

International Commercial Law and Innovation in Global Digital Markets: Pre-History, History, and Post-History

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INTRODUCTION

What role does law, especially international law, play in the emergence of continued innovation in global markets? Historically, what role has it played and, normatively, what role should it play today and in the future? While these questions have preoccupied scholars over time and across many fields – economics, law, international relations, sociology, and interdisciplinary versions of these – this paper is limited to scholarship on law and global digital markets. This paper is focused on the history of international commercial law promulgated to assist emerging global electronic and digital markets.¹

This paper offers the history of international commercial law as a counter-narrative to conventional scholarship on digital markets, which mostly² views regulation as inhibiting innovation in digital markets and undermining technological progress in the digitalization of globalized markets.³ Conventional scholarship has influenced US regulation of the tech industry. This law is intentionally scant “precisely because of [the] fear that attempts to interfere with tech companies’ operations would undermine their innovative capacity.”⁴ The tech industry has thrived, and the success of Silicon Valley is attributed to this hands-off deregulatory approach.⁵ Unquestioned acceptance of the negative implications of regulation on technical innovation in digital markets has, however, begun to falter.

Beginning in 1995, with the adoption of the General Data Protection Directive, the European Union (EU) initiated digital markets regulation to

1 The reference to “international commercial law” focuses on global trade and commercial transactions but is not limited to sales of goods. Its precise boundaries are imperfectly fixed but is mostly transactional and more likely described as private than public law. It should be (but is not always) distinguished from “international trade law,” which currently focuses on laws imposing, limiting, or restricting tariffs (and the like).

2 Some Internet law scholarship opposes regulation of digital markets on grounds distinct from its implications for innovation. For the claim of cyber-libertarians that the Internet should be free from all regulation, see, e.g., John Perry Barlow, *A Declaration of the Independence of Cyberspace*, 18 DUKE L. & TECH. REV. 5-7 (2019). Although cyber-libertarianism has roots in both the left and the right, recent scholarship sees cyber-libertarianism as predominantly right-leaning. See DAVID GOLUMBIA, *CYBERLIBERTARIANISM: THE RIGHT-WING POLITICS OF DIGITAL TECHNOLOGY* (2024).

3 See, e.g., Nicholas Crafts, *Regulation and Productivity Performance*, 22 OXFORD REV. ECON. POL’Y 186, 187 (2006); Philippe Aghion, Antonin Bergeaud & John Van Reenen, *The Impact of Regulation on Innovation* (Nat’l Bureau of Econ. Rsch., Working Paper No. 28381, 2021), <https://www.nber.org/papers/w28381>; James Andrew Lewis, *Tech Regulation Can Harm National Security*, CTR FOR STRATEGIC & INT’L STUD. (Nov. 28, 2022), <http://www.csis.org/analysis/tech-regulation-can-harm-national-security>. For refutation of this view, see Anu Bradford, *The False Choice Between Digital Regulation and Innovation*, 119 NW. U. L. REV. 377 (2024).

4 Bradford, *supra* note 3, at 379. In her recent book, Bradford distinguishes US, Chinese, and EU regulation of digital markets, describing them as “three digital empires” premised on “regulatory models that provide competing visions for the digital economy”; she describes the US approach as a “market-driven regulatory model,” China as a “state driven” model, and the EU’s approach as “distinctly rights-driven.” See ANU BRADFORD, *DIGITAL EMPIRES: THE GLOBAL BATTLE TO REGULATE TECHNOLOGY* 7-8, 23 (Oxford Univ. Press 2023); see also Aziz Huq, *The Geopolitics of Digital Regulation*, 92 U. CHI. L. REV. 833 (2025) (reviewing BRADFORD, *supra* note 4).

5 Anupam Chander, *How Law Made Silicon Valley*, 63 EMORY L.J. 639 (2014).

protect the privacy of the residents in its Member States.⁶ which was subsequently strengthened in 2018 by its General Data Protection Regulation,⁷ and later expanded with the adoption of the Digital Markets Act⁸, the Digital Services Act⁹, and a proposed Digital Fairness Act.¹⁰ This suite of EU regulations on digital markets has been criticized by industry actors and academia for squelching innovation in the tech industry.¹¹ But there are also fans.¹² Anu Bradford, professor at Columbia Law School and preeminent scholar of EU law, recently published a book supporting EU “rights-based” regulation of digital markets,¹³ and a companion law review article refuting claims that EU regulation undermines innovation in these markets.¹⁴

More recently, US and EU officials have proposed regulation of digital markets grounded in national security concerns about the global telecommunications networks and equipment markets, such as Huawei Technologies Co., Ltd. National security concerns were raised about the implications of data collection for influencing users, for example, by the government of the People’s Republic of China through the TikTok application.

Recent scholarship on digital markets also has shifted away from its earlier single-minded focus on innovation. Some scholars view digital markets as challenging “traditional international relations theory.”¹⁵ Some

6 Council Directive 95/46, 1995 O.J. (L 281) 31 (EC) (Data Protection Directive).

7 Commission Regulation 2016/679, 2016 O.J. (L 119) 1 (General Data Protection Regulation) (effective May 25, 2018).

8 Commission Regulation 2022/1925, 2022 O.J. (L 265) 1 (Digital Markets Act).

9 Commission Regulation 2022/2065, 2022 O.J. (L 277) 1 (Digital Services Act).

10 *Communication from the Commission on the 2030 Consumer Agenda and Action Plan for Consumers in the Single Market: ‘A New Impulse for Consumer Protection, Competitiveness and Sustainable Growth’*, COM (2025) 848 final (Nov. 19, 2025).

11 For literature critical of EU digital policies, see, e.g., John M. Yun, *A Report Card on the Impact of Europe’s Privacy Regulation (GDPR) on Digital Markets*, 31 GEO. MASON L. REV. FOR. 104 (2024); Daniëlle Flonk, Markus Jachtenfuchs & Anke Obendiek, *Controlling Internet Content in the EU: Towards Digital Sovereignty*, 31 J. EUR. PUB. POLICY 2316 (2024); Bart Custers & Gianclaudio Malgieri, *Priceless Data: Why the EU Fundamental Right to Data Protection is at Odds With Trade in Personal Data*, 45 COMPUT. L. & SEC. REV. 1 (2022).

12 Since EU regulation of digital markets and services emerged, many scholars of EU law, especially that on privacy and consumer protection regulation, are critically supportive of these laws. See, e.g., Michelle Cini & Patryk Czulno, *Digital Single Market and the EU Competition Regime: An Explanation of Policy Change*, 44 J. EUR. INTEGRATION 41 (2022); Christina Simone & Antonio Laudando, *Principles and Obligations of the Digital Markets Act in Regulating the Economic Power of Gatekeepers: Positive, Negative or Trade-off Effects?*, 35 ELECTRON. MKTS. 42 (2025); see also GERAINT HOWELLS, CHRISTIAN TWIGG-FLESNER & THOMAS WILHELMSSON, *RETHINKING EU CONSUMER LAW* (2017).

13 BRADFORD, *supra* note 4.

14 Bradford, *supra* note 3.

15 For the argument that “individual technology oligarchs consolidate authority in ways that challenge

traditional international relations theory,” see Maha Rafi Atal et al., *Oligarchic Sovereignty: Technology and the Future of Global Order*, 52 REV. INT’L STUD. 1 (2025); see also Carla Ibled, *Founder as Victim*,

view these markets as challenging the “neoliberal agenda,”¹⁶ including global trade law.¹⁷ Yet others see a new consensus surrounding the European “rights-driven” perspective,¹⁸ although questions about this consensus persist.¹⁹

How can we understand current events and scholarship on digital markets given this dissensus? This paper looks to history for guidance. Historical accounts of digital markets and the digitalization of global trade either look to the post-WWII era, when computers initially emerged,²⁰ or the 1970s, when the Internet was developed.²¹ Although the Internet may well be described as the origin of digitalization, focusing exclusively on its history obscures important economic history and the related history of international law. This paper reaches back to the 1850s to uncover a *longue duree* and its implications. The distinct historical account set out in the paper proceeds in three parts.

Part I begins with the premise that the Internet is best understood through recalling its antecedent pre-history. This pre-history of telegraphy, telephony, and radio waves describes technical advances in communication dependent on coordination. Contrary to the conventional narrative, this coordination was achieved through international law (IL) and international organizations (IOs), including some IL to counter market concentration.

Part II continues this revision of the conventional narrative on digital markets to focus on the role of IL and IO on the global impact of the Internet, not just as a method of communication, but more importantly as a repository of records, a virtual global marketplace, and a mechanism for individuals,

Founder as God’: Peter Thiel, Elon Musk and the Two Bodies of the Entrepreneur, 18 J. CULTURAL ECON. 629 (2023).

¹⁶ See, e.g., GOLUMBIA, *supra* note 2; Martin M. Guzman & Joseph E. Stiglitz, *Post-Neoliberal Globalization: International Trade Rules for Global Prosperity* (Nat’l Bureau of Econ. Rsch., Working Paper No. 32533, 2024), https://www.nber.org/system/files/working_papers/w32533/w32533.pdf [<https://perma.cc/2M3R-VBAP>]; David Cayla, *How the Digital Economy Challenges the Neoliberal Agenda: Lessons from the Antitrust Policies*, 56 J. ECON. ISSUES 546 (2022); Georgios Dimitropoulos, *Law and Digital Globalization*, 44 U. PENN. J. INT’L L. 41 (2022); see also Edward D. Mansfield & Nita Rudra, *Embedded Liberalism in the Digital Era*, 75 INT’L ORG. 558 (2021).

¹⁷ See, e.g., Mira Burri, *The Impact of Digitalization on Global Trade Law*, 24 GERMAN L. REV. 551 (2023) (exploring “transformations triggered by digitalization in the domain of global trade law and seek[ing] to evaluate the nature and the effects of the unfolding legal adaptation in this field of international law”); Thomas Cottier, *Technology and the Law of International Trade Regulation*, in THE OXFORD HANDBOOK OF LAW, REGULATION AND TECHNOLOGY 1017 (Roger Brownsword, Eloise Scotford & Karen Yeung eds., 2017); Mira Burri & Thomas Cottier, *Digital Technologies and International Economic Regulation: An Introduction*, in TRADE GOVERNANCE IN THE DIGITAL AGE 1 (2012).

¹⁸ BRADFORD, *supra* note 4.

¹⁹ Huq, *supra* note 4, at 833 (expressing skepticism that “a deep regulatory equilibrium” around EU law exists and suggesting that “ambitions for global regulatory convergence when it comes to new digital technology, therefore, should be modest”).

²⁰ See Huq, *supra* note 4.

²¹ See, e.g., HENRY FARRELL & ABRAHAM NEWMAN, UNDERGROUND EMPIRE: HOW AMERICA WEAPONIZED THE WORLD ECONOMY (2023).

businesses, and others to reveal preferences and predilections through personalized data. It does this through three case studies: (i) computerization of the international sale and transport of goods; (ii) financialization of the manufacture and purchase of globalized goods, including through digital enhancement of pre-existing financial techniques (sometimes referred to as “FinTech”); and (iii) digital payment and money transfers and the digitalization of “money.” In each case, ILs and IOs helped standardize this communication and recordkeeping, some enabled by the Internet and all increasingly digitalized. As with the pre-history set out in Part I, the history of IL set out in Part II demonstrates that global digital markets emerged and expanded because of (rather than despite) the production of IL through IOs, again, undermining the conventional scholarly narrative. Part II finds plenty of law. It also finds scant support for the claim that this law constrained or sought to constrain digital markets, with the exception of EU regulation of digital markets, digital services, and (perhaps) digital fairness.

Finally, Part III considers the future of digitalized globalization in light of the IL history set out above. This future is likely to involve digital markets empowered by artificial intelligence (AI), markets that will bring not just technological advances in communication, recordkeeping, and data collection, but also the ability to delegate commercial decisionmaking. Relying on scholars’ fears that national and international law would hold back Internet-enhanced markets,²² industry actors similarly contend that AI-enhanced digital markets should not be regulated because any regulation could thwart innovation. A close study of the history set out in Parts I and II provides grounds for challenging application of this conventional narrative to AI. This history invites a balance between the benefits of innovation and countervailing concerns, such as national security, market concentration, privacy, and consumer protection. Whether IL and IOs are up to the challenge of this emerging future is tentatively explored in this concluding section of the paper.

I. PRE-HISTORY

Global trade is slow, cumbersome, and fraught with risk. Goods may be lost or damaged in transit. The means of transit may fail through shipwreck, derailment, plane crashes, etc. Delays might also result from inclement weather, war, or labor unrest. The buyer may wrongfully reject the goods or fail to pay for them after they are delivered; the seller may send nonconforming goods, delay initiating shipment, or fail to ship at all.

²² See *supra* note 3 and all accompanying texts.

Communication and recordkeeping substantially reduce these risks, but until the mid-nineteenth century, all communication and recordkeeping associated with global trade relied on cumbersome paper-based documentation: letters, bills of exchange, bills of lading, warehouse receipts, and various contractual arrangements. Paper could be lost or destroyed—it is cumulatively heavy and complicates transport. If the documents were negotiable, loss of the paper meant rights pertaining to possession, ownership, or payment were also likely lost.

Telegraphy, radio, telephone, and television enabled near-instantaneous communication across continents and oceans, which reduced much of the risk attendant to global trade. These technical advances did not eliminate all risk; however, they also created new problems.

Telegraphy emerged early in the nineteenth century: first, with inventions enabling the transmission of electrical pulses over wires in the 1830s; second, with the development of Morse code; and third, with the laying of underwater cables, including submarine cables that traversed the Atlantic Ocean in 1858, 1866 and thereafter. The global connectivity offered through telegraphy faced an important technical limitation: these systems initially depended on wiring. Wires were vulnerable to intentional and unintentional severing. In addition, ships—whether carrying commercial or military passengers or cargo—could not be wired together. These problems were eventually solved through wireless telegraphy—i.e., radio. Guglielmo Marconi invented radio transmitters and receivers in the mid-1890s, but the first ship-to-shore communications did not occur until 1899 or 1900. Initially, wireless communications relied on Morse code, which was slow to transmit and translate on receipt, but radio voice transmissions followed with the invention, in 1907, of the vacuum tube. By the 1920s, the technology enabling voice transmission had improved substantially and was widely used (including during WWI).

The new technologies were not just relied on by the military.²³ Global commerce also quickly relied on them. Primary and secondary markets grew as a consequence.²⁴ Telegraphy enabled buyers to learn of shipment delays well before the carrier failed to arrive on time. Ship-to-ship telegraphy and radio transmissions meant that sellers and their insurers could communicate regularly with ship captains; weather reports could be conveyed before storms caused delay or damage, and information about the fact of delay or damage could be received before the ship reached shore. Sellers and buyers could communicate about their shipments in real time,

²³ The British Navy (1901) and the U.S. Coast Guard (1899, 1907) were early users of this means of communication.

²⁴ See, e.g., SVEN BECKERT, *EMPIRE OF COTTON* (2015); SCOTT REYNOLDS NELSON, *OCEANS OF GRAIN* (2022); Alexander Engel, *Buying Time: Futures Trading and Telegraphy in Nineteenth-Century Global Commodity Markets*, 10 J. GLOB. HIST. 284 (2015).

which meant disputes about delay in shipment, or loss or damage to goods in route, might be resolved without litigation. It also meant that buyers' contractual rights to receive goods could be sold and resold while the goods were in route – a key to creating secondary commodities markets. Telegraphy was also relied on by commercial actors as a means of “transferring” funds through coded telegraphic messaging between banks. In the U.S., Western Union Co. enabled the telegraphic transfer of funds as early as the 1870s.²⁵

Technological improvements in communication meant that global trade and transit were less slow, cumbersome, and fraught with risk. But, even with these advances, two problems remained, only one of which was resolved through nineteenth century international law. First, whether wired or wireless, externalities and problems of connectivity and coordination inhered in these technologies. Second, although coordinated telegraphy, telephony, and radio offered enormous advances on prior methods of communication, problems of recordkeeping remained. Paper-bound records remained obstacles to global trade until well after the Internet was invented in the mid-twentieth century.

A. Problems of Coordination

A “telegraph” is defined as “an apparatus for communicating at a distance by coded signals.”²⁶ The “magic” of modern telegraphy allowed irregular electronic pulses to be conveyed through code, either along wires or wirelessly by means of radio waves. But communicating through electronic pulses is useful only if both the sender and the receiver understand the code; they are useful the more users in the network and the further these pulses can be sent and received; they work most efficiently if equipment and code is standardized. But because telegraphy (whether wired or wireless) was privately developed, with competing technologies and patents, it was not standardized. This lack of standardization created coordination problems.

1. Wired Telegraphy

Roughly simultaneously, three distinct regional telegraphic systems arose in the United States, the United Kingdom, and continental Europe. By 1851, the US Census reported 75 telegraph companies whose messages ran through more than 21,147 miles of wire; most paralleled railway lines and

²⁵ See, e.g., JOSHUA D. WOLFF, *WESTERN UNION AND THE CREATION OF THE AMERICAN CORPORATE ORDER 1845* (2013).

²⁶ *Telegraph*, MERRIAM-WEBSTER DICTIONARY, <https://www.merriam-webster.com/dictionary/telegraph> (last visited Mar. 30, 2026) [<https://perma.cc/RN77-EA62>].

most relied on Morse code to transmit messages.²⁷ In the UK, the Electric Telegraph Company (ETC) initially relied on a needle telegraph system, distinct from the American system.²⁸ In the US, the ETC initially supplied telegraphy to railway services paralleling existing rail lines throughout the United Kingdom. It also depended on submarine cables for connectivity. The British telegraphic system was connected to France by submarine cable in 1850 and to North America by 1858. By 1866, the US and UK telegraphy systems had been connected through a series of submarine cables beneath the Atlantic Ocean.²⁹

Electric telegraphy also existed in continental Europe. Continental Europe relied on technical systems for telegraphic transmission and reception mostly invented by German and Russian physicists.³⁰ As with the British and American systems, which ran tandem with rail lines, the German system mostly followed railways. But unlike the American and British systems, continental European telegraphy was mostly government-built and operated as state monopolies, prioritizing military, and other governmental uses. This state control of European telegraphy created pressure within Europe for bilateral treaties to define the types of equipment and codes that could be used, as well as the tariffs that could be charged for cross-border telegrams. The numerous bilateral European treaties that got negotiated between 1849 and 1865 were complicated and, to a degree, inconsistent. They also did not fully solve telegraphic coordination problems. “Where lines crossed national borders, messages had to be stopped and translated into the particular system of the next jurisdiction.”³¹ This lack of uniformity served neither national security nor commerce.

Resolution of this cacophony requires international law and organization. By 1865, the French government invited all nations to attend a diplomatic conference in Paris to negotiate what would become the first International Telegraph Convention. Through this conference and the multilateral convention, the International Telegraph Union (ITU) was

27 See, e.g., Tomas Nonnenmacher, *Law, Emerging Technology, and Market Structure: The Development of the Telegraph Industry, 1838–1868*, 57 J. ECON. HIST. 488 (1997); ALBERT A. HOPKINS & A. RUSSELL BOND, *SCIENTIFIC AMERICAN REFERENCE BOOK 189* (1905). See also JEFFREY D. SACHS, *THE AGES OF GLOBALIZATION* (2020).

28 See, e.g., Roland Wenzlhuemer, *The Development of Telegraphy, 1870–1900: A European Perspective on a World History Challenge*, 5 HIST. COMPASS 1720 (2007); Jean-François Fava-Verde, *Victorian Telegrams: The Early Development of the Telegraphic Despatch and its Interplay with the Letter Post*, 72 NOTES & REC. R. SOC. LONDON 275 (2018).

29 The UK further expanded these early submarine connections with the completion in the early twentieth century of what it referred to as its “All Red Line” – submarine cables connecting much of the British Empire, including Canada, certain Caribbean Islands, South Africa, the Suez Canal, India, Malaysia, Singapore, Australia, and New Zealand. See, e.g., GEORGE JOHNSON, *THE ALL RED LINE: THE ANNALS AND AIMS OF THE PACIFIC CABLE PROJECT* (1903).

30 See, e.g., Wenzlhuemer, *supra* note 28.

31 *Overview of ITU's History (1)*, INT'L TELEGRAPHIC UNION, <https://www.itu.int/en/history/Pages/ITUsHistory.aspx> [https://perma.cc/6RDS-4PU4].

established. Annexed to the Convention were the agreed-upon Regulations for International Service. Although initially, only 20 countries ratified the convention, this number grew over time. The ITU has survived to date as an UN-affiliated entity. The 1865 convention was revised in 1875, and the Telegraph Regulations have been updated numerous times. For example, in 1885, the Regulations were amended to include the International Telecommunication Regulations on cross-border telephone services.³²

2. Wireless Telegraphy

Despite the global connectivity enabled through IL and coordination, technical (and contractual) limits remained. Until the turn of the twentieth century, telegraphic systems relied on wired connections. Wires were vulnerable to severing, including intentional severing for national security reasons. Moreover, ships – whether carrying commercial or military passengers or cargo – could not be wired together. The wiring problem, including the problem of ship-to-ship and ship-to-shore communication, was soon solved with the invention of wireless telegraphy – i.e., radio.

In 1901, Guglielmo Marconi was the first to demonstrate that radio waves could travel long distances, successfully transmitting a signal across the Atlantic. Marconi sought to resolve telegraphy's problematic lack of standardization commercially through contract design. Marconi contracts and equipment were engineered so that users could send and receive radio transmissions exclusively to and from Marconi Electric Co. transmitters. Marconi contracts were not just about market domination (although clearly that was partly the purpose). Receipt of radio wave transmissions depended on many factors, including interference from radio transmissions conveyed at the same or similar wavelengths. Contractual exclusivity enhanced reception between Marconi radios. It also limited reception, however. If no one was tuned into the exact radio wavelength of the transmission, the communication would be lost. Thus, like telegraphy, radio suffered coordination problems.

International law also succeeded in resolving radio's coordination problems. Pressure began with a misunderstanding between thin-skinned national leaders – the “Deutschland Incident” – but it was not until the sinking of the RMS Titanic in 1914 that public opinion coalesced to create enormous pressure on countries to ratify an International Radio Telegraph Convention.

The Deutschland Incident started innocently. Prince Henry of Prussia (the brother of Germany's Kaiser Wilhelm II) visited US President

32 *Id.* (“At the International Telegraph Conference held in Berlin in 1885, ITU began to draw up international legislation governing telephony.”). This international agreement was occurred less than a decade after telephony was first patented. *Id.*

Theodore Roosevelt in 1902.³³ The visit was a success and, wanting to thank the President for his hospitality, Prince Henry tried to send a radiogram from his ship, the SS Deutschland, as it began to sail across the Atlantic. But his ship-to-shore radio system relied on Slaby-Arco technology, a German-built system, which was not interoperable with the nearby Marconi receiving station in Nantucket.³⁴ Kaiser Wilhelm was incensed and turned to international law for a response to this slight. He called for a diplomatic conference to be convened to resolve this and other issues associated with radiotelegraphy (as it was called at the time).³⁵

The German government called a Preliminary Radio Conference in Berlin in 1903 to consider international regulation of radiotelegraph communications, followed in 1906 by the International Radiotelegraph Conference, where the 30 country representatives in attendance agreed that the Bureau of the ITU would take on this regulatory responsibility. The International Radiotelegraph Convention was ratified that same year; the ITU promulgated Radio Regulations soon thereafter.³⁶

Although the first International Radiotelegraph Convention entered into effect in 1906,³⁷ and included the signatures of US representatives in attendance at the conference, the Radiotelegraph Convention was not binding on the US until Senate ratification in 1913, with the enactment of the Radio Act of 1912. This unlikely ratification was prompted by the sinking of the Titanic in April 1912 and the death of more than 1,500 of its passengers and crew.

Press coverage at the time, and thus public opinion, placed responsibility for the disaster squarely on the lack of regulation of radio transmissions.³⁸ The Titanic had not received warning of the location of icebergs in the North Atlantic. After the ship struck an iceberg and sustained damage to its hull, few received communication from the Titanic of their need for rescue. On the night of April 14, 1912, Thomas Bartlett, the operator of the Marconi Wireless Telegraph Station located near the Cape Bear Lighthouse in Murray Harbor, Prince Edward Island, received an SOS from the Titanic, which he relayed to nearby stations in Charlottetown and Halifax. But this

33 Linwood S. Howeth, *The Origins of Regulation: Objections to Monopoly*, in HISTORY OF COMMUNICATIONS-ELECTRONICS IN THE UNITED STATES NAVY 67 (1963).

34 *Id.*

35 *Id.*

36 *Overview of ITU's History (2)*, INT'L TELEGRAPHIC UNION, <https://www.itu.int/en/history/Pages/ITUsHistory-page-2.aspx> [<https://perma.cc/GCS5-N9FV>].

37 The 1906 convention was revised following a subsequent diplomatic conference in London in 1912. The U.S. Senate ratified the 1912 version of this convention.

38 *See, e.g., To Check Wireless Anarchy*, THE S.F. CALL (July 7, 1912), <https://earlyradiohistory.us/1912chk.htm>

[<https://perma.cc/MZH2-TJU3>] (hoping that "Congress and the International Wireless Convention of London will take steps to crush the pirates of the air and remedy abuses which result in dire danger to passenger vessels").

transmission and retransmission took time, and the delay was deadly. The same night, a “relatively outmoded ocean liner,” the RMS Carpathia, also received the SOS. It rushed hundreds of miles through the iceberg-strewn ocean to rescue over 700 Titanic survivors who had been clinging to small lifeboats in the frozen sea for several hours. But roughly 1,500 Titanic passengers were never rescued. Radio transmissions might have reduced the number of fatalities, in other words, but only Marconi receivers heard transmissions from the Titanic. The possibility that shipwrecked passengers from the Titanic could have been rescued had been made clear with the earlier sinking of the RMS Republic in 1909. The Republic had collided with another ship, RMS Florida, off the coast of Nantucket, but, unlike the Titanic, wireless operators on the Republic signaled distress to nearby lighthouses and ships, which quickly led to the rescue of nearly all of its passengers.

As with wired telegraphy, radio’s coordination problems were resolved through international law. Contrary to Marconi Co. contracts, the 1906 International Radiotelegraphic Convention established “SOS” as the international maritime distress call. The 1912 revised convention further agreed on a common wavelength for ships’ radio distress signals, which meant that every ship could receive distress calls, regardless of contractual agreement to the contrary; it also required every ship to maintain sporadic radio silence and directed operators to listen for distress calls. By the late 1920s, a further revision to the convention allocated frequency bands to the various radio services (fixed, maritime, and aeronautical mobile, broadcasting, amateur, and experimental).³⁹

3. Summary

Negotiation of the International Telegraphic Convention in the middle of the nineteenth, and the Radio Telegraphic Convention in the early twentieth, centuries aimed to solve coordination problems that markets could not. The Telegraphic Convention chose between competing regional technologies and modes of communication, but left questions of private and public ownership within national purview.⁴⁰ The Radio Telegraphic Convention limited enforcement of standardized contracts with monopolistic implications to preserve the public interest in radio

³⁹ *Overview of ITU’s History (I)*, *supra* note 31 (discussing 1927 diplomatic conference held in Washington, D.C.).

⁴⁰ Although the International Telegraphic Convention mandated use of Morse Code in wired telegraphy, convergence around a single mode of communication did not limit international telegraphic communication. Simone M. Müller & Heidi J.S. Tworek, *The Telegraph and the Bank: On the Interdependence of Global Communications and Capitalism, 1866–1914*, 10 *J. GLOB. HIST.* 259 (2015); Simone M. Müller, *From Cabling the Atlantic to Wiring the World*, 57 *TECH. & CULTURE* 507 (2016).

transmission.⁴¹ These were regulatory aims achieved through international law. Despite this regulation, wired and wireless telegraphic markets continued to grow and innovate, finding numerous market applications. Telegraphy increased the speed that information about trade was dispersed, which expanded demand for foreign goods. Armed with this information at great speed, telegraphy enabled suppliers' ability to ship greater distances and their willingness to accept the risks of global shipments. It also allowed secondary markets to emerge, for example, markets enabling traders to make payments (called wire transfers) to distant sellers through coded telegraphic exchanges, and markets to trade in commodity futures.⁴²

B. The Internet and the Problem of Recordkeeping

IL and IO resolved the distinct coordination problems that had prevented wired and wireless telegraphy from realizing their full promise. But there was a second issue that telegraphy and radio transmissions faced, and that was not fully resolved until the invention of the Internet (and further international law reform).

Telegrams, telephone calls, and radio transmissions worked through ephemeral and epiphenomenal communications that occurred at the speed of light, but that mostly vanished into the "ether" after receipt. Telegrams and teletypes were conveyed to recipients through slips of paper that might get delivered like a letter, but these too often vanished, quickly thrown away once the message was received. Businesses may have contracted by exchanging telegrams, or over the telephone, but this level of informality created litigation risk. And payment and transport documents could not be conveyed without delivering or endorsing indispensable pieces of paper.

Telegraphy created efficiencies in communication but did not alleviate market reliance on paper until the invention of the Internet. The Internet was designed to work computer-to-computer, which shifted communication from electronic to digitalized technology. This shift held economic and legal implications. Because the Internet enabled communication from computer to computer, it also enabled communications to be retained in digital records on computer hard drives at both the sending and receiving ends. Encryption and blockchain technology further enabled globalization by providing a means for enhanced protection of the information sent over the Internet and retained for safekeeping. Each of these technical advances depended on digital technology and together enabled the digitalization of global trade.

41 Although the Radio Telegraphic Convention ended the monopoly position contractually held by the Marconi Radio Co. in ship-to-shore communication, economic historians note that its business model adapted and grew in strength throughout WWI, later merging with Cable and Wireless Ltd and, eventually, the Radio Company of America (RCA). Gabriele Balbi, *Marconi's Diktats: How Italian International Wireless Policy Was Shaped by a Private Company, 1903—1911*, 3 IEEE 1 (2012).

42 See *supra* note 24 and all accompanying texts.

The impact of the Internet on global trade exceeded that of wired and radio telegraphy combined. Developed more than a hundred years later, the Internet established a broader method of communication than telegraphy, telephony, and radio waves, because it enabled direct conversation between senders and recipients, similar to letter writing or telephone calls. It also allowed broad-based communication to users.

As with wired and wireless telegraphy, Internet communication depends on coordinative protocols. Unlike telegraphy, the Internet quickly coalesced uniform protocols established through private individuals and private standard-setting initiatives. Internet protocols for websites (HTTP/DNS) and email (SMTP/POP/IMAP) originated from an agency within the US Defense Department (DARPA). These protocols emerged from ARPANET research in the 1970s and evolved by using the Transmission Control Protocol (TCP) to ensure reliable, orderly, and error-checked data delivery, and the Internet Protocol (IP) to handle addressing and routing of these data packets. Individual computer scientists⁴³ are credited with “inventing” protocols, like the Simple Mail Transfer Protocol (SMTP), to standardize messaging through email, and the Domain Name System (DNS) to map human-readable names to IP addresses for easier access and connecting web browsers with websites. Distinct from telegraphy, international law was not needed to resolve coordination problems created by disagreement surrounding competing Internet protocols.

To describe the Internet as an improved means of communication, however, it would miss the larger point: once the Internet became commercialized through the standardization of websites and email addresses, it did more than assist market coordination. Standardization of Internet access created “records” of virtual locations and communications within the Internet, which could be produced subsequently and easily examined, a shift that resembles the impact of societies’ movements from oral language and oral history to written and text-based communication and recordation. Through this standardization, the Internet also became a virtual marketplace without boundaries. These virtual marketplaces eventually were housed in platforms, which enabled not just one computer to connect to another computer but for multiple computers to connect to numerous networked websites. Platforms collected records of data through “cookies” and other packets of information, which aided their own marketing but eventually also sold to data buyers in secondary markets.

Standardized Internet communication shifted digital trade from its pre-history to history and, thus, enabled cross-border trade to become e-

⁴³ See, e.g., Barry M. Leiner, et. al., *A Brief History of the Internet*, 39 *COMPUT. COMMUN. REV.* 22 (2009) (discussing Ray Tomlinson’s 1971 email system; Jon Postel’s 1982 STMP; Paul Mockapetris’s 1983 DNS); John Naughton, *The Evolution of the Internet: From Military Experiment to General Purpose Technology*, 1 *J. CYBER POL.* 5 (2016).

commerce and digitalized global trade. The digitalization of recordkeeping for global trade resolved one problem. This technical resolution created new opportunities but also new problems, which in turn required international law for full resolution. The next section turns to this international law.

II. HISTORY

This section relies on several interconnected legal histories to provide important examples of IL to enable digital records and data collection to expand across three markets: e-commerce in goods and services; digital financial lending and lending records (including through FinTech); e-payments and virtual currency. Each case study demonstrates the importance of IL and the lawmaking efforts of IOs, whether composed of member states (“IGOs”), non-state entities (“NGOs”), or some combination of these (e.g., trade and professional associations, mixed-membership organizations, public-private partnerships, and the like).

The case studies are intentionally provocative of the conventional narrative of digital markets. That narrative maintains that law is unnecessary because it stands in the way of market innovation -- the invisible hands of digitalized and computerized markets. This section finds, contrary to this narrative, that IL undergirds digitalized global markets and that these laws are not just tolerated by business actors. It finds that commercial and financial interests actively sought law reform to achieve standardization of Internet recordkeeping. It also finds that business actors were involved, through IOs, in the negotiation and production of these revised standards.

A. e-Commerce.

Transnational e-commerce – fully digitalized commercial transactions that cross borders – did not flourish in the twentieth century until IL clarified how countries could shift from the paper-based requirements of pre-existing sales laws (e.g., statutes of fraud) and other laws (e.g., negotiability through written promissory notes and insurability through written bills of lading). The UN’s Commission on International Trade Law (UNCITRAL) was a leader in identifying the possibilities for e-commerce once legal obstructions to the emergence of these markets were removed. It was also a leader in promulgating soft law – international law-like instruments – to encourage and enable nation-states to resolve these obstructions. Through these laws, virtual records expanded to enable e-mail, e-commerce, as well as social media and retail platforms. These expansions subsequently created secondary markets in the big data created through platforms.

UNCITRAL did not begin its work on e-commerce until after completing a handful of projects it had begun when it was first created in 1968 by the UN’s General Assembly. For the first twenty-five years of its

existence, UNCITRAL revised IL that earlier IOs and international conferences had struggled to resolve on international sale of goods, international transport, international payments, and international arbitration and other methods of alternative dispute resolution.⁴⁴ Its work on electronic commerce began as happenstance. Before finishing touches on its draft Convention on Bills of Exchange and International Promissory Notes were complete, UNCITRAL's Working Group on Payments and Trade Finance began work on what would become the UNCITRAL Legal Guide on Electronic Funds Transfers (1987) and UNCITRAL Model Law on International Credit Transfers (1992).⁴⁵ As an aside to these electronic funds projects, the Secretariat, at the direction of the Working Group on Payments, produced what it referred to as Recommendations to governments and international organizations concerning the legal value of computer records (1985).

The Recommendations were a technical oddity. First, they were not an UNCITRAL instrument. The Payments Working Group had suggested their preparation but had not deliberated the recommendations. They were drafted by international civil servants in the UNCITRAL secretariat. Second, the form of the Recommendations did not resemble anything that UNCITRAL had produced before. These other instruments included draft conventions, model laws, model legal provisions, and rules produced for ratification by UNCITRAL's governing commission (and subsequently the UN General Assembly). The Recommendations were more a checklist of work to be done, both by national governments and IOs.

Any more detailed international instrument than that set out in the Recommendations would have been impossible, though. The Internet was invented with funding provided by the US military in the 1960s.⁴⁶ Although the goal was to find a resilient means of communication during wartime, the potential for commercialization of computer-to-computer communication was well understood. And yet commercialization was not feasible until standards for establishing websites and email addresses were set, and hyperlinks and browsers were developed, through the creation of the World

44 This list included: Arbitration Rules (1976); Conciliation Rules (1980); the UN Convention on the Carriage of Goods by Sea (1978) (known as the "Hamburg Rules"); the UN Convention on the International Sale of Goods (1980) ("CISG"); the UNCITRAL Legal Guide on Electronic Funds Transfers (1987); the UN Convention on International Bills of Exchange and International Promissory Notes (1988); UNCITRAL Model Law on International Credit Transfers (1992); the UN Convention on Independent Guarantees and Stand-by Letters of Credit (1995). For a more detailed history of the emergence of UNCITRAL, see, e.g., SUSAN BLOCK-LIEB & TERENCE C. HALLIDAY, *GLOBAL LAWMAKERS: INTERNATIONAL ORGANIZATIONS IN THE CRAFTING OF WORLD MARKETS* (2017).

45 U.N. Secretary General, *Legal Value of Computer Records*, U.N. Doc. No. A/CN.9/265 (Feb. 2, 1985) [<https://perma.cc/P886-NBU6>].

46 *Birth of the Commercial Internet: The Internet*, US NAT'L SCI. FOUND., <https://www.nsf.gov/impacts/internet> [<https://perma.cc/TS2L-GBMD>].

Wide Web. This standard setting took until 1990, five years after publication of the Recommendations.⁴⁷

The Recommendations are barely three pages in length.⁴⁸ They refer to an earlier 30-page report issued by UNCITRAL's secretariat,⁴⁹ also dated 1985.⁵⁰ In a preamble to the Recommendations, the Commission briefly summarized the Secretariat's report as failing to find "problems in the use of data stored in computers as evidence in litigation" but, nonetheless, finding a more serious problem in "requirements that documents had to be signed or be in paper form."⁵¹ These requirements, the Recommendations noted, may create "serious legal obstacles to the use of computers and computer-to-computer telecommunications in international trade."⁵² They recommend that national governments "review" four sorts of legal rules or requirements:

- (a) . . . rules affecting the use of computer records as evidence in litigation . . . ;
- (b) . . . requirements that certain trade transactions or trade related documents be in writing, whether the written form is a condition to the enforceability or to the validity of the transaction or document . . . ;
- (c) . . . requirements of a handwritten signature or other paper-based method of authentication on trade related documents . . . ;
- (d) . . . requirements that documents for submission to governments be in writing and manually signed.⁵³

They also recommend that international organizations engaged in trade lawmaking should "consider modifying existing legal texts in line with the present Recommendation."⁵⁴

Between the time of UNCITRAL's publication of the Recommendations, in 1985, and its creation of the e-Commerce Working Group in 1995, the Internet had begun to demonstrate its potential as a

⁴⁷ See TIM BERNERS-LEE, *WEAVING THE WEB: THE ORIGINAL DESIGN AND ULTIMATE DESTINY OF THE WORLD WIDE WEB* (2000).

⁴⁸ UNCITRAL, *Recommendations on the Legal Value of Computer Records* (1985), https://uncitral.un.org/en/texts/ecommerce/legislativeguides/computer_records [<https://perma.cc/8ELM-F3SN>].

⁴⁹ See *Legal Value of Computer Records*, *supra* note 45.

⁵⁰ That report refers to the earlier fifteenth session of UNCITRAL's governing commission and a meeting of the Working Party of the Facilitation of International Trade Procedures, both in 1982. *Id.* at 3. The Working Party is described as a "body jointly sponsored by the Economic Commission for Europe [UNECE] and the United Nations Conference on Trade and Development [UNCTAD]." *Id.* Between 1982 and 1985, the Secretariat wrote its report, as well as "a questionnaire on the use of computer-readable data as evidence in court proceedings," which together with the results of the questionnaire are appended to the 1985 report.

⁵¹ *Recommendations on the Legal Value of Computer Records*, *supra* note 48, at 1.

⁵² *Id.*

⁵³ *Id.* at 2.

⁵⁴ *Id.*

commercial venue and a mechanism for commercial trade. The e-Commerce Working Group's work between 1995 and 2001 laid the foundations for digital markets for the sale of goods (both domestic and international), as well as the foundations for this digital contracting to occur within digital markets (platforms). Once established, the Working Group on Electronic Commerce quickly produced the Model Law on Electronic Commerce (1996) and Model Law on Electronic Signatures (2001).

The e-Commerce Model Law is perhaps UNCITRAL's most successful model law. UNCITRAL reports that "[l]egislation based on or influenced by [this] Model Law has been adopted in 88 states and a total of 171 jurisdictions," including the US (through various state law enactments).⁵⁵ The e-Commerce Model Law describes its purpose simply as "providing equal treatment to paper-based and electronic information."⁵⁶ It consists of 15 provisions on electronic commerce generally, and two additional provisions related to contract for the carriage of goods by sea and related transportation documents, such as bills of lading.⁵⁷

Given its simplicity, the Model Law on e-Commerce said only general things about digital signatures. The legal enforceability of digital signatures was understood to be a key to continued innovation in this digital market. The topic of encrypted e-signatures was revisited with the 2001 Electronic Signatures Model Law,⁵⁸ which has also been widely adopted, with legislation "based on or influenced by" it adopted in 40 states and a total of 42 jurisdictions (although not in the US, UK or EU).⁵⁹ The e-Signature Model Law was subsequently followed by the UN Convention on the Use of Electronic Communications in International Contracts (2005),⁶⁰ which

⁵⁵ Status: *UNCITRAL Model Law on Electronic Commerce (1996)*, UN, https://uncitral.un.org/en/texts/ecommerce/modellaw/electronic_commerce/status [<https://perma.cc/G3YG-9MGU>]. The Uniform Electronic Transactions Act (2000) has been adopted by 49 states. *Electronic Transactions Act*, UNIF. L. COMM'N, <https://www.uniformlaws.org/committees/community-home?CommunityKey=2c04b76c-2b7d-4399-977e-d5876ba7e034> [<https://perma.cc/7J5T-C5LC>].

⁵⁶ *UNCITRAL Model Law on Electronic Commerce (1996) With Additional Article 5 Bis As Adopted in 1998*, U.N., https://uncitral.un.org/en/texts/ecommerce/modellaw/electronic_commerce [<https://perma.cc/Q27U-9M54>].

⁵⁷ *UNCITRAL MODEL LAW ON ELECTRONIC COMMERCE (1996) WITH ADDITIONAL ARTICLE 5 BIS AS ADOPTED IN 1998*, UNCITRAL (1999), https://digitallibrary.un.org/record/286739/files/19-04970_ebook.pdf [<https://perma.cc/DML8-62TX>].

⁵⁸ *UNCITRAL Model Law on Electronic Signatures (2001)*, https://uncitral.un.org/en/texts/ecommerce/modellaw/electronic_signatures [<https://perma.cc/ZK2G-MBPE>].

⁵⁹ For distinct US federal law on this topic, see *Electronic Signatures in Global and National Commerce Act*, Pub. L. 106-229, 15 U.S.C. §§ 7001-7006 (2000).

⁶⁰ See *United Nations Convention on the Use of Electronic Communications in International Contracts (New York, 2005)*, U.N. (Nov. 23, 2005), https://uncitral.un.org/en/texts/ecommerce/conventions/electronic_communications [<https://perma.cc/U5KH-FBSR>]; see also *PROMOTING CONFIDENCE IN ELECTRONIC COMMERCE: LEGAL ISSUES ON INTERNATIONAL USE OF ELECTRONIC AUTHENTICATION AND SIGNATURE METHODS*, UNCITRAL (2009), <https://digitallibrary.un.org/record/657519?v=pdf> [<https://perma.cc/J594-QZSX>].

entered into force with 20 countries bound to its terms (again, not including the US, UK or EU).⁶¹ The limited success of the e-Signature Model Law and Convention has been explained as the exuberance of the Working Group, which centered this IL on one technology – public key infrastructure – to the exclusion of other simpler technologies.⁶²

This work on e-commerce emboldened UNCITRAL to expand beyond digital records on the sale of goods over the Internet to reach to documentation governing the transport and storage of goods in transit, such as bills of lading, warehouse receipts and other documents of title.⁶³ These documents allow the movement of goods across distances, especially the carriage of goods by sea, without the need for an agent of the seller or buyer to physically accompany those goods. Historically, the security of this documentation was ensured through paper, with the document itself representing ownership (or rights of possession) in goods. If the documents were viewed as negotiable under domestic or international law, the paper itself and the language set out on this paper followed strict formal requirements. If endorsement was required, questions rose as to whether and what sort of signature would suffice. For global markets to achieve a fully digital status, reform of the formalities associated with transport documents was necessary.

The need for this law reform had been clear for some time, but two obstacles stood in the way: long-standing international law and technology. For example, the Hague Rules on Carriage of Goods by Sea (1924) limited its protections and obligations to those set out in paperbound documents of carriage.⁶⁴ So did other international laws⁶⁵ and statements of international practice.⁶⁶ This IL was slow to change. So too was technology. When the e-Signature Model Law was promulgated, technology had not yet fully developed, impacting the number of countries signing these laws.

61 This number increases yearly. For example: The Islamic Republic of Iran ratified the Convention on the Use of Electronic Communication in International Contracts in January 2026, and Thailand in March of 2025.

62 For critique of technical assumptions underlying the e-Signature Model Law, see Jane Winn, *The Emperor's New Clothes: The Shocking Truth About Digital Signatures and Internet Commerce*, 37 IDAHO L. REV. 353 (2001); C. Bradford Biddle, *Legislating Market Winners: Digital Signature Laws and the Electronic Commerce Marketplace*, 34 SAN DIEGO L. REV. 1225 (1997).

63 See *UNCITRAL Model Law on Transferable Records*, UNCITRAL (adopted July 13, 2017), https://uncitral.un.org/en/texts/e-commerce/modellaw/electronic_transferable_records [https://perma.cc/VY2K-8LZP] (on documents of title, including bills of lading).

64 International Convention for the Unification of Certain Rules of Law Relating to Bills of Lading (“Hague Rules”), & Protocol of Signature, Aug. 25, 1924, 120 L.N.T.S. 157 (entered into force June 2, 1931).

65 See Protocol to Amend The International Convention for the Unification of Certain Rules of Law Relating to Bills of Lading (“Visby Protocol”), Feb. 25, 1968, 1412 U.N.T.S. 127; U.N. Convention on the Carriage of Goods by Sea (“Hamburg Rules”), Mar. 31, 1978, 1695 U.N.T.S. 3.

66 U.N. Conference on Trade and Development, *Adoption of the UNCTAD/ICC Rules on Multimodal Transport Documents*, UN Doc. No. TRADE/WP.4/INF.117 (July 9, 1991).

UNICTRAL's governing commission did not want to make the same mistake twice.

To prevent this problem, UNICTRAL disbanded its e-Commerce Working Group in 2004 and created a Working Group on the International Transport of Goods, with directions that it should attempt to solve the problem of paperbound transport documents. Industry groups and professional associations, however, saw this move as an opening to a much larger project. The Transportation Working Group accepted the challenge to completely rewrite earlier transport treaties, a challenge proposed to it in a report prepared by the Committee Maritime International, a longstanding trade and professional association, and by 2008 the working group had completed work on a draft Convention on Contracts for the International Carriage of Goods Wholly or Partly by Sea (2008), now known as the "Rotterdam Rules."⁶⁷ But during negotiations on the draft convention, technology supporting digital bills of lading had not yet solved the technical and legal problems identified back in 1985.⁶⁸ As a result, the draft convention included only broadly worded provisions allowing shippers to extend and carriers to accept digital bills of lading without details as to the contents of these digital documents.⁶⁹ Reliance on this sort of open-ended language in the Rotterdam Rules was unusual for a multilateral convention. It meant that additional IL would be needed to address the question of digital bills of lading and other cargo. Blockchain technology continued to progress after the diplomatic convention on the Rotterdam Rules concluded, but slowly. Domestic law⁷⁰ and an EU framework on the topic⁷¹ eventually enabled private entities to market digital Bills of Lading, but these were not finalized for another dozen years.

Although disbanded in 2004, the e-Commerce Working Group later resumed its work in 2011. Since then, it has produced three additional model laws:⁷² the UNCITRAL Model Law on Electronic Transferable Records (2017); UNCITRAL Model Law on the Use and Cross-border Recognition of Identity Management and Trust Services (2022); UNCITRAL Model

67 BLOCK-LIEB & HALLIDAY, *supra* note 44.

68 *Id.*

69 *Id.*

70 See *Electronic Trade Documents Act 2023*, LEGISLATION.GOV.UK <https://www.legislation.gov.uk/ukpga/2023/38/contents/enacted> [<https://perma.cc/QX8Q-MRU5>].

71 See Commission Regulation 910/2014, 2014 O.J. (L 257) 73.

72 See GUIDE ON LEGAL ISSUES RELATING TO THE USE OF DISTRIBUTED LEDGER TECHNOLOGY IN TRADE, UNCITRAL, <https://uncitral.un.org/sites/default/files/media-documents/EN/Texts/UNCITRAL/2516855e-ebook-accessible.pdf> [<https://perma.cc/4QXD-TRJ7>]; TAXONOMY OF LEGAL ISSUES RELATED TO THE DIGITAL ECONOMY, UNCITRAL, <https://uncitral.un.org/sites/default/files/media-documents/uncitral/en/digitaleconomytaxonomy.pdf> [<https://perma.cc/LCZ2-3R3G>]; NOTES ON THE MAIN ISSUES OF CLOUD COMPUTING CONTRACTS, UNCITRAL, <https://uncitral.un.org/cloud> [<https://perma.cc/YZ39-9T3N>].

Law on Automated Contracting (2024).⁷³ More than a decade later, UNCITRAL's governing commission also created a Working Group on Negotiable Cargo Documents in 2022, which produced the draft UN Convention on Negotiable Cargo Documents.⁷⁴ It also created a Working Group on Warehouse Receipts in 2023. Unlike bills of lading, warehouse receipts are not governed by an earlier international convention; hard international law was viewed as unnecessary to address the shift to digital warehouse receipts. Together with a study group established by the International Institute for the Unification of Private Law (UNIDROIT),⁷⁵ UNCITRAL set to work on a Model Law on Warehouse Receipts and an accompanying Guide to Enactment.⁷⁶ With these international instruments, UNCITRAL solved the last of the problems identified in its 1985 Recommendations, but not until 2025.

While its projects on negotiable cargo documents and warehouse receipts are complete, UNCITRAL views its work on digital markets as ongoing. To consider future similar work, it held a colloquium on "Digital Payments and Paperless Trade" in January 2026,⁷⁷ and another in February 2026, entitled "Harmonizing Law in the Age of Digital Trade and Finance."⁷⁸

B. Digitization of Commercial Finance.

Internet-based digital markets in the sale of goods and services have exploded since the 1990s and UNCITRAL's law reform initiatives are partly responsible for this innovation.⁷⁹ But digitization has also affected financial lending markets, including both (B2B) commercial and (B2C)

⁷³ See *UNCITRAL Model Law on Transferable Records*, *supra* note 63; UNCITRAL MODEL LAW ON THE USE AND CROSS-BORDER RECOGNITION OF IDENTITY MANAGEMENT AND TRUST SERVICES, UNCITRAL, <https://uncitral.un.org/en/mlit> [<https://perma.cc/7D4E-LEN9>]; UNCITRAL MODEL LAW ON AUTOMATED CONTRACTING WITH GUIDE TO ENACTMENT, UNCITRAL, <https://uncitral.un.org/en/mlac> [<https://perma.cc/C86R-76VZ>]. UNCITRAL's Working Group on e-Commerce is also nearing completion of a suite of materials on Data Provision Contracts: Default Rules, Model Legislative Provisions, and an accompanying Explanatory Note.

⁷⁴ *United Nations Convention on Negotiable Cargo Documents (New York, 2025)* (the "Accra Convention on Negotiable Cargo Documents"), UNCITRAL (adopted Dec. 15, 2025), <https://uncitral.un.org/en/ncdconvention> [<https://perma.cc/DJK8-N3S3>].

⁷⁵ See *Model Law on Warehouse Receipts*, UNIDROIT, <https://www.unidroit.org/studies/model-law-on-warehouse-receipts/> [<https://perma.cc/93GA-RX33>].

⁷⁶ *Id.*

⁷⁷ See *UNCITRAL Colloquium on Digital Payments and Paperless Trade, 19-22 January 2026, Vienna*, UNCITRAL, <https://uncitral.un.org/en/paymentspaperlesstrade> [<https://perma.cc/9S5T-YJPM>].

⁷⁸ See *UNCITRAL Colloquium on "Harmonizing Law In The Age of Digital Trade And Finance", 10-13 February 2026, New York*, UNCITRAL, <https://uncitral.un.org/en/platforms-st> [<https://perma.cc/X4MP-LWXA>].

⁷⁹ Mira Burri, *The Impact of Digitalization on Global Trade Law*, 24 GERMAN L.J. 551 (2023).

consumer finance.⁸⁰ One example of this impact involves the market for secured credit. Digitalization of the markets for secured credit is based on two domestic and international law reform initiatives: (i) digitalization of security agreements, and (ii) digitalized public records of secured lending.

1. Digital Recording to Provide Notice of Security Interests.

As with all sorts of contracting, UNCITRAL's e-Commerce Model Law and e-Signature Model Law and Convention simplified contracting for secured credit. But secured lending is only valuable to secured creditors if the security interests that borrowers voluntarily grant to them are valid and enforceable against the borrowers' other creditors. Because secured creditors do not enjoy privity of contract with these third parties, the priority and enforceability of a security interest often depends on some form of public notice, such as a UCC-1 financing statement filed in the state in which the borrower resides. Historically, these public records (financing statements) have involved filing paperwork with the relevant bureaucratic office. By the mid-1990s, this practice began to change⁸¹ and, after legal reform in 2000, electronically filed financing statements became permissible in both the US and Canada,⁸² and became commonplace shortly thereafter.⁸³

The timing of this technological development coincided with two international law reform initiatives: one conducted by UNCITRAL's Working Group on Secured Credit, and another involving a different IO, the International Institute for the Unification of Private Law ("UNIDROIT").

UNCITRAL created the Working Group on Secured Transactions in 2002, which for more than fifteen years promulgated a series of soft-law instruments on the topic of secured credit, including the UNCITRAL Legislative Guide on Secured Transactions (2007); a supplement to this Legislative Guide covering the possibility that a borrower's intellectual property could constitute collateral in such a loan (2010); the UNCITRAL Guide on the Implementation of a Security Rights Registry (2013); and eventually the Model Law on Secured Transactions (2016), with a Guide to Enactment (2017) and related Practice Guide (2019).⁸⁴ Each of these

⁸⁰ Sophie Sirtaine & Indermit Gill, *How Digitization is Disrupting Collateral-Based Lending*, WORLD BANK BLOG (May 22, 2025), <https://blogs.worldbank.org/en/voices/how-digitization-is-disrupting-collateral-based-lending> [<https://perma.cc/934T-J83S>].

⁸¹ Lynn M. LoPucki, *Computerization of the Article 9 Filing System: Thoughts on Building the Electronic Highway*, 55 L. & CONTEMP. PROB. 5 (1992); Edward S. Adams et al., *A Revised Filing System: Recommendations and Innovations*, 79 MINN. L. REV. 877, 889–90 (1995).

⁸² U.C.C. §§ 9-102, 9-516, 9-526 (circa 2000 revisions).

⁸³ See, e.g., Blake Harris, *Electronic UCC Filing Faster and Cheaper*, GOV'T TECH. (Aug. 12, 2010) <https://www.govtech.com/magazines/gt/electronic-ucc-filing-faster-and-cheaper.html> [<https://perma.cc/5E7Q-94Z8>].

⁸⁴ For links to these legislative guides and model laws, see *Security Interests*, UNCITRAL, <https://uncitral.un.org/en/texts/securityinterests> [<https://perma.cc/4FDG-AUMX>].

UNCITRAL instruments strongly favors public recording of security interests, including digital systems for retaining and providing public notification of these financial records.⁸⁵

As with the sale of goods, records of these sorts of financing statements historically involved paperwork filed with bureaucrats that was subject to public access. The paper-based systems for recordkeeping and public access to these records was slow, expensive, and prone to human error. In its soft law on the topic, UNCITRAL highlights the importance of adopting digital recordation systems on efficiency grounds to benefit the secured lender, its borrower, and related parties in interest,⁸⁶ and more generally to minimize the cost of a recording system and its likelihood for error.⁸⁷ UNCITRAL soft laws on secured transactions all recommend the adoption of a digital filing system as preferable to similar paper-bound records.⁸⁸

UNCITRAL's suite of soft law instruments refer broadly to all sorts of secured lending and collateral but depend on states' implementation of these model laws to become enforceable. There also exists hard international law on the topic of secured lending. In 2001, UNIDROIT began negotiating draft conventions on secured lending with a narrower focus—specifically, the Cape Town Convention⁸⁹ on High-Value Mobile Equipment (CTC) and its now four related protocols on specific categories of equipment: (i) aircraft and aircraft related equipment; (ii) railroad stock and related equipment; (iii) space assets; and (iv) mining, agricultural, and construction equipment.⁹⁰ The CTC entered into force in 2006 with 90 contracting states

85 See, e.g., UNCITRAL GUIDE ON THE IMPLEMENTATION OF A SECURITY RIGHTS REGISTRY, UNCITRAL, <https://uncitral.un.org/sites/default/files/media-documents/uncitral/en/security-rights-registry-guide-e.pdf> [<https://perma.cc/R7PL-GB98>].

86 See, e.g., *Mode of Access to the Registry*, in UNCITRAL LEGISLATIVE GUIDE ON SECURED TRANSACTIONS, UNCITRAL 158, https://uncitral.un.org/sites/default/files/media-documents/uncitral/en/09-82670_ebook-guide_09-04-10english.pdf [<https://perma.cc/SJ98-F7E4>] (“Traditionally, registration records had to be kept in paper form. However, the advent of digital storage has facilitated the adoption of computerized databases, greatly reducing the administrative and archival burden on the registry.”).

87 *Id.* at 159 (“A fully electronic system of this kind places the responsibility for accurate data entry directly on registrants. As a result, staffing and operational costs of the registry are minimized and the risk of registry personnel making an error in transcribing documents is eliminated.”).

88 See, e.g., UNCITRAL PRACTICE GUIDE TO THE MODEL LAW ON SECURED TRANSACTIONS, UNCITRAL 4, https://uncitral.un.org/sites/default/files/media-documents/uncitral/en/19-10910_e.pdf [<https://perma.cc/KF5B-LJ79>] (“A secured creditor will want to make sure that its security right is also effective against third parties, as the security right will otherwise not be of much benefit. The most usual way of making a security right effective against third parties under the Model Law is to register a ‘notice’ in the general security rights registry (the ‘Registry’). The Registry under the Model Law should be fully electronic and accessible online for registering a notice and for carrying out searches.”).

89 *Cape Town Convention*, UNIDROIT, <https://www.unidroit.org/instruments/security-interests/cape-town-convention/> [<https://perma.cc/B3L5-QJ4X>].

90 To read more on the aircraft, rail, space, and mac protocols, see Security Interest, UNIDROIT, <https://www.unidroit.org/instruments/security-interests/> [<https://perma.cc/7Q36-RG38>]; *Operative Legal Texts*, CTCAP, <https://ctcap.org/repository/operative-legal-texts/> [<https://perma.cc/5NXG-KZVJ>]. See also Roy Goode, *Issues of Interpretation Under the Cape Town Convention and its Protocols*, 8 CAPE TOWN CONVENTION J. 3 (2023).

(including the US, UK and many EU member states), as has the Aircraft Protocol with 87 contracting states.⁹¹ The Rail Protocol, completed in 2007, entered into force in 2024.⁹² While there is much to distinguish between the UNICTRAL and UNIDROIT secured transactions projects, they fully agree on the desirability of digitally-filed public records for these transactions. “International interests” created under the Cape Town Convention and its Aircraft Protocol, for example, are protected only if recorded in a specialized filing system established by the treaty.⁹³ This International Registry, managed by Aviareto Ltd., a private company located in Dublin, is a specialized electronic system for registering financing governed by the Convention.⁹⁴

2. Full Digitalization of Secured Lending.

With international and domestic laws in place to recognize the validity of digital security agreements that are enforceable against third parties through digital means of perfection, secured lending took off over the Internet, including through smartphones. Financial digitalization enhanced business borrowers’ access to bank lending. It also enabled bank and non-bank lending in consumer and household finance transactions, like mortgages, car loans, and small-value personal loans. Fully digitalized secured lending lowered the cost of lending and increased its convenience and privacy.⁹⁵

The digitalization of consumer lending harbors a new set of policy problems, however, namely consumers’ over indebtedness and lenders’ extension of credit on complex terms considered by some to be unfair and potentially predatory. While many countries enacted domestic legislation to regulate internal markets for consumer financial protection, these regulations tended not to reach lenders located across borders. Other than the EU,⁹⁶ transnational law did not govern or address financial consumer protection until the global financial crisis (GFC). Even after the GFC, there is scant regional and international law on financial consumer protection—but not for lack of trying.

91 *States Parties: Convention on International Interests in Mobile Equipment*, UNIDROIT, <https://www.unidroit.org/instruments/security-interests/cape-town-convention/states-parties/> [<https://perma.cc/AD9Q-WC7D>].

92 *Id.* Neither the Space Protocol (completed in 2012) nor the MAC Protocol (completed in 2019) has yet entered into force.

93 *Cape Town Convention*, *supra* note 89, at Art. 16.

94 See Rob Cowan & Donal Gallagher, *The International Registry for Aircraft Equipment—The First Seven Years, What We Have Learned*, 45 U.C.C.L.J. 225, 228 (2014) (“Everything on the IR is accomplished electronically; user applications and approvals, registrations, amendments and discharges are consented to electronically, and the electronic record is definitive.”).

95 See *supra* notes 85-88 and all accompanying notes.

96 See, e.g., Mateucz Grochowski, *European Consumer Law after the New Deal: A Tryptich*, 39 Y.B. EUR. L. 387 (2020) [<https://perma.cc/6YQQ-7G9Z>].

Many viewed the GFC as a crisis caused by the failure of consumer protection regulation in lending markets.⁹⁷ In the aftermath of this crisis, IOs actively sought to promote international norms of financial consumer protection. The G20 and G7 encouraged entities, like the newly-established Financial Stability Board (FSB), to add financial consumer protection to the list of financial regulation that nations should consider bolstering.⁹⁸ The FSB partnered with the Organization for Economic Cooperation and Development (OECD) to draft High-Level Principles on Financial Consumer Protection (2011, 2022), which the G20 ratified.⁹⁹ These high-level principles were not particularly detailed. They closely resemble the open-ended checklist of Recommendations that UNCITRAL had adopted on electronic data interchanges in 1985. The World Bank and International Monetary Fund also published staff reports on the topic of consumer over indebtedness, but the governing boards of these international financial institutions did not follow up on the recommendations of their staff.¹⁰⁰ None of this international coordination on the topic of financial consumer protection resulted in hard or soft IL.¹⁰¹ Fears that financial consumer protection regulation would stifle economic recovery and subsequent innovation won out.

C. *Electronic and Digitized Cross-Border Payments*

Cash-based economies held global trade back until electronic and digital money transfers were accepted as currency substitutes. Currency substitutes were hardly an invention of the twenty-first century, however.

97 See, e.g., Edward J. Balleisen & Melissa B. Jacoby, *Consumer Protection After the Global Financial Crisis*, 107 GEO. L. REV. 813, 816 (2019) (“In the aftermath of the GFC, policymakers identified deceptive and unfair practices as significant contributors to the eventual instability in the American mortgage market and wider financial markets.”).

98 See, e.g., *Press Release, G20 Meetings 2011 – Consumers International Response to OECD High Level Principles on Financial Consumer Protection and FSB Report on Enhancing Protection in Consumer Finance*, CONSUMER REPS. (Oct. 18, 2011), https://advocacy.consumerreports.org/press_release/g20-meetings-2011-consumers-international-response-to-oecd-high-level-principles-on-financial-consumer-protection-and-fsb-report-on-enhancing-protection-in-consumer-finance [https://perma.cc/QS27-2KNW]

99 G20/OECD HIGH LEVEL PRINCIPLES ON FINANCIAL CONSUMER PROTECTION, OCED (Dec. 12, 2022), <https://www.oecd.org/content/dam/oecd/en/topics/policy-sub-issues/financial-consumer-protection/G20-OECD-FCP-Principles.pdf> [https://perma.cc/NX6V-KM6P].

100 For examples of these sorts of reports, see, e.g., WORKING GROUP ON THE TREATMENT OF THE INSOLVENCY OF NATURAL PERSONS, WORLD BANK, <https://openknowledge.worldbank.org/server/api/core/bitstreams/1780a7a6-1e04-53bd-99c8-dde06425bf3e/content> [https://perma.cc/Z25A-QZVP]; Yan Liu & Christoph B. Rosenberg, *Dealing with Private Debt Distress in the Wake of the European Financial Crisis: A Review of the Economics and Legal Toolbox* (Int’l Monetary Fund, Working Paper No. WP/13/44, 2013), <https://www.imf.org/en/publications/wp/issues/2016/12/31/dealing-with-private-debt-distress-in-the-wake-of-the-european-financial-crisis-a-review-of-40326> [https://perma.cc/6KUR-GW7U].

101 Susan Block-Lieb & Terence Halliday, *The Macropolitics and Microeconomics of Global Financial Crises: Bankruptcy as a Point of Reference*, in SOVEREIGN INSOLVENCY: POSSIBLE LEGAL SOLUTIONS (Gerald Sander, Jasnica Garasic, Nadia Bodiroga-Vukobrat, eds, forthcoming in Springer Press 2027).

As early as the development and expansion of wired telegraphy, buyers and sellers learned to pay for the sale of goods through “wire transfers” of money (sometimes referred to as “telegraphic transfers”).¹⁰² By 1877, for example, Western Union Co. was transferring \$2.5 million annually between commercial actors, mostly between major trading cities within the US, but also extending internationally via submarine cables under the Atlantic Ocean.¹⁰³ To ensure that this interbank messaging was neither garbled nor intercepted, some US and UK banks installed dedicated telegraphic lines through which they sent coded communications about money transfers, usually involving large sums of money, that were set off by cash or gold bullion.¹⁰⁴ Dedicated telegraphic lines were later also established to clear accounts without transferring cash and cash-like instruments among banks in the US Federal Reserve System,¹⁰⁵ among Commonwealth banks relying on the Bank of England,¹⁰⁶ and within other systems.¹⁰⁷ The International Telegraphic Convention discussed in Part I, thus, also enabled international wire transfers of funds.

International wire transfers represented only a small proportion of various methods for settling cross-border trade obligations; these were also satisfied through letters of credit or bills of exchange. But international agreement on paperbound cross-border financial transfers was painfully slow. Diplomatic negotiation to recognize international bills of exchange was initiated as early as 1885 and 1888, but the diplomatic conferences failed, as did subsequent efforts, including in 1930 & 1931 under the aegis of the League of Nations. By the time UNCITRAL promulgated a draft Convention on International Bills of Exchange and International Promissory Notes in 1988, these forms of payment held limited practical relevance and this UN treaty never entered into effect.¹⁰⁸ The failure to reach international agreement on bills of exchange and the like meant that money

¹⁰² See, e.g., Müller & Tworek, *supra* note 40.

¹⁰³ See, e.g., TOM STANDAGE, *THE VICTORIAN INTERNET: THE REMARKABLE STORY OF THE TELEGRAPH AND THE NINETEENTH CENTURY'S ON-LINE PIONEERS* (1998).

¹⁰⁴ *Id.*

¹⁰⁵ See, e.g., Adam M. Gilbert, Dara Hunt, & Kenneth C. Winch, *Creating an Integrated Payment System: The Evolution of Fedwire*, FRBNY ECON. POL'Y REV. (1997).

¹⁰⁶ See, e.g., Ben Norman, Rachel Shaw, & George Speight, *The History of Interbank Settlement Arrangements: Exploring Central Banks' Role In The Payment System* (Bank of England, Working Paper No. 412, 2011), <https://www.bankofengland.co.uk/-/media/boe/files/working-paper/2011/the-history-of-interbank-settlement-arrangements-exploring-central-banks.pdf> [<https://perma.cc/HBL8-PYB2>].

¹⁰⁷ See, e.g., *THE EVOLVING ROLE OF CENTRAL BANKS*, INT'L MONETARY FUND (Bruce J. Summers & Reza Vaez Zadeh eds., 1991).

¹⁰⁸ *Status: United Nations Convention on International Bills of Exchange and International Promissory Notes* (New York 1988), UNCITRAL, https://uncitral.un.org/en/texts/payments/conventions/bills_of_exchange/status [<https://perma.cc/3VGF-VTT8>].

moved across borders mostly through electronic and digital transfers of funds.

Although there is no international treaty in force explicitly governing the wired transfer of funds, there is extensive international coordination and cooperation governing these financial practices.¹⁰⁹ Importantly, the coordination on payments and transfers of funds between banks mostly follows private standards.¹¹⁰ Developments in financial digitalization have attracted the attention of various international organizations and actors, although so far this coordination is only the subject of guidance and principles, not multinational treaties or soft international law.¹¹¹

Private standard setting in this context occurs through two entities. The first, “SWIFT,” or the Society for Worldwide Interbank Financial Telecommunications, was established in 1973 to “provide secure, reliable, and efficient financial communications used by more than 10,000 financial institutions in about 200 countries.”¹¹² SWIFT is a “private cooperative entity”¹¹³ that provides a “messaging channel, not a payment system.”¹¹⁴ SWIFT, in turn, relies on another private standard setter, the International Organization for Standardization (ISO), which is “an independent, non-governmental organization made up of members from the national standards bodies of 175 countries.”¹¹⁵ SWIFT currently relies on ISO 20022 as the standard language for its cross-border payments.¹¹⁶

Wire transfers through SWIFT continue today, although heavily sanctioned countries, such as the Russian Federation and the Islamic Republic of Iran, have worked together to develop alternatives. Russia developed its System for Transfer of Financial Messages (SPFS) in 2014,

109 For soft law on this topic, see UNCITRAL MODEL LAW ON INTERNATIONAL CREDIT TRANSFERS, UNCITRAL, https://uncitral.un.org/en/texts/payments/modellaw/credit_transfers [https://perma.cc/2EDV-M3S2].

110 For detailed discussion of these private standards, see, e.g., Ben Geva, *Global Payment and Settlement Systems*, in HANDBOOK OF KEY GLOBAL FINANCIAL MARKETS, INSTITUTIONS AND INFRASTRUCTURE 513 (Gerard Carpio, Jr. ed., 2012).

111 *Id.*; Lan Wang, *The Modification of Soft Law Governance for the Regulatory Alienation of Global Digital Finance*, SWUPL SCI. & TECH. L. REV. 23 (2024).

112 See *Organization & Governance*, SWIFT, <https://www.swift.com/about-us/organisation-governance> (last visited Mar. 20, 2026) [https://perma.cc/YW8K-QFVE].

113 Although an NGO, the governance structure of ISO resembles that of many IGOs, such as UNCITRAL and UNIDROIT. *Id.* (“Our members play a vital role in how we operate, meeting once a year for a General Assembly that decides our strategic objectives. Our Central Secretariat in Geneva, Switzerland, coordinates the system and runs day-to-day operations, overseen by the Secretary-General.”). For complete text of the ISO Statutes, see *Governance*, INT’L STANDARDS ORG. 14, <https://www.iso.org/publication/PUB100322.html> (last visited Mar. 20, 2026) [https://perma.cc/5WSV-TW72].

114 *Id.*

115 See *Structure and Governance*, INT’L STANDARDS ORG., <https://www.iso.org/structure.html> (last visited Mar. 20, 2026) [https://perma.cc/CEL2-N9ZL].

116 ISO is “an independent, non-governmental organization made up of members from the national standards bodies of 175 countries.” *Id.*

and now claims 550 users across 20 countries.¹¹⁷ China similarly developed its China Cross-Border Interbank Payment System (CIPS) to supplement SWIFT for yuan-based money transfers.¹¹⁸ SWIFT remains dominant, with more than 11,000 users worldwide, but pressure for alternatives remains, especially after the US imposed extensive financial sanctions in the wake of Russia's invasion of Ukraine in 2022.¹¹⁹

SWIFT wire transfers rely on banks, so they are rarely used for small dollar payments or remittances and are never used by “unbanked” individuals. Cognizant of this limitation, private entities worked with countries to enable individuals and small businesses to make payment and remittance transactions. Mobile money services allow people to store and transfer money through a mobile phone and have been enormously successful in developing payment networks unlinked to banking and other traditional financial institutions.¹²⁰ For example, mPesa, a mobile payment system launched in 2007, “was adopted by about 70 percent of all households in Kenya in just four years.”¹²¹ Similar services have been launched in Latin America,¹²² Asia,¹²³ and throughout the global south.¹²⁴

Whether small or large dollar amounts and whether banks are involved in the process, digital money services are mostly provided through private entities. This does not mean that international and national law and legal

117 Russian Central Bank Plans to Implement Tracking Service as Part of Financial Message Transmission System, INTERFAX (June 5, 2024), <https://interfax.com/newsroom/top-stories/103040/> [<https://perma.cc/45XH-K9GZ>].

118 Xinyi Wu, *How China Opened the Door to Creating a Direct Rival to U.S. Payment Systems*, SOUTH CHINA MORNING POST (Mar. 19, 2026), https://www.scmp.com/economy/china-economy/article/3347053/how-china-opened-door-creating-direct-rival-us-payment-systems?module=perpetual_scroll_0&pgtype=article [<https://perma.cc/T4HN-UJXU>].

119 Barry Eichengreen, *Sanctions, SWIFT, and China's Cross-Border Interbank Payments System*, CTR FOR STRATEGIES & INT'L STUD. (May 20, 2022), <https://www.csis.org/analysis/sanctions-swift-and-chinas-cross-border-interbank-payments-system> [<https://perma.cc/H5AZ-GVEZ>]; Marco Cipriani, Linda S. Goldberg & Gabriele La Spada, *Financial Sanctions, SWIFT, and the Architecture of the International Payments System*, FED. RSRV. BANK STAFF REP. NO. 1047 (Jan. 2023), https://www.newyorkfed.org/medialibrary/media/research/staff_reports/sr1047.pdf [<https://perma.cc/Q3AJ-56FM>].

120 For one study of the growth of mobile money services, see Global System for Mobile Communications Association, *Harnessing the Power of Mobile Money to Achieve the Sustainable Development Goals* (2019), <https://www.gsma.com/mobilefordevelopment/resources/harnessing-the-power-of-mobile-money-to-achieve-the-sustainable-development-goals/> [<https://perma.cc/G5JX-X8LY>] (finding over 866 million registered accounts in 90 countries).

121 Raissa Fabregas & Tite Yokossi, *Mobile Money and Economic Activity: Evidence from Kenya*, 36 WORLD BANK ECON. REV. 734, 735 (2022).

122 See, e.g., Ainsworth Anthony Bailey, et. al., *Mobile Payment Adoption in Latin America*, 32 J. SERV. MKTG. 1 (2022); Carlos Leon, *The Adoption of A Mobile Payment System: The User Perspective*, 2 LAT. AM. J. CENT. BANKING 1 (2021).

123 See, e.g., Yiping Huang, Xue Wang, & Xun Wang, *Mobile Payment in China: Practice and Its Effects*, 19 ASIAN ECON. PAPERS 1 (2020); Thị Ngọc Hà Đăng & Katarzyna Boratyńska, *The Role of Fintech in Enhancing Financial Innovation in Asia: Sustainable Development Approach*, 18 SUSTAINABILITY 773 (2026).

124 See, e.g., Barbara Brandl & Guadalupe Moreno, *Cashing in on the Cashless: Different Pathways to Cashless Payments in the Global South*, in SUSTAINABLE DIGITAL FINANCE 311 (Ingrid-Gabriela Hoven, Soh Young In, & Thomas Puschmann eds., 2026).

reform play no part in this digital market. For example, pressure for international acceptance of cross-border digital transfers of digital assets has prompted a wide range of inter-governmental organizations and clubs of nations to issue reports and soft-law instruments regarding law-like norms in this context. UNCITRAL has been a leader in this context, with its Model Law on International Credit Transfers (1992), Model Law on the Use and Cross-Border Recognition of Identity Management and Trust Services (2022), and Model Law on Automated Contracting (2024). UNCITRAL and UNIDROIT continue to work on next steps for digital transfers and digital assets, both together and individually.¹²⁵ The work of these international lawmaking organizations was preceded by work on developing law-like norms on the topic of digital payments by the G20,¹²⁶ OECD,¹²⁷ the World Bank,¹²⁸ IMF,¹²⁹ and United Nations and UN-affiliated entities.¹³⁰ Private standard setters, like the International Chamber of Commerce, have also been engaged in this work.¹³¹

Work of IOs on digital assets has also begun recently to focus on central bank digital currencies (CBDCs).¹³² Although none of this work suggests

125 For an example of UNIDROIT's work on this issue, see, e.g., UNIDROIT PRINCIPLES ON DIGITAL ASSETS AND PRIVATE LAW, UNIDROIT (2023), <https://www.unidroit.org/wp-content/uploads/2024/01/Principles-on-Digital-Assets-and-Private-Law-linked-1.pdf> [<https://perma.cc/W7CD-UNNA>].

126 See, e.g., German G20 Presidency, *Building Inclusive Digital Payments Ecosystems: Guidance Note for Governments*, GLOB. P'SHIP FOR FIN. INCLUSION (2017) [<https://perma.cc/K4UX-3A74>]; *G20 Priorities on Digital Economy*, G20 GERMANY 2017 HAMBURG, https://unctad.org/system/files/non-official-document/dtl_eWeek2017p37_WalterWerner_en.pdf [<https://perma.cc/6FVF-PYU7>]; *G20 Ministerial Statement on Trade and Digital Economy*, G20 INFO. CTR. (June 9, 2019), <https://www.g20.utoronto.ca/2019/2019-g20-trade.html> [<https://perma.cc/XD6G-2GFK>].

127 See, e.g., *Consumer Policy Guidance on Mobile and Online Payments*, OECD DIGIT. ECON. PAPERS, No. 236 (OECD Publ'g 2014) [<https://perma.cc/4G83-RLD2>]; *Supporting Informed And Safe Use of Digital Payments Through Digital Financial Literacy*, OECD (Sep. 8, 2025), https://www.oecd.org/en/publications/supporting-informed-and-safe-use-of-digital-payments-through-digital-financial-literacy_21de47d1-en/full-report.html [<https://perma.cc/628R-JV8C>].

128 See, e.g., *Digital Public Infrastructure and Development: A World Bank Group Approach*, WORLD BANK GRP. (Mar. 2025), <https://documents1.worldbank.org/curated/en/099031025172027713/pdf/P505739-84c5073b-9d40-4b83-a211-98b2263e87dd.pdf> [<https://perma.cc/7J4Y-DEY4>].

129 See, e.g., Alexander Copestake, Divya Kirti, & Maria Soledad Martinez Peria, *Growing Retail Digital Payments: The Value of Interoperability*, FINTECH NOTES, No. 2025/004 (June 25, 2025), <https://www.imf.org/en/publications/fintech-notes/issues/2025/06/25/growing-retail-digital-payments-the-value-of-interoperability-567814> [<https://perma.cc/KXQ6-E2HG>].

130 See, e.g., *U.N. Principles for Responsible Digital Payments*, INT'L LAB. ORG. (Sep. 28, 2021), <https://digitalwages.org/insights/united-nations-principles-responsible-digital-payments/> [<https://perma.cc/WH3V-HHCX>].

131 See, e.g., *Uniform Rules for Digital Trade Transactions*, I.C.C. (2021), <https://www.ccpit.org/image/1331845279825047554/73f151fe9623443ebbe223a4a2d324cd.pdf> [<https://perma.cc/HQF8-UY9G>].

132 For recent scholarship on this topic, see, e.g., Jack Buchan & Murat Üngör, *Monetary Sovereignty in the Digital Age: The Role of Central Bank Digital Currencies*, INT'L J. POLIT. ECON. 1 (2026); Lambis Dionysopoulos, Miriam Marra, & Andrew Urquhart, *Central Bank Digital Currencies: A Critical Review*, 91 INT'L REV. FIN. ANAL. 1 (2024); Emiliios Avgouleas & William Blair, *A Critical Evaluation of Central Bank Digital Currencies (CBDCs): Payments' Final Frontier?*, 19 CAP. MRKTS L. J. 103 (2024).

that CBDCs should be wholly privatized, retaining the sovereignty of central banks in this context will require attention to the need for law reform. International financial institutions, such as the World Bank,¹³³ International Monetary Fund,¹³⁴ and the Hague Conference on Private International Law¹³⁵ are interested in this topic.

Like the past two case studies on digitalization of the global sale of goods and financial services, this study of the digitalization of payment services also refutes the conventional view that law, including international law, creates obstacles to market innovation. Law and law-like norms abound here, too, although some emanate from or in partnership with private standard-setting agencies. The goal of these law and law-like norms has been to aid in the unfolding of markets for digital money services.

D. Summary

This section considered three markets that grew with the invention of the Internet a century after wired telegraphy (i.e., e-commerce, commercial and consumer finance, and digital payments), and revealed the influence of domestic and international law on the emergence of these Internet-based digital markets for goods and financial services. In none of these markets was innovation hindered by international law. To the contrary, the law reform emphasized in this section enabled market innovations, rather than thwarting them.

The pro-regulatory IL set out in this section differs in form from that discussed in Part I, both in terms of the governance through which it was crafted and in terms of its policy goals. The law reform in Part II is mostly accomplished through soft laws and law-like norms crafted by IOs, unlike the treaties (hard IL) discussed in Part I, which were negotiated in diplomatic conferences convened on an ad hoc basis.

¹³³ See, e.g., CENTRAL BANK DIGITAL CURRENCY: A PAYMENTS PERSPECTIVE, WORLD BANK (2021) <https://openknowledge.worldbank.org/entities/publication/511663ae-f0cd-5219-92e8-8fe8d1cd985d> [https://perma.cc/TG55-5EFW].

¹³⁴ See, e.g., Wouter Bossu, Masaru Itatani, & Catalina Marg, *Legal Aspects of Central Bank Digital Currencies: Central Bank and Monetary Law Considerations* (Int'l Monetary Fund, Working Paper No. WP/20/254, 2020) <https://www.imf.org/-/media/files/publications/wp/2020/english/wpica2020254-print-pdf.pdf> [https://perma.cc/62BL-X2YV]; Marianne Bechara et al., *Private Law Aspects of Central Bank Digital Currencies* (Int'l Monetary Fund, Working Paper No. Note/2025/003, 2025), <https://www.imf.org/-/media/files/publications/ftn063/2025/english/ftnea2025003.pdf> [https://perma.cc/3ZCF-YFY9]; *Implications of Central Bank Digital Currency for Monetary Operations*, IMF (2024) <https://www.elibrary.imf.org/view/journals/063/2024/007/article-A001-en.xml> [https://perma.cc/R7ZF-4R85].

¹³⁵ The Hague Conference on Private International Law currently is engaged in working on a project entitled "Private International Law Aspects of Central Bank Digital Currencies (CBDCs)." See *Proposal for Exploratory Work: Private International Law Aspects of Central Bank Digital Currencies*, HCCH (2023), <https://assets.hcch.net/docs/29eba099-b35d-4f2d-abe5-c1db40270f55.pdf> [https://perma.cc/J4JQ-F7CM].

The IOs discussed in this section are mostly permanently established inter-governmental organizations (IGOs). Many of these IGOs are intentionally designed to allow interaction among state and non-state actors. Given this intentional governance design, it is unsurprising that these IOs did not look to thwart business practices and mostly avoid resolution of issues described as involving (national) public policy. Although some IOs with broader missions, such as the OECD, do not avoid issues of public policy altogether, they tread lightly, relying on staff reports, guidance, and high-level principles to identify law-like norms and related global scripts. Importantly, some of this work has occurred through private standard setters that claim broad representation in their membership, but not of states.

III. POST-HISTORY

Parts I and II, above, reveal that digitalization and precursor technologies both enabled global trade and were highly dependent on domestic and international law produced through international organizations. The historical account set out in these sections undermines the conventional narrative regarding law and digital markets and reveals that international law need not stand in the way of innovation. More than has been previously credited, advances in electronic communication and digital recordkeeping enabled new markets through law reform premised not on deregulation, but pro-regulation in the interest of businesses and prompted by business actors' (direct and indirect) involvement in this global lawmaking.

This Part III considers the future of digitalized globalization and the role of law in that future. Although this future is built on the shoulders of past technology, modern digital markets increasingly work through artificial-intelligence (AI) empowered computerization. The introduction of AI has expanded the commercial purposes of digital markets from communication, recordkeeping, and data collection, toward delegated information gathering (summative AI) and delegated decision making (predictive AI).

AI holds the promise, we are told, for explosive expansion of global trade in goods and services, including financial services; and private entities embedded in the extension of AI services are keen to capture all this upside. They question regulation of AI on the grounds that it would undermine innovation in this sector. Although binding agreements and voluntary commitments regarding AI ethical principles and guidelines exist, they are mostly self-regulatory proposals from the private sector.¹³⁶

Increasingly, however, some domestic and international policymakers are unconvinced that AI-empowered digital markets must remain

¹³⁶ *AI Ethics Guidelines Global Inventory*, ALGORITHM WATCH (2020), <https://inventory.algorithmwatch.org/> [<https://perma.cc/2MVU-UQ3H>].

unregulated for AI to innovate, grow markets, and enhance social welfare.¹³⁷ For example, the World Trade Organization (WTO) recently projected that “the use of AI could boost goods and services trade by 40 percent by 2040.”¹³⁸ This same report also raised questions about this promise of innovation, noting that: “AI could either foster innovation, boost economic growth, and prompt income convergence between and within economies – or it could deepen existing economic and technological divides.”¹³⁹ Implicit in this statement is the fear that AI might both increase economic growth *and* further income inequality and technological divides. The WTO is not alone in fearing inequality and division.

So far, many IOs have collected information about AI, and some have prepared reports disseminated to public-focused audiences¹⁴⁰ including the G20.¹⁴¹ Some IOs and other international actors have begun to work toward global consensus on the topic of AI. At the end of 2025, the UN General Assembly passed a resolution on the possibilities that AI presents for achieving its Sustainable Development Goals.¹⁴² The G20 Leaders’ Declaration reiterated its confidence in “the potential of digital and emerging technologies including AI for good and for all.”¹⁴³ Simultaneously, UNESCO established its Technology Policy Assistance Facility.¹⁴⁴ For several years, the OECD has worked toward developing high-level principles on AI, though so far it has only published the

137 For discussion of what innovation-enhancing regulation might look like, *see, e.g.*, Cary Coglianese & Colton R. Crum, *Leashes, Not Guardrails: A Management-Based Approach to AI Risk Regulation*, 45 RISK ANALYSIS 4397 (2025); Cary Coglianese & Colton R. Crum, *On Leashing (and Unleashing) AI Innovation* (Penn Publ. L. & Legal Theory Rsch. Paper Series, Paper No. 25-29, 2025), https://papers.ssm.com/sol3/papers.cfm?abstract_id=5319728 [<https://perma.cc/PK5X-659R>].

138 *World Trade Report 2025: Making Trade And AI Work Together To The Benefit Of All*, WTO 6 (2025), https://www.wto.org/english/res_e/booksp_e/wtr25_e.pdf [<https://perma.cc/YF4C-NYWA>].

139 *Id.* at 8.

140 For a collection of analytic papers and blogs prepared by IMF staff, *see Artificial Intelligence*, IMF (2026) <https://www.imf.org/en/topics/artificial-intelligence> [<https://perma.cc/Q7BR-ZLG3>] (“Recent advancements in artificial intelligence offer substantial benefits, but there are risks associated with this rapidly evolving technology.”). The World Bank also has a Working Group on Artificial Intelligence, which is collecting information on this industry. *See Global Program on GovTech & Public Sector Innovation: Artificial Intelligence (AI) Working Group*, WORLD BANK, <https://www.worldbank.org/en/programs/govtech/artificial-intelligence> (last visited Mar. 20, 2026) [<https://perma.cc/8AZH-BQN3>].

141 *See, e.g.*, *The Use of Artificial Intelligence for Policy Purposes*, BIS (Oct. 2025), <https://www.bis.org/publ/othp100.pdf> [<https://perma.cc/2KUK-89PF>]. For a report to the G20 from the Center for Governance of Change, *see Roxana Radu, The G20 and Global AI Governance*, AI FOR DEMOCRACY (July 2024) https://static.ie.edu/CGC/G20_Global_AI_Governance.pdf [<https://perma.cc/7LZ7-XRYX>].

142 *See* G.A. Res. 79/334 (Dec. 5, 2025) [<https://perma.cc/HHX7-VUPW>] (including reference to earlier resolutions on the topic of AI).

143 *G20 South Africa Summit: Leaders’ Declaration*, G20 INFO. CTR. ¶ 44 (Nov. 22, 2025) <https://www.g20.utoronto.ca/2025/251122-declaration.html> [<https://perma.cc/U698-5Z6A>].

144 *Welcome to the Technology Policy Assistance Facility*, G20, <https://g20techpolicy.unesco.org/en> (last visited Mar. 20, 2026) [<https://perma.cc/HF76-NT8L>].

Recommendations of its Council on Artificial Intelligence.¹⁴⁵ This instrument “recommends that [the 38 OECD] Members and [10 additional] non-Members [plus the EU] adhering to this Recommendation . . . promote and implement the following principles for responsible stewardship of trustworthy AI, which are relevant to all stakeholders,” and specified five “underlining principles.”¹⁴⁶

None of these IOs has proposed anything resembling IL on the topic of AI thus far. This apparent timidity among IOs seems consistent with the conventional scholarly narrative that law and the regulation of AI-enhanced digital markets should step aside to allow innovation to unfold.¹⁴⁷ But whether the potential for future high-level principles should be viewed as predictive of future soft or hard IL is less clear than this narrative asserts. Given the role of the G20 in collecting information from IOs on the topic of AI and the G20 ratification of OECD high-level principles, it may be that the G20 will ratify the work of the OECD as well, although possibly without US involvement.¹⁴⁸ But high-level principles do not always harden incrementally into something more prescriptive.¹⁴⁹

National approaches to artificial intelligence have begun to emerge. In her 2021 study of a dozen national strategies, Roxana Radu found “a predominance of ethics-oriented rather than rule-based systems and a strong preference for functional indetermination as deliberate properties of hybrid AI governance.”¹⁵⁰ This consensus may have shifted in the past five years. With a change in Administrations, the US has shifted toward a policy that aims to be only minimally burdensome to AI, at least as it continues rapidly

145 *Recommendations on the Council on Artificial Intelligence*, O.E.C.D. (adopted May 22, 2019, amended May 3, 2024), <https://legalinstruments.oecd.org/en/instruments/OECD-LEGAL-0449#adherents> [<https://perma.cc/6U7H-JEY9>] (referring to these Recommendations as a “legal instrument” similar to “standards developed by the OECD in the areas of privacy, digital security, consumer protection and responsible business conduct”).

146 *Id.* These principles include: (i) “inclusive growth, sustainable development and well-being”; (ii) “respect for the rule of law, human rights and democratic values, including fairness and privacy”; (iii) “transparency and explainability”; (iv) “robustness, security and safety”; and (v) “accountability.” *Id.*

147 For scholarship critical to AI, see, e.g., MARKUS D. DÜBBER, FRANK PASQUALE, & SUNIT DAS, *THE OXFORD HANDBOOK OF ETHICS OF AI* (2020); SAYASH KAPOOR & ARVIND NARAYANAN, *AI SNAKE OIL: WHAT ARTIFICIAL INTELLIGENCE CAN DO, WHAT IT CAN’T, AND HOW TO TELL THE DIFFERENCE* (2024).

148 Konstantin Komaitis, *The G20 is Moving Forward On Global AI Governance—And the US Risks Being Left Out*, NEW ATLANTICIST (Dec. 2, 2025), <https://www.atlanticcouncil.org/blogs/new-atlanticist/the-g20-is-moving-forward-on-global-ai-governance-and-the-us-risks-being-left-out/> [<https://perma.cc/7NDA-937L>].

149 See Block-Lieb & Halliday, *The Macropolitics and Microeconomics of Global Financial Crises: Bankruptcy as a Point of Reference*, *supra* note 101.

150 Roxana Radu, *Steering The Governance of Artificial Intelligence: National Strategies in Perspective*, 40 POL’Y & SOC’Y 178 (2021). Patchwork legislation makes visible what might be described as “the ‘return of the state’ in the AI field . . . but only in a fragmented way.” *Id.* at 181.

to innovate,¹⁵¹ unless AI is viewed as constraining national security interests.¹⁵² Other nations have begun to set more strict regulatory boundaries. For example, China's approach to AI is far more stringent than that of the US.¹⁵³ Distinct from both the US and Chinese rules-based approaches to AI, the EU recently adopted its ethics-oriented Artificial Intelligence Act.¹⁵⁴

IV. CONCLUSION

The history of IL and digital markets set out in this paper suggest several things about the future of AI-driven digital markets:

First, the current lack of IL should not be misunderstood as a global consensus on deregulation. Numerous domestic legislatures have adopted "national strategies" on AI.¹⁵⁵ The EU has enacted its own AI Act.¹⁵⁶ Pressure for coordination through IL may arise, as did pressure for coordination of wired and wireless telegraphy in the past.¹⁵⁷ The UN, G20, and OECD have already begun to recommend foundational principles for AI-empowered digital markets.¹⁵⁸ International pressure for coordination could instead (or in addition) come from industry and other private actors, especially if inconsistencies in domestic legislation is perceived to create obstacles to innovation. Alternatively, it may also come from states acting to protect security or other national interests.

Second, the plethora of IOs currently involved in observing AI technology and the national and international strategies regarding this technology need not be viewed as problematic. There is a tendency for scholars of IL, IO, and IR to view pluralism as equivalent to fragmentation

151 Exec. Order No. 14,179, 90 Fed. Reg. 8741 (Jan. 23, 2025); Exec. Order No. 14,365, 90 Fed. Reg. 58499 (Dec. 11, 2025).

152 See, e.g., Secretary of Defense, *Memorandum for Senior Pentagon Leadership Commanders of the Combatant Commands Defense Agency and Dow Field Activity Directors: Artificial Intelligence Strategy for the Department of War* (Jan. 9, 2026), <https://media.defense.gov/2026/Jan/12/2003855671/-1/-1/0/ARTIFICIAL-INTELLIGENCE-STRATEGY-FOR-THE-DEPARTMENT-OF-WAR.PDF> [<https://perma.cc/P2TA-A6E8>]. For discussion and analysis of interaction between the Department of Defense and Anthropic, see Gideon Lewis-Kraus, *The Pentagon Went to War with Anthropic. What's Really at Stake?*, THE NEW YORKER (Mar. 14, 2026), <https://www.newyorker.com/news/annals-of-inquiry/the-pentagon-went-to-war-with-anthropic-whats-really-at-stake> [<https://perma.cc/9DG7-54BY>].

153 See, e.g., Lin Zhu et al., *AI Policy Models in China and the United States: A Multi-Level Comparative Analysis of Policy Convergence and Divergence*, 27 J. COMPAR. POL'Y ANALYSIS 524 (2025); Xuechen Chen & Lu Xu, *State, Society, and Market: Interpreting the Norms and Dynamics of China's AI Governance*, 59 COMPUT. L. & SEC. REV. 1 (2025).

154 Commission Regulation 2024/1689, 2024 O.J. (L. 1689).

155 For discussion of a range of these strategies, see Radu, *Steering The Governance of Artificial Intelligence: National Strategies in Perspective*, *supra* note 150; Radu, *The G20 and Global AI Governance*, *supra* note 141.

156 See Commission Regulation 2024/1689, *supra* note 154.

157 See *supra* notes 30-31, 34-36 and all accompanying texts.

158 See *supra* notes 140-49 and all accompanying texts.

but, so far at least, IOs have coordinated on the topic of AI. This coordination is more likely to mean that IOs are working toward common goals (perhaps as set out in high-level principles) than that they will inefficiently work in silos or, worse yet, at cross-purposes.

Moreover, coordinated action among a plurality of IOs may constitute a sufficient statement of global consensus even in the absence of IL. Although IL has conventionally been viewed as necessary to thwart (rogue?) unilateral national action, the historical account in this paper demonstrates that law-like norms are important and potentially sufficient. Norms have been demonstrated to be important, for example, with the development of high-level principles or recommendations that create a useful checklist for incremental action.¹⁵⁹ UNCITRAL demonstrated this with the longstanding incremental progress they reached on electronic and digital documents, beginning with their Recommendation in 1985 and continuing to date.¹⁶⁰ Similarly, the G20, working together with the OECD or FSB or other entities, also relies on this method of work.¹⁶¹

Working incrementally from statements of law-like norms to some form of IL can be slow but effective. High-level principles are easier to negotiate when topics – like central banking – are situated closely to nations' sovereign claims. Although consensus on high-level principles may not always lead to development of other, stronger international instruments or even statements of practice, this sort of vertical incrementalism may be unnecessary where statements of principle codify existing global norms or prompt global practices to settle in alignment with such statements.¹⁶² Working in this way can also avoid mistakes like that of UNCITRAL in focusing on PKI technology in its e-Signature Model Law. It is important to note, however, that even when international law reform got ahead of digital technology, that law did not obstruct markets (as the conventional literature contends). Instead, markets simply engineered around the law and rendered it irrelevant.¹⁶³

The history set out above demonstrates that there is another possibility: guidance through high-level principles may end up providing mere window dressing and an excuse to stop further, more difficult work on a policy project; but so too might soft and even hard international laws. High-level principles are not uniquely unenforceable. All sorts of IL and law-like norms are also mostly unenforceable. Whether they are followed in practice,

159 For discussion of incrementalism in international commercial law, see Susan Block-Lieb & Terence C. Halliday, *Incrementalisms in Global Lawmaking*, 32 BROOKLYN J. INT'L L. 1 (2007).

160 See *supra* notes 45-77 and all accompanying texts.

161 See, e.g., *supra* notes 83-77 and all accompanying texts.

162 For further explication of incremental development of international laws, see Block-Lieb & Halliday, *supra* note 101.

163 See *supra* note 62 and all accompanying texts.

has less to do with their formality and more to do with the social and economic cohesion they inspire.

Lawmaking through an incremental, iterative process may be especially difficult with AI, since this technology is still emerging and growing far more quickly than policymakers are used to. Reports that were accurate yesterday may be inaccurate tomorrow. This level of change is difficult to keep up with. The speed of these technical developments may explain the current “predominance of ethics-oriented rather than rule-based systems.”¹⁶⁴

Coordinated pluralistic effort may be necessary in the context of AI, given the reluctance of countries, such as the US and China, to join in any initiative toward IL or international norms about AI-centered digital markets. The involvement of the US in international commercial lawmaking has been commonplace since the end of WWII.¹⁶⁵ IL and international norms may be harder to develop if the US is not involved in their development; and may be nearly impossible to develop if the US decides to thwart these coordinative efforts.¹⁶⁶

One way to reinforce business actors’ compliance to IL is to invite their involvement and engagement in the lawmaking process. Hybrid governance has been especially important in the crafting of international commercial law. Business actors’ centrality in this process does not guarantee success in the production of such law, in part because hybridity often results in compromise.¹⁶⁷ Recent scholarship discusses the complexity of the hybridity of AI governance.¹⁶⁸ For example, Roxana Radu found that “[c]orporate representatives were often driving in the drafting process,” and that “industry representatives [often] continue to play an important role” in implementation of the rules on governance in the AI field.¹⁶⁹ This paper

164 Radu, *Steering The Governance of Artificial Intelligence: National Strategies in Perspective*, *supra* note 150, at 178.

165 BLOCK-LIEB & HALLIDAY, *supra* note 44.

166 See, e.g., FARREL & NEWMAN, *supra* note 21.

167 For a consistent argument across distinct issue areas, see Susan Block-Lieb, *Soft and Hard Strategies: The Role of Business in Crafting International Commercial Law*, 40 MICH. J. INT’L L. 433 (2019); BLOCK-LIEB & HALLIDAY, *supra* note 44.

168 For general discussion of the complexity of hybridity, including theory relying on economic sectors distinct from AI, see, e.g., Radu, *The G20 and Global AI Governance*, *supra* note 141; N. CANCLINI, *HYBRID CULTURES: STRATEGIES FOR ENTERING AND LEAVING MODERNITY* (1995); M. Carr, *Public-Private Partnership in National Cyber-Security Strategies*, 92 INT’L AFFAIRS 43 (2016); Benjamin Cashore et. al., *Private Authority and Public Policy Interactions in Global Context*, 15 REG. & GOVERNANCE 1166 (2021); ROXANA RADU, *NEGOTIATING INTERNET GOVERNANCE* (2019); ROXANA RADU, J.M. CHENOU & R. WEBER, *THE EVOLUTION OF GLOBAL INTERNET GOVERNANCE: PRINCIPLES AND POLICIES IN THE MAKING* (2014); Chris Skelcher & Steven Rathgeb Smith, *Theorizing Hybridity: Institutional Logics, Complex Organization, And Actor Identities: The Case of Non-Profits*, 93 PUB. ADMIN. 433 (2015).

169 Radu, *Steering The Governance of Artificial Intelligence: National Strategies in Perspective*, *supra* note 150, at 186, 189 (finding that “the majority of the nations included in this analysis envisioned the creation of special AI Councils or Data Committees to monitor AI adoption and implementation processes”).

demonstrates that business actors' participation in the lawmaking process has tended to produce IL in the form of pro-regulation favorable to business interests.

Moreover, the involvement of business actors in this process cannot be assumed. Business interests may decide they can reach similar results through means other than those involving hybrid governance. Reports of self-regulation, as well as purely private standard-setting initiatives pertaining to AI and AI ethics, demonstrate the breadth and depth of engagement on this front.¹⁷⁰ But purely privately produced standards also have limitations. Private standards are not easily enforced against non-compliant actors; they are easily evaded, as coded engineering can simply be recoded. Enforcing IL or even law-like norms against non-compliant AI may sound impossible, but it misses the point of human responsibility for the development and emergence of AI.

AI may well present distinct issues for international commercial lawmaking. But AI is not unique. The history of the digitalization of global trade has a lot to say about it. The claim that international regulation of AI will undermine its full innovative potential ignores history. The conventional narrative also misses the elegance and humanity embedded in most high-level principles on the topic.

Is the globe half full or half empty? Only time will tell.

¹⁷⁰ See *AI Ethics Guidelines Global Inventory*, *supra* note 136.