain and has moved all business transactions to its blockchain platform, all associated enterprises within Group X, including Company A and Company B, would become the participants (nodes) of the blockchain. Assuming the blockchain has been programmed in accordance with T.P. rules, the smart contract function of blockchain will ensure that the contract will be executed only if Company B is able to broadcast that Company B has the capacity to provide PaaS and IaaS.

The smart contract function of blockchain will also ensure that the payment can be automatically made from Company A to Company B only if the invoice and relevant pricing details are broadcasted on the blockchain as per the pre-determined T.P. policy of Group X.[133] Assuming that Group X's T.P. policy requires that Company B (1) charge its users cost plus 20 percent on the service provided and (2) raise an invoice containing the pricing details consistent with T.P. rules, payment will be automatically made from Company A to Company B if these two conditions are met. If Company B offers Company A a price below that specified in the T.P. policy, the contact will not be executed by the system and no payment will be made.

By blocking suspicious T.P. transactions, the blockchain system serves as a taxation compliance system. This function may help to reduce the risk of any artificial breach of ALP.

2. Information Collection Tool for DEMPE Functional Analysis

Blockchain-based RegTech's information collection function may facilitate T.P. rule compliance analysis processes, particularly the analysis on intergroup transactions with intangible assets such as I.P. and cloud computing.

---

133. *See id*. (providing a similar example).

The process of creating intangible assets can be complex and involve multiple jurisdictions.[134] As a general tendency, countries have started to impose a higher burden on enterprises to justify their T.P. arrangements. For example, Australia amended its tax law and introduced a Diverted Profits Tax in 2017.[135] This new law adopts a U.K. style "pay [first] and argue later" approach,[136] allowing the ATO Commissioner to form a reasonable conclusion without being prevented by a lack of information provided by the taxpayer.[137] This increases the burden on MNE groups by requiring them to provide reliable evidence to justify their T.P. arrangements in relation to I.P. and cloud services.

Blockchain-based RegTech can help alleviate this burden by providing traceable records of the creation of intangible assets for MNE groups. Through the blockchain platform, an MNE group can easily record complete information on all business transactions between associated companies within the MNE group, such as the "start time and trading conditions of related transactions."[138]

Because the OECD has adopted recommendations under the OECD's BEPS Action plan, record keeping is particularly important for MNE groups' compliance with T.P. rules in the OECD countries. The OECD's BEPS Action Plan introduced the Development, Enhancement, Maintenance, Protection and Exploitation (DEMPE) framework through which taxation authorities conduct T.P. analysis on intangibles. Unlike traditional value chain analysis, which will "only identify the significant intangibles and contributions to transactions within the [organization,] the DEMPE analysis then considers which entities [in the organization] perform functions or bear [sic] risks and should therefore receive remuneration in relation to those

---

134. *See supra* Part III.

135. *See* Diverted Profits Tax Act 2017 (Cth) s 3 (Austl.).

136. *Id.*

137. *See* AUSTRALIAN GOV'T, THE TREASURY, IMPLEMENTING A DIVERTED PROFITS TAX 2 (2016) https://treasury.gov.au/consultation/implementing-a-diverted-profits-tax (examining the governmental discussion paper for introducing Diverted Profit Tax, it explicitly stated that the Diverted Profit Tax will "provide the ATO with greater powers to deal with taxpayers who transfer profits, assets or risks to offshore related parties using artificial or contrived arrangements to avoid Australian tax and who do not cooperate with the ATO.").

138. Xu Miao, *Blockchain Technology: Bringing Convenience to Transfer Pricing Management,* CHINA TAXATION NEWS, http://w.cntransferpricing.com/index.php/zhuanrangdingjiayingdui/453.html (last updated Nov. 16, 2018, 9:24 AM).

intangibles."[139] This requires MNE groups to provide more details about intangible-related transactions to justify the legitimacy of their T.P. arrangements in different jurisdictions.[140]

As introduced above, the current development of intangibles often requires cooperation of different business entities within an MNE group which are often located in different jurisdictions. Thus, to justify T.P. activities between these entities, it is important for an MNE group to retain accurate business records so authorities can "determine which party has developed or acquired the intangibles used . . . , which party has the legal ownership[,] and which party receives the benefit."[141] Blockchain technology can clearly help with this.

As some regulators have suggested, the information collected by blockchain-based RegTech may serve as important evidence for taxation authorities by helping to conduct more effective analysis on T.P. activities in relation to intangibles.[142] In doing so, in a small way, blockchain-based RegTech can help to achieve the OECD BEPS's goal of "realign[ing] the location of taxable profits with the location of the underlying economic activity and value creation." [143]

---

139. ORG. FOR ECON. CO-OPERATION & DEV., REVISED GUIDANCE ON PROFIT SPLITS PART I 162 (2016) (stating that DEMPE analysis surpasses value chain analysis by additionally considering received gains from sustaining risk and performing functions); *see also* Mun Yee Wong, *Overview of Development, Enhancement, Maintenance, Protection and Exploitation (DEMPE) Analysis*, TRANSFER PRICING SOLUTIONS MALAYSIA MALAY. https://www.transferpricingsolutions.my/knowledge/overview-of-development-enhancement-maintenance-protection-and-exploitation-dempe-analysis/ (stating that DEMPE analysis helps MNEs assign returns and costs, delineating transactions by asking questions based from the acronym, DEMPE); Gupta, *supra* note 62, at 208–18.

140. Not every transfer pricing activity should be prohibited. The *United Nations Practical Manual for Transfer Pricing* explicitly states that if an entity is able to produce an intangible, then it should be able to reap the rewards by licensing the intangible or using the intangible. U.N. PRACTICAL MANUAL 2013, *supra* note 48, at 191, 195.

141. *Id.*

142. *Id.*; *see also* Caterina Colling Russo & Hendrik Blankenstein, *Intangibles in a Post-BEPS World*, INT'L TAX REV. (May 20, 2016), https://www.internationaltaxreview.com/Article/3556068/Intangibles-in-a-post-BEPS-world.html?ArticleId=3556068 (providing a concise introduction on how to apply the framework for analysing intercompany transactions involving intangibles).

143. *See* ORG. FOR ECON. CO-OPERATION & DEV., OECD/G20 BASE EROSION & PROFIT SHIFTING PROJECT, TAX CHALLENGES ARISING FROM DIGITALISATION – INTERIM REPORT 2018, at 111 (2018), ("[A] key part of the 2015 BEPS Action 5 Report requires that preferential tax regimes provide benefits only where the taxpayer is undertaking substantial activities.").

3. Information Analytic and Self-Management Tools for Taxpayers

In addition to serving as an information collection tool, blockchain-based RegTech can help with the T.P. analysis and facilitate the determination of a proper arm's length price for a transaction. It can be used to automatically identify and differentiate sophisticated intercompany services provided by entities within the same MNE group (intragroup services). The entities and beneficiaries involved in intragroup services generally share the expenses depending on the different functions they have undertaken or other agreed distribution indicators (e.g., sales or the number of personnel involved).[144]

These intragroup, intangible-related transactions are expected to cause an increase in T.P. disputes between tax authorities and MNEs.[145] An MNE group often has subsidiaries in different countries that have different internal operations, information collection processes, and standards of accounting. The quantification of a transaction price for a specific intragroup service often requires a lot of effort, including the identification and analysis of specific functions, asset-inputs, risks, and benefits of each subsidiary involved.[146]

Blockchain smart contract technology can certainly facilitate this process. It can integrate information, conduct functional analysis, and eventually standardize and automate the pricing calculation for intragroup services.[147] For example, the group can set up a unified method or standard for intragroup service fee calculations, convert the calculation method to an algorithm, and program this algorithm into the group's private blockchain. If the fee defined in an intragroup service agreement is not consistent with the fee calculated in accordance with the group's pricing standard, such a transaction will not be executed or validated by the blockchain system. The payment for such a service will not be released either. Blockchain-based RegTech not only helps to enhance the group's compliance with T.P. rules, but also may serve as a powerful instrument to enhance the internal management, pricing control, and overall efficiency of the MNE group's business operations.

---

144. *See* Miao, *supra* note 138.
145. *See* Russo & Blankenstein, *supra* note 142.
146. *See* Miao, *supra* note 138.
147. *Id.*

4. Documentation and Reporting Tools for Taxpayers

The blockchain-based RegTech may help MNEs achieve their T.P. information disclosure obligations, such as T.P. documentation preparations. Multinational groups with annual consolidated group revenue equal to or above EUR 750 million,[148] in accordance with the requirements of the *OECD BEPS Action Plan 13*,[149] must provide country by country reports that disclose the group's revenues, profits, taxes paid for global operations, as well as certain measures of economic activity that individual entities have taken in different jurisdictions.[150] By applying blockchain technology at the MNE group level, the tax and finance departments within the group (as a node in the blockchain) can easily obtain all of the real-time information required for CbC reports from the group's blockchain (distributed ledgers). This will facilitate the process of the enterprise's T.P. documentation preparations.[151]

Moreover, blockchain-based RegTech may help to improve the management and reporting of T.P. activities at the group level by facilitating contemporaneous material filing and intragroup transactions reporting.[152] Traditionally, the subsidiaries within an MNE group only record their own financial status, inventory status, and pricing calculation methods for intragroup transaction. They typically do not have knowledge of the business operations of other subsidiaries, particularly other subsidiaries in different jurisdictions. Once the MNE group moves its business operations to blockchain, the transaction flow and value chain of each business entity within the MNE group will be documented and distributed to the whole group.[153] This means that a standard

148. ORG. FOR ECON. CO-OPERATION & DEV., OECD/G20 BASE EROSION AND PROFIT SHIFTING PROJECT, 2015 FINAL REPORTS: EXECUTIVE SUMMARIES 38 (2015), http://www.oecd.org/ctp/beps-reports-2015-executive-summaries.pdf.

149. *See generally* ORG. FOR ECON. CO-OPERATION & DEV., OECD/G20 BASE EROSION & PROFIT SHIFTING PROJECT, TRANSFER PRICING DOCUMENTATION AND COUNTRY-BY-COUNTRY REPORTING, ACTION 13: 2015 FINAL REPORT 9 (2015) [hereinafter OECD ACTION 13: 2015 FINAL REPORT](providing revised standards for transfer pricing documentation as well as a template for country-by-country reporting of revenues, profits, taxes paid, and certain measures of economic activity).

150. ORG. FOR ECON. CO-OPERATION & DEV., ACTION PLAN ON BASE EROSION AND PROFIT SHIFTING 23 (2013), http://www.oecd.org/ctp/BEPSActionPlan.pdf [hereinafter OECD BEPS ACTION PLAN] (obligating OECD members to develop rules to strengthen documentation of Transfer Pricing, including the standardization of certain Transfer Pricing reports (including Master File and Local File) and the exchange of country-by-country reporting).

151. *See* Miao, *supra* note 138.

152. *Id.*

153. *Id.*

set of historical data in relation to each asset and pricing status for each intragroup transaction will be fully recorded on the group's blockchain platform. The immutability feature of blockchain will ensure the integrity and consistency of all transaction records. These comprehensive and reliable transaction records will help MNEs save time, improve efficiency, and reduce compliance risks.[154]

5. Compliance and Auditing Tool for Taxation Authorities

The blockchain-based RegTech can be used to help taxation authorities monitor MNE's compliance of T.P. rules and improve taxation authority's capability of auditing suspicious intragroup T.P. transactions. This is achieved when an MNE group adds the taxation authority as a participator/node to the group's blockchain. The taxation authority will benefit from the key features of blockchain technology, such as transparency, control, and security. The taxation authority will also obtain direct access to transaction records on the group's blockchain platform, allowing it to directly retrieve relevant information on intragroup transactions, such as the method used for intragroup pricing determinations and the structure of the global value chain of the MNE group.[155]

By enabling tax authorities to interface with the platform, blockchain-based RegTech can establish a taxation system that makes transactions more transparent to taxation authorities without requiring an additional regulatory reporting requirement. Blockchain-based RegTech can also fulfill regulatory reporting requirements automatically.[156] This will help to reduce the operational costs of tax collection by helping taxation authorities improve efficiency.

Nevertheless, like blockchain technology itself, blockchain-based RegTech has its limits. Before formally adopting it to regulate T.P. activities, it is important to examine the potential risks and obstacles associated with applying blockchain-based RegTech and explore any possible solutions.

---

154. *Id.*

155. But see *infra* Part V.A for a discussion on privacy concerns.

156. *See DLT as a Game Changer in Regulatory Reporting?*, *supra* note 130.

PART V. POTENTIAL RISKS FOR USING BLOCKCHAIN-BASED REGTECH FOR TP RULE COMPLIANCE AND POSSIBLE SOLUTIONS

Generally speaking, the potential risks and obstacles for applying blockchain-based RegTech to regulate T.P. activities include three aspects: (1) technological risks; (2) judicial obstacles; and (3) policy obstacles.

A. Technological Risks & Possible Solutions

Blockchain-based RegTech is developed on the basis of blockchain technology. Thus, the three technological risks with applying blockchain technologies introduced in Part III naturally also exist for blockchain-based RegTech.

First, cybersecurity issues must be considered. As introduced above, blockchain/DLT, and thus blockchain-based RegTech, is not free from external data manipulation and is still subject to a 51% attack if a bad actor takes over the blockchain network's computing power.

This risk can be minimized by selecting the proper blockchain structure. As mentioned above, a 51% attack risk mainly exists for public permissionless blockchain, which is open to access by public users anonymously. Thus, when an MNE group establishes its blockchain network, it is much safer if the MNE group chooses private permissioned blockchain. Private blockchain only allows the companies within the group to be registered as participants. Permissioned blockchain only allows authorized parties/persons to access the relevant information on the blockchain. Together, these characteristics will reduce the risk of a cyberattack.

Second, data privacy risks should be well addressed. The transparency characteristics of blockchain means that all transaction records on the blockchain platform are open and visible to all network participators. There is no privacy between nodes since all transaction records are available on the distributed ledger. This could put the business entities on the blockchain platform at risk of breaching their legal duty of confidentiality under the Privacy Act and contract laws.[157]

This risk can also be minimized by implementing a private permissioned blockchain structure. Since it is a private blockchain, system administrator can grant different levels of access rights and operation rights to each node. For example, only

157. Zetzsche et al., *supra* note 93, at 1375, 1394.

financial and compliance departments within the company as well as parties involved in a specific intragroup transaction will have access to data relating to that transaction. Assume Headquarter Company H, Company A, Company B, and Company C all belong to a same MNE group, Group X. These companies are nodes on the private blockchain of Group X. Companies A and B have an intragroup service agreement. In this case, only the Headquarter Company H, Companies A, and Company B will have access to the relevant transactional data. The system administrator of Group X can grant Headquarter Company H the authority to revise intragroup transaction rules (e.g., the arm's length pricing calculation method) or correct suspicious T.P. activities between subsidiary companies. Thus, the group can take advantages of the transparency feature of the blockchain technology without sacrificing privacy or breaching the duty of confidentiality owed to the clients.

Moreover, the MNE Group can also add the taxation authority as a participator/node of the blockchain and grant it access to the group's blockchain records. This must be done cautiously, however. It is necessary to ensure that the taxation authority can only access the data it has a right to access, such as the information listed under the CbC Report. Because the MNE group has an obligation to protect its clients' confidential information, any broad access granted to the taxation authority will likely cause the MNE group to be liable for the breach of the duty of confidentiality.[158]

Third, the decentralized structure of public permissionless blockchain creates concerns about effective governance as well as jurisdiction issues since the business entities on the group's blockchain are often located in different countries. Many questions need to be addressed, such as which business entity is governing the blockchain platform and which country's T.P. law should be applied to each transaction.

This risk can also be minimized by adopting a private permissioned blockchain structure. Since private blockchain has a specific network administrator or owner who is in charge of the whole blockchain platform, usually the headquarter company, this administrator will be responsible for any governance mistakes such as using an incorrect pricing calculation method. Because "joint control is likely to come along with joint liability,"[159] if an intragroup service agreement contains provisions breaching T.P.

158. *See* Council Regulation 2016/679, 2016 O.J. (L 119) 19 (EU).

159. Zetzsche et al., *supra* note 93, at 1403.

rules, all contracting parties should be jointly liable. The headquarter company, which sets pricing calculation method, will be liable as well. Moreover, the immutability and transparency feature of blockchain will ensure all transaction records are safely stored on the blockchain platform. Once an MNE group moves all business operation to the blockchain, it is easy to track relevant transactions. These records may serve as important evidence for determining which country's law should be applied to a certain transaction.

Overall, when choosing appropriate blockchain structure for future RegTech instruments to regulate T.P. activities, it is important to take into account these potential risks and address them in advance.

B. Judicial Obstacles & Possible Solutions - Evidence Legitimacy & Court's position in China

In addition to the technological risks, it is necessary to explore and address potential judicial obstacles to using blockchain-based RegTech to regulate T.P. activities, particularly the legitimacy of using electronic records on the blockchain as evidences in court. Although blockchain/DLT may help collect comprehensive information in relation to transactions within an MNE group, these records are meaningful only when courts accept them as evidence.[160] Therefore, it is important for domestic judicial systems to formally recognize blockchain records as admissible judicial evidence.

It is encouraging to see that an increased number of international institutes and domestic judiciaries have started to accept digital evidence, including blockchain records. For example, the International Chamber of Commerce (ICC) Incoterm 2000 Rules listed certain documents which can be replaced by electronic data interchange messages.[161] The ICC Incoterm 2010 Rules further extended the acceptability of e-documents and gave "electronic means of communication the same effect as paper communication, as long as the parties so agree or where

---

160. *See* Allison Stanfield, *Digital Evidence*, SG LEGAL SERVICES (Mar. 27, 2017), http://sglegalservices.com.au/2017/03/27/digital-evidence/#_ftn28 (suggesting that "[b]efore a document, including a business record, is admitted in evidence, it is necessary that there should be an evidentiary basis for finding that it is what it purports to be. Ordinarily, documents are not taken to prove themselves, although there are exceptions such as public registers and certified documents.") (citations omitted).

161. *See* INTERNATIONAL CHAMBER OF COMMERCE, ICC INCOTERMS 2000: REPORT OF THE SECRETARY-GENERAL (A/CN.9/479) 599–601, 629 (1999), https://www.uncitral.org/pdf/english/texts_endorsed/INCOTERMS2000_e.pdf.

customary."[162] Thus, digital communication or e-documents stored on the blockchain can be used as evidences as long as the contracting parties so agree. At the domestic level, the courts in some countries have explicitly indicated that records on the blockchain can be used as evidences for court proceedings. On June 28, 2018 in an online copyright infringement case, the Internet Court in Hangzhou, China admitted evidence that was authenticated by blockchain technology for the first time.[163] The court examined the process of data collection and concluded that the data uploaded to a blockchain platform "reflected its source, generation and path of delivery, and [was] therefore reliable evidence."[164] More importantly, the court identified key principles and specific elements used in determining the authenticity of evidence stored on a blockchain.[165] As general principles, the Internet court held that when determining the authenticity of electronic data, which is stored and deposited through blockchain or other technical means, an assessment should be conducted on a "case-by-case basis" with "an open and neutral attitude."[166] More specifically, the assessment should focus on reviewing (1) the integrity of the electronic data source and content, (2) the security of technical means, (3) the reliability of methods of data storage, (4) the legality of the formation of the evidence, and (5) the degree of relevance to other evidence.[167]

In line with this case, on September 3, 2018, China's Supreme People's Court (SPC) issued a judicial interpretation in relation to electronic evidence.[168] The SPC Interpretation explicitly "allows

---

162. *See The Incoterms Rules 2010*, INT'L CHAMBER COM., https://iccwbo.org/publication/incoterms-rules-2010/ (last visited Jan. 13, 2020).

163. *See* Wei Wang & Yang Zhou, *Blockchain Risk Series Thirteen: From the First Blockchain Certificate Judgment in China to See the Great Impact of Blockchain on Chinese Business*, LEXOLOGY (July 3, 2019), https://www.lexology.com/library/detail.aspx?g=0dff9120-c661-4045-8b11-1364725a1fa3 (China). For a full text of the court decision in *Huangzhou Huatai Yimei Culture Media Ltd vs. Shenzhen Daotong Technology Development Ltd*, see Zhang Yanlai, *The Nation's First Blockchain Deposit Judgment Was Born in Hangzhou Internet Court (with Judgment)*, CHINA INTELL. PROP. INFO. NETWORK (July 2, 2018, 3:13 PM), http://www.iprchn.com/cipnews/news_content.aspx?newsId=109090 (China).

164. Sophie Hunter, *China's Innovative Internet Courts and Their Use of Blockchain Backed Evidence*, CONFLICT LAWS (May 28, 2019), http://conflictoflaws.net/2019/chinas-innovative-internet-courts-and-their-use-of-blockchain-backed-evidence/.

165. *See* Wang & Zhou, *supra* note 163; *see also* Yanlai, supra note 163.

166. *What Kind of Blockchain Deposit Has Legal Effect? Hangzhou Internet Court Gives Four Elements*, SOHU (Apr. 26, 2019, 7:42 PM), http://www.sohu.com/a/310520659_260616.

167. *Id*.

168. Zuigao Renmin Fayuan Guanyu Hu Lianwang Fayuan Shenli Anjian Ruogan Wenti De Guiding (最高人民法院关于互联网法院审理案件若干问题的规定) [Provisions of the

evidence stored and verified on blockchain platforms to be used in legal disputes heard by the three [I]nternet courts in Hangzhou, Beijing, and Guangzhou."[169] Article 11 of the SPC Interpretation allows Internet courts to consider electronic evidence "that can be proven authentic through electronic signatures, time stamps, hash value checks, and tamper-proof verification methods stored on blockchain platforms."[170]

Because China is a civil law country, Article 11 is binding legal precedent and provides a strong foundation for other internet courts in China to "recognize the legality of blockchain as a method for storing and authenticating digital evidence."[171] This creates a sound judicial environment for implementing blockchain-based RegTech for T.P. rule compliance. The trend in China to accept electronic data as evidence has the potential to influence judiciaries' opinions in other jurisdictions.[172]

C. Policy Obstacles and Possible Solution – Building a Supportive Environment for Blockchain-based RegTech Application

In addition to the technological risks and judicial obstacles, it is necessary to pay attention to potential policy obstacles and impacts of implementing blockchain-based RegTech. The openness of judiciaries and regulators to adopt new technology, including blockchain technology, may have a direct impact on the success of applying blockchain-based RegTech to regulate T.P. activities.

1. Openness of Judiciaries and Potential Limits of Judicial Blockchain

Judiciaries in many countries have found that "[b]lockchain-related innovations are increasingly becoming relevant to legally authenticate evidence."[173] One commentator suggests that

---

Supreme People's Court on Several Issues on the Hearing of Cases by Internet Courts] (promulgated by the Supreme People's Court of the People's Republic of China., Sept. 3, 2018, effective Sept. 7, 2018), http://www.court.gov.cn/zixun-xiangqing-116981.html (China); *see also* Zhao, *supra* note 11.

169. Laney Zhang, *China: Supreme Court Issues Rules on Internet Courts, Allowing for Blockchain Evidence*, GLOBAL LEGAL MONITOR (Sept. 21, 2018), http://www.loc.gov/law/foreign-news/article/china-supreme-court-issues-rules-on-internet-courts-allowing-for-blockchain-evidence/.

170. *Id.*

171. Zhao, *supra* note 11.

172. Hunter, *supra* note 164 ("This post sheds light on this new model and how it has potential to influence other jurisdictions.").

173. *Id.* (stating also that because "a blockchain generates immutable, time-stamped data which can then be used as an auditable trail, it seems likely that the legal sphere will

Chinese judiciaries seem to be "ahead of the game in this respect."[174] In October 2018, Hangzhou Internet Court officially launched its judicial blockchain and "became the first court [in China] to use blockchain technology to settle disputes."[175] The blockchain platform was developed by Gongdao Network Technology with technical support from Ant Finance Ltd.[176] It allows users to register, log on to the judicial platform, and use the internet to find evidence, such as copyright infringement websites or purchase records.[177] Users can then "download the proof, and a hash of it is stored on the blockchain."[178] "The platform offers typical blockchain benefits: encryption, the ability to electronically sign evidence[,] and cost savings."[179]

It seems that the judicial blockchain platform works well so far. In the recent 2019 Forum on China Intellectual Property Protection, Zhang Wen, the president of the Beijing Internet Court, stated that the Internet court "deployed blockchain in 58 cases to collect and provide evidence," and "of the 41 cases concluded [with blockchain technology] so far, parties chose to settle out of court rather than litigate in 40 cases with compelling evidence from blockchain."[180]

Nevertheless, some limits of applying the judicial blockchain platform have been identified. According to the Internet Financial Trial Big Data Analysis Report (the Report) issued by the Hangzhou Internet Court, isolated data island issues still exist among financial entities, regulatory authorities, and courts.[181] The Report further pointed out that, "although the Hangzhou Internet Court has successively launched the electronic evidence depositing platform and the judicial blockchain platform," the regulators in

---

get heavily influenced in the near future by the security of the blockchain (which is set before any transactions or documentation takes place).").

174. *Id.*; *see also* Simon Webber et al., *INSIGHT: Blockchain and Distributed Ledgers—Another Wave of Challenges to Tax and Transfer Pricing From the Digital Economy*, 2019 DAILY TAX REP. (BNA) No. 95, at 15, 16 (May 17, 2019).

175. *Hangzhou Internet Court's Judicial Blockchain Goes Online*, CHINA LEGAL INFO. CENTER, http://www.chinadaily.com.cn/m/chinalic/2018-10/16/content_37080413.htm (last updated Oct. 16, 2018).

176. Mark Barley, *Chinese Court Launches Blockchain Evidence Platform*, LEDGER INSIGHTS, https://www.ledgerinsights.com/chinese-court-blockchain-evidence-platform/ (last visited Jan. 13, 2020).

177. *Id.*

178. *Id.*

179. *Id.*

180. Ana Alexandre, *Chinese Internet Court Employs AI and Blockchain to Render Judgement*, COINTELEGRAPH (Apr. 25, 2019), https://cointelegraph.com/news/chinese-internet-court-employs-ai-and-blockchain-to-render-judgement.

181. *See id.*

financial sectors "have not yet developed the corresponding data transmission platform[s]" and do not have capacity for data transmission.[182] As a result, these regulators do not have the capability to electronically submit financial data to the Court's blockchain platforms.[183] Therefore, it is clear that the success of blockchain-based RegTech requires the cooperation of all stakeholders. If only one stakeholder has the capacity to use blockchain/DLT, the effectiveness of blockchain-RegTech will be significantly limited.

2. Openness of regulator & Feasibility in taxation sectors

The cooperation between all stakeholders is also important when applying blockchain-based RegTech to taxation, including T.P. activities. For example, although China's Internet Courts have developed their capacities to use blockchain platforms to facilitate dispute resolution, if the taxation authority SAT does not develop a similar technological capacity for DLT applications, the chance of successfully applying blockchain-based RegTech to regulate T.P. activities would decrease.

However, the Chinese taxation authority has demonstrated a sound openness in relation to the adoption of blockchain technology. For example, China's taxation authority in Shenzhen has partnered with China's internet giant Tencent since 2018 to use blockchain to combat tax evasion.[184] They have jointly established an "Intelligent Tax" innovation lab in order to enhance technological innovation used in the taxation process.[185] As its first product, the lab has developed a blockchain-based invoice solution for transport systems in Shenzhen.[186] With this technology, subway ride invoices will be recorded to the blockchain platform.[187]

---

182. *The Report Pointed Out that Although the Hangzhou Internet Court Has Launched the Judicial Blockchain Platform, It Is Still Unable to Submit Electronic Financial Data*, BLOCKING, https://blocking.net/13622/the-report-pointed-out-that-although-the-hangzhou-internet-court-has-launched-the-judicial-blockchain-platform-it-is-still-unable-to-submit-electronic-financial-data/ (last visited Jan. 13, 2020).

183. *Id.*

184. Sujha Sundararajan, *Chinese City to Use Blockchain in Fight Against Tax Evasion*, COINDESK, https://www.coindesk.com/tencent-partners-with-city-authority-to-combat-tax-evasion-with-blockchain (last updated May 25, 2018, 12:04 PM).

185. *Id.*

186. *Tencent Enables Blockchain Invoicing for Transport in Shenzhen, China*, LEDGER INSIGHTS, https://www.ledgerinsights.com/tencent-blockchain-invoicing-china (last visited Jan. 13, 2020).

187. *See* Miles Goscha, *Briefing: China's First Blockchain-Based Subway Invoices Issued in Shenzhen*, TECHNODE (Mar. 20, 2019) https://technode.com/2019/03/20/briefing-chinas-first-blockchain-based-subway-invoices-issued-in-shenzhen/.

Once the transaction is complete, the blockchain platform will automatically generate a digital invoice which can be accessed through the WeChat or Shenzhen Metro mobile apps.[188] On March 18, 2018, the "first blockchain-based invoice was issued for the metro [which departed] from Shenzhen Futian station."[189] According to the data provided by the lab and metro, using the blockchain-based digital invoice as an alternative for paper-based invoices will help to reduce the printing cost by 400,000 CNY per year.[190] Additionally, as some commentators noted, blockchain-based invoices are "harder to tamper with" which makes it easier for taxation authorities to trace their "source and authenticity."[191]

At this time, there is no evidence that the Chinese taxation authority has developed its own blockchain-based RegTech for T.P. rule enforcement. Nevertheless, it may have obtained the capacity to collaborate with the Chinese Internet courts in this area since both of them have started to use blockchain-based RegTech to facilitate their duties. Although "blockchain technologies are still in their relative infancy and still suffer their own frictions,"[192] the attempts of the Chinese judiciaries and taxation authorities to adopt blockchain technology may provide useful insights for counterparts in other jurisdictions to conduct similar attempts.

PART VI. CONCLUSION

This article examined the recent development of T.P. activities by MNE groups and explored both risks and feasibilities of using blockchain-based RegTech to regulate these activities. It first provided an overview of the main forms of cloud-related T.P. activities and key challenges for implementing T.P. rules. It then

---

188. *See Tencent Enables Blockchain Invoicing for Transport in Shenzhen, China*, *supra* note 186.

189. *Id.*; *see also* Guanyu Shidian Yingyong Shuilian Qukuai Lian Dianzi Fapiao Pingtai Kaiju Tongyong Lei Fapiao De Gonggao Guojia Shuiwu Zongju Guangdong Sheng Shuiwu Ju Gonggao Erling Yiba Nian Di Ershi Sihao (关于试点应用"税链"区块链电子发票平台开具通用类发票的公告 国家税务总局广东省税务局公告2018年第24号) [Announcement of the State Administration of Taxation, Guangdong Provincial Taxation Bureau on the Pilot Application of the "Tax Chain" Blockchain Electronic Invoice Platform for Issuing General Invoices, Announcement No. 24, 2018 of the Guangdong Provincial Taxation Bureau of the State Administration of Taxation] (promulgated by the St. Admin. of Tax'n Guangdong Provincial Tax'n Bureau, Dec. 24, 2018, effective Dec. 24, 2018), http://www.gd-n-tax.gov.cn/gdsw/ssfggds/2018-12/05/content_b9645c6d25d54cb99517968bb4aa0b1d.shtml (China).

190. *Tencent Enables Blockchain Invoicing for Transport in Shenzhen*, *supra* note 186 ("Previously travelers had to visit Shenzhen Metro customer services to get an invoice, with roughly 160,000 paper invoices issued daily.").

191. *Id.*

192. Webber et al., *supra* note 174, at 16.

introduced key features and potential limits of DLT, blockchain, and smart contracts. Next, it discussed how blockchain smart contracts can be used as RegTech for implementing T.P. rules. In order to provide a more balanced analysis, it not only examined feasibilities but also potential obstacles for using blockchain-based RegTech to regulate T.P. activities, including potential technological, judicial and policy risks and obstacles. On this basis, it explored possible solutions for these risks/obstacles by drawing on insights from the recent attempts by enterprises, judiciaries, and taxation authorities in China.

Blockchain-based RegTech may serve as an important supplement for T.P. rule enforcement in many ways, such as serving as a self-check tool, information collector, analyst, reporting tool for taxpayers, and compliance and auditing tool for taxation authorities. However, the advantages of blockchain smart contracts should not be overstated because "blockchain technologies are still in their relative infancy and still suffer their own frictions."[193]

193. *Id.*