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Governing Digital Trade

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Abstract: As global data flows and digital technologies transform international trade, governments and regulators have to determine how to benefit from these developments while maintaining the integrity of their domestic regulations. Currently, governments are increasingly restricting global data flows and requiring data localization, undermining the economic benefits of digital trade. To address this trend will require a system of digital trade governance that has two key elements. One element is new digital trade rules, some of which exist in the WTO and others which are being developed in free trade agreements. The other is international regulatory cooperation to develop standards and mutual recognition agreements in areas such as privacy and consumer protection that gives domestic regulators confidence that allowing data to leave their jurisdiction will not undermine achievement of domestic regulatory goals. In the absence of such regulatory cooperation, governments are likely to continue to restrict data flows, relying on the exceptions provisions to their digital trade commitments.

1. Introduction

The internet and the ability to move data freely across borders increasingly underpins international trade and economic growth, but these opportunities are being put at risk by data localization requirements that restrict cross-border data flows.

The use of data, including data-based digital technologies such as cloud computing and Artificial Intelligence (AI) increasingly influences economy-wide growth and trade. The McKinsey Global institute estimates that in 2014 global data flows were more valuable than trade in goods,[1] and by 2030, AI could raise global GDP by over $15 trillion.[2] In the US, digital trade is estimated to have

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[1] McKinsey & Company (2015), *By 2025, Internet of Things Applications Could Have US$11 Trillion Impact*, www.mckinsey.com/mgi/overview/in-the-news/by-2025-internet-of-things-applications-could-have-11-trillion-impact.

[2] Price Waterhouse Coopers (2017), 'Sizing the Prize', www.pwc.com/gx/en/issues/analytics/assets/pwc-ai-analysis-sizing-the-prize-report.pdf (accessed 5 January 2019).

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raised US GDP by up to 4.8% in 2014,[3] and the majority of these gains have been realized in non-IT sectors, underscoring how it is the use, rather than the production of digital technologies, that matters most.

This paper focuses on the opportunities arising from the data-driven transformation of international trade and the system of governance that is needed to maximize the opportunities of digital trade. There are four key areas where trade is being transformed and that are elaborated on below. First, the internet enables trade in services, whether it be, for example, the online provision of IT, professional or financial services, or new digital services such as cloud computing. A related development is the transformation by data flows are transforming trade in goods into trade in services. For example, additive manufacturing or 3D printing, which relies on connectivity and transfers of information, turns trade in manufactured goods into a service – trade in a design – that is printed locally.[4] Second, data capture and use are also allowing businesses to add value to traditional goods exports – part of the so-called servitization of manufacturing.

Third, the globalization of the internet and cross-border data flows are also transforming trade by enabling small businesses and developing-country firms to participate in the global economy in ways that were not previously possible. Internet platforms such as eBay, Etsy, and Alibaba provide small businesses with access to customers globally, and, combined with online financial payment options and access to delivery services, allow for an increasingly seamless cross-border e-commerce experience. Fourth, global value chains (GVCs) are also enabled by the internet and global data flows. Internet-based voice communications, such as Skype or Google Hangout, enable global coordination of production, and radio frequency identification devices (RFID) are used to manage complex logistic chains.

As digital trade expands, governments have two key challenges. The first is to maximize the opportunities from data flows for trade and the impact of data on growth and jobs. The second related challenge is to manage the impact of cross-border data flows on the achievement of other goals, such as the protection of privacy, cybersecurity, or the need to access data for law enforcement purposes.[5] For instance, domestic privacy standards can be undermined when personal data are sent to jurisdictions with lower levels of privacy protection. Increasingly, governments are turning to data localization requirements in order to effectively maintain domestic standards from being undermined by cross-border data flows.[6] For

[3] United States International Trade Commission (2014), 'Digital Trade in the US and Global Economies', Part 2, Investigation 332–540, Pub. No. 4485, August 2014.

[4] S. Miroudot and C. Cadestin (2017), 'Services in Global Value Chains: From Inputs to Value-Creating Activities', OECD Trade Policy Paper 197, p. 16.

[5] J. P. Meltzer (2013), 'The Internet, Cross-Border Data Flows and International Trade', *Issues in Technology Innovation*, No. 22, February 2013.

[6] M. F. Ferracane (2017), 'Restrictions on Cross-Border Data Flows: A Taxonomy', ECIPE Working Paper No. 1/2017.

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instance, the EU General Data Protection (GDPR), which covers EU privacy standards and the conditions under which processing of personal data is allowed, restricts cross-border transfers of personal data to jurisdictions that do not have a level of privacy protection equivalent to the EU.[7] Other governments are requiring data to remain local in the belief this will improve cybersecurity.[8] Data localization is also being driven by protectionist goals, such as the desire to protect domestic companies from foreign competition.

Data localization measures have domestic and international costs. Domestically, data localization reduces access to data and digital technologies. Data localization measures may also be counterproductive. For instance, requiring data localization to address cybersecurity concerns can increase data vulnerability by requiring data to be kept in a single jurisdiction, making it easier to target and possibly preventing data back-ups in globally distributed data centers. Data localization also raises the costs of access to, and use of, data, thereby reducing gains from digital trade.[9,10]

Data localization laws also affect businesses and people in other countries in various ways. For one, data localization is a cost that falls disproportionately on digital exporters who are required to meet the data localization requirements, and these costs are particularly acute for small and medium-sized enterprises. The GDPR requirement that data importing countries have essentially equivalent data privacy protection as the EU replicates the EU's preference for privacy and the trade-off in GDPR between privacy protection and the opportunities from digital trade; an outcome which may be odds with how other countries would prefer to protect privacy and engage in digital trade.[11]

Data flow restrictions can also undermine the value of WTO members' GATS services commitments. For instance, where WTO members have scheduled a GATS commitment, they must also allow the data flow to deliver the service.[12] Yet localization measures can reduce access to, or raise the cost of transferring, such data. Finally, the cost of data localization measures is also additive in that

[7] EU General Data Protection Regulation, 27 April 2016, L 119/1, 679, Article 45; see also *Schrems* v. *Data Protection Commissioner* [2014] I.E.H.C. 310, para. 73, where the CJEU found that a finding of adequacy requires other countries to have in place a privacy regime that is 'essentially equivalent' to that of the EU.

[8] J. P. Meltzer and P. Lovelock, 'Regulating for a Digital Economy: Understanding the Importance of Cross-Border Data Flows in Asia', Brookings Working Paper 113, March 2018.

[9] M. Bauer *et al.*, 'The Costs of Data Localisation: Friendly Fire on Economic Recovery', ECIPE Occasional Paper No. 3/2014.

[10] A. B. Bernard, J. B. Jenson, S. J. Redding, and P. K. Schott (2007), 'Firms in International Trade', *Journal of Economic Perspectives*, 21(3): 105–130.

[11] A. Mattoo and J. P. Meltzer (2018), 'International Data Flows and Privacy: The Conflict and Its Resolution', *Journal of International Economic* Law, 21(4): 760–789.

[12] WTO Panel Report, *United States – Measures Affecting the Cross-Border Supply of Gambling and Betting Service*, WT/DS285/AB/R, para. 6; WTO Appellate Body Report, *China – Measures Affecting Trading Rights and Distribution Services for Certain Publications and Audiovisual Entertainment Products* (*China–Audiovisuals*), WT/DS363/AB/R (21 December 2009), para. 364.

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each new data localization requirement contributes towards breaking the internet, balkanizing and thereby reducing the types of information, data, and digital trade that is possible.[13]

The potentially significant economic opportunities of digital trade and the costs of restrictions on data flows underscores the need for mechanisms to govern digital trade. Here, the World Trade Organization (WTO) rules are relevant.[14] WTO rules can help address data flow restrictions and facilitate digital trade in goods that are sold online. However, as the WTO rules were developed in the early 1990s, largely pre-internet, these rules have limits. Since 2003, governments have also been introducing digital trade rules in free trade agreements.[15] These rules remain patchwork but if expanded globally would be an important element of digital trade governance. A parallel agenda of international regulatory cooperation is also required if the current trend towards restricting global data flows is to be addressed and an effective digital trade governance mechanism is to emerge.

Section 2 of this paper looks at the importance for economic growth and trade of cross-border data flows. Section 3 looks more closely at some of the key digital technologies that rely on the global internet and cross-border data flows, and their impact on economic growth and trade. Section 4 discusses how the internet and data are transforming international trade. Section 5 provides an overview of barriers to digital trade. Section 6 discusses the relevance of WTO rules to digital trade, focusing on the relevance of the GATS. This section also provides an overview of the development of digital trade rules in free trade agreements. Section 7 provides an overview of the international regulatory cooperation needed to govern digital trade. Section 8 concludes.

2. The economic value of digital trade

Currently, approximately half of the world is online. Between 2005 and 2021, global internet traffic will have increased 127-fold. Internet access is also increasingly happening using mobile devices. By 2021, the number of devices connected to the internet will be triple the global population.[16] The developments have underpinned enormous and exponential growth in the production and use of data globally. For instance, the amount of data produced globally is expected to

[13] A. Chander and U. P. Le (2015), 'Data Nationalism', *Emory Law Journal*, 64: 677.

[14] M. Burri (2017), 'The Governance of Data and Data Flows in Trade Agreements: The Pitfalls of Legal Adaptation', *U.C.Davis Law Review*, 51: 65–133; A. D. Mitchell and N. Mishra (2018), 'Data at the Docks: Modernising International Trade Law for the Digital Economy', *JETLaw*, 20: 1073, 1095.

[15] M. Wu (2017), 'Digital Trade-Related Provisions in Regional Trade Agreements: Existing Models and Lessons for the Multilateral Trade System', RTA Exchange, Geneva: ICTSD and IDB, November 2017, p. 6.

[16] Cisco (2017), 'The Zettabyte Era: Trends and Analysis', White paper, www.cisco.com/c/en/us/solutions/collateral/service-provider/visual-networking-index-vni/vni-hyperconnectivity-wp.pdf.

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increase from 12 zertabytes in 2015 to 47 zetabytes and to over 160 zetabytes in 2025.[17]

The production and use of data are leading to the digitization of economies and trade. From a macroeconomic perspective, these innovations should improve efficiency, innovation, and increase productivity.[18] Yet, productivity growth remains low in developed (and many developing) economies, despite these digital innovations. There is a debate underway as to why productivity numbers in the US and globally remain low.[19] The significance of this issue was underscored by Paul Krugman's observation that 'productivity isn't everything but in the long run it is almost everything.'[20] This is not the place to discuss the productivity debate in any detail, but the reasons for this lack of aggregate productivity growth so far is in part due to mismeasurement of the digital phenomenon,[21] weak aggregate demand, and slow uptake by many firms of digital technologies.[22] Eric Brynjolfsson argues that a key reason for the lack of productivity growth is that it takes time for an economy to incorporate and make effective use of new technologies, particularly complex ones with economy-wide impacts such as AI.[23] This includes time to build a large enough capital stock to have an aggregate effect and for the complimentary investments needed to take full advantage of AI investments, including access to skilled people and business practices.[24] Assessing the economic importance of digital trade also has to contend with the limitations of the available trade data. Governments and international organizations do not collect regular, comprehensive data on the impact of the internet and data on growth, jobs, and trade. Official statistics that do capture cross-border data flows are often limited to the tech-related sectors of the economy.

There is also the challenge of quantifying the role of data in trade given that many cross-border data transfers do not involve money changing hands as

[17] 'Volume of data/information created worldwide from 2005 to 2025 (in zetabytes)', www.statista.com/statistics/871513/worldwide-data-created/ (accessed 15 January 2019). A Zetabyte is a trillion gigabytes.

[18] World Bank (2016), 'World Development Report 2016: Digital Dividends', World Bank, Washington, DC; Bernard *et al.* (2007), supra note 10, 105–130.

[19] R. J. Gordon (2012), 'Is US Economic Growth Over? Faltering Innovation Confronts the Six Headwinds', Working Paper 18315, National Bureau of Economic Research; P. M. Romer (2008), 'Economic Growth', Library of Economic and Liberty, www.econlib.org/library/Enc/EconomicGrowth.html.

[20] P. Krugman (1997), *The Age of Diminished Expectations: US Economic Policy in the 1990s*, Cambridge, MA: MIT Press.

[21] D. M. Byrne, J. G. Fernald, and M. B. Reinsdorf (2016), 'Does the United States Have a Productivity Slowdown or a Measurement Problem?', Brookings Papers on Economic Activity (Spring), 109; C. Syverson, 'Challenges to the Mismeasurement Explanations for the U.S. Productivity Slowdown', NBER Working Paper 21974, February 2016.

[22] J. Remes *et al.* (2018), 'Solving the Productivity Puzzle: The Role of Demand and the Promise of Digitization', McKinsey Global Institute, February.

[23] E. Brynjolfsson *et al.* (2017), 'Artificial Intelligence and the Modern Productivity Paradox: A Clash of Expectations and Statistics', NBER Working Paper 24001, October 2017 (revised December 2017), p. 10.

[24] Ibid.

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information moves from one country to another. Movement of data from Country A to Country B is usually accomplished by copying the data, which makes cross-border data flows hard to count unlike traditional trade statistics based on imports and exports.[25]

Some studies have estimated the economic importance of the internet for growth and trade using economic models. As noted, McKinsey estimated that in 2014 the free flow of data contributed US$2.8 trillion to the global economy,[26] a figure that could reach US$11 trillion by 2025.[27] A study by the United States International Trade Commission (USITC) found that in the US in 2014, digital trade (within the US and globally) raised US GDP by 3.4 to 4.8% by increasing productivity and lowering the costs of trade; it has also increased wages and has likely contributed to as many as 2.4 million new jobs.[28] A 2018 study by the US Bureau of Economic Analysis concluded that from 2006 to 2016 the US digital economy grew at an average annual rate of 5.6%, outpacing the average annual rate of growth for the US economy overall by 1.5%; accounted for 6.5% of US output, 3.9% of employment, and 6.7% of employee compensation.[29]

Another approach to getting a sense of the importance of data for trade has been to determine which services are 'digitally deliverable' services that could be provided online. The United National Conference on Trade and Development (UNCTAD) found that some 50% of all traded services are enabled by the technology sector, including cross-border data flows.[30] Somewhat similarly, the USITC estimated that, by the early part of this decade, US exports globally of digitally deliverable services were already 61% of total US services exports and 53% of services imports.[31] EU exports and imports of digitally deliverable services were at similar levels.[32]

[25] US Department of Commerce (2016), 'Measuring the Value of Cross-Border Data Flows', www.ntia.doc.gov/files/ntia/publications/measuring_cross_border_data_flows.pdf, 2.

[26] McKinsey & Company (2016), *Digital Globalization: The New Era of Global Flows*, www.mckinsey.com/business-functions/digital-mckinsey/our-insights/digital-globalization-the-new-era-of-global-flows.

McKinsey & Company (2015), *By 2025, Internet of Things Applications Could Have US$11 Trillion Impact*, www.mckinsey.com/mgi/overview/in-the-news/by-2025-internet-of-things-applications-could-have-11-trillion-impact.

[27] Ibid.

[28] United States International Trade Commission (2014), 'Digital Trade in the US and Global Economies', Part 2, Investigation 332–540, Pub. No. 4485, August 2014; D. Castro (2013), 'The False Promise of Data Nationalism', Information Technology & Innovation Foundation (ITIF), www2.itif.org/2013-false-promise-data-nationalism.pdf.

[29] K. Barefoot *et al.* (2018), 'Defining and Measuring the Digital Economy', Bureau of Economic Analysis Working Paper, 15 March 2018.

[30] United Nations (2017), 'Digitalization, Trade and Development', UNCTAD Information Economy Report 2017, United Nations Publications, Switzerland, p. 30.

[31] D. Castro and A. McQuinn, 'Cross-Border Data Flows Enable Growth in All Industries', ITIF Report, February 2015, 1; USITC (2014), 'Digital Trade in the US and Global Economies, Part 2', Pub. No. 4485, August 2014, p. 29 .

[32] J. P. Meltzer (2014), 'The Importance of the Internet and Transatlantic Data Flows for US and EU Trade and Investment', Brookings Institution, www.brookings.edu/research/the-importance-of-the-internet-and-transatlantic-data-flows-for-u-s-and-eu-trade-and-investment/.

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3. Using data in growth and trade

As can be seen, despite a lack of specificity of the data, the digital trade opportunities are potentially large. The following explains in more detail how the digitization of economies and of international trade has the potential to drive a new wave of productivity-enhancing innovation and its implications for international trade. Understanding the role of data requires expanding our horizons as to the potential and value of data. Building a digital economy is not merely about transforming physical goods and services into digital products. In a digital economy, data can be the product; data can be used to produce digital goods and services, and can be a source of information that leads to further action.[33]

As noted, the impact of data and the global internet is not limited to the IT sector but is driving broad economic and trade growth in industries such as manufacturing, mining, and agriculture. According to the USITC, so-called digitally intensive industries in the US include content industries, communications, finance and insurance, retail, health care, education, and manufacturing.[34] Take the finance industry, which relies on the ability to transfer data across borders in order to complete electronic transactions and make money transfers,[35] or the insurance industry which collects data globally to better assess risk and thereby offer more cost-effective and targeted insurance services, while telecommunications companies collect data including geo-location data in order to provide mobile telecom services.[36]

Data are also transforming traditional manufacturing into smart manufacturing that is focused on digitization of the entire manufacturing enterprise from early product design through to maintenance at the product's end-of-life, using advanced sensors and big data analytics to achieve faster lifecycles and collaborative and connected supply chains.[37] A key element of smart manufacturing is the role of data in adding value to products. This is underpinning new business models focused on providing customers with solutions as well as products. For example, Xerox – a company that makes printers – now positions itself as a document solution company through the addition of maintenance and document design services. Rolls Royce uses sensors to collect data from its jet engines to better tailor maintenance and minimize downtime while offering aircraft leases based on hours in the air. Even in sectors such as mining and agriculture, data are increasingly valuable as they enable firms to provide value-added solutions to their customers.

[33] Australian Computer Society (2017), 'Data Sharing Frameworks', Technical White Paper (ed. Ian Opperman), p. 9.

[34] USITC (2014), supra n. 3, p., 275.

[35] D. Gozman and J. Liebenau (2015), 'The Role of Big Data in Governance: A Regulatory and Legal Perspective of Analytics in Global Financial Services', SWIFT Institute Working Paper No. 2014-009, 6.

[36] F. Calabrese, L. Ferrari, and V. Blondel (2014), 'Urban Sensing Using Mobile Phone Network Data: A Survey of Research', *ACM Computing Surveys*, 47(2): Art. 25.

[37] L. Yu *et al.* (2016), 'Current Standards Landscape for Smart Manufacturing Systems', NIST, NISTIR 8107, February 2016.

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Caterpillar, which sells large mining equipment, has developed CAT MineStar to collect real-time data analytics on grading accuracy, load quantities, and quality of work to help customers minimize fuel costs and downtime and improve productivity of CAT mining equipment.[38] In the agricultural sector, sensors combined with data aggregation are being used to trace a product from the farm to the market, giving consumers information on the farmer and time the product was harvested.

These are only the beginning of the data-driven innovation potential. Driverless cars are close to becoming a reality, robotics are becoming widespread in industry, and AI is rapidly advancing, helped along by increasingly large data sets and computing power.[39]

3.1 Big data

Much of what constitutes the digital economy and digital trade is underpinned by big data. Big data refers to data sets with sizes that are beyond the ability of commonly used software tools to capture, curate, manage, and process within a tolerable degree of time.[40] According to one estimate, 90% of the data in the world today was created in the last two years.[41] Data are being continuously generated by people and businesses and from sensors embedded in products from cars to mobile devices.

According to an OECD report, big data has the potential to be a key driver of innovation, productivity growth, and economic competitiveness.[42] One driver of large data sets is the collection globally of discrete local data sets, which requires cross-border data flows. The economic and trade opportunities from big data come from analysing the data to better understand the business environment to create new products and respond to changes in usage patterns as they occur.[43] A related development is the use of the internet to interact with customers and to engage third parties in the co-design of products. For instance, UK online grocer Ocado elicits consumer feedback to better design products.[44]

[38] Caterpillar (2018), www.cat.com/en_US/by-industry/mining/articles/improving-safety-and-productivity.html.

[39] McKinsey Global Institute (2018), 'The Promise and Challenge of the Age of Aritificial Intelligence', October 2018, www.mckinsey.com/~/media/McKinsey/Featured%20Insights/Artificial%20Intelligence/The%20promise%20and%20challenge%20of%20the%20age%20of%20artificial%20intelligence/MGI-The-promise-and-challenge-of-the-age-of-artificial-intelligence-in-brief-Oct-2018.ashx.

[40] C. Snijders *et al.* (2012), 'Big Data: Big Gaps of Knowledge in the Field of Internet Science', *International Journal of Internet Science*, 7(1): 1–5.

[41] IBM (2017), '10 Key Marketing Trends in 2017', http://comsense.consulting/wp-content/uploads/2017/03/10_Key_Marketing_Trends_for_2017_and_Ideas_for_Exceeding_Customer_Expectations.pdf.

[42] OECD (2015), *Data Driven Innovation: Big Data for Growth and Well-Being*, Paris: OECD Publishing.

[43] T. H. Davenport *et al.* (2012), 'How "Big Data" Is Different', *MIT Sloan Management Review*, 52 (1): 44, https://sloanreview.mit.edu/article/how-big-data-is-different/.

[44] J. Bughin *et al.* (2016), 'Digital Europe: Pushing the Frontier, Capturing the Benefits', McKinsey Global Institute, June 2016.

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Another development here is the use of open online innovation platforms to source ideas and determine their commercial viability before moving on to physical production – all of which rely on the collection of data (often globally) and its analysis. For instance, BMW has created an 'idea management system' to evaluate ideas submitted through its 'virtual innovation agency'. This has reduced the time taken to identify high-potential ideas by 50% and led the company to annually incorporate two to three ideas from this open innovation effort into new car models.[45]

Big data analytics can also be used to improve health outcomes. For instance, collecting data on larger and global populations can reduce the time taken to bring new drugs to market, as any problems can be more rapidly and accurately identified and benefits proven. At the research end, AstraZeneca has established an Open Innovation platform that brings together academics and non-profit organizations globally to participate in drug discovery. Big data could also be used to provide better health care by enabling health interventions that are more evidence based.[46] The McKinsey Global Institute estimates that embracing such developments could reduce US national healthcare expenditures by about 8%.[47]

3.2 Cloud computing

Cloud computing often relies on cross border data flows to provide cheaper on-demand computing capacity that can be scaled and paid for as needed.[48] This includes basic cloud services such as email, software and access to processing, storage, and other computing resources. Cloud computing reduces the need for upfront investment in IT and the associated costs of maintaining often underutilized computing power.[49] In effect, cloud computing turns a fixed IT cost into a variable operating cost.[50] By providing computing capacity on-demand, cloud computing enables businesses to avoid the often large upfront capital costs of IT investments. This is of particular value for small businesses and startups that face higher costs,[51] as cloud computing helps level the playing field by giving small firms access to the type of computational power that was previously available only to large corporations. Computing using sophisticated cloud providers such as Amazon, Google, and Microsoft is also often more secure than relying on in-house

[45] J. Manyika *et al.* (2011), *Internet Matters: The Net's Sweeping Impact on Growth, Jobs and Prosperity*, p. 80, www.mckinsey.com/industries/high-tech/our-insights/internet-matters.

[46] F. de Costa (2014) 'Big data in biomedicine', *Drug Discovery Today*, 19(4): 433–440.

[47] Manyika supra note 45.

[48] C. S. Yoo (2015), 'Cloud Computing: Architectural and Policy Implications', Institute for Law & Economics University of Pennsylvania Law School Research Paper No. 11-15, pp. 5–6.

[49] F. Etro (2009), 'The Economic Impact of Cloud Computing on Business Creation, Employment and Output in Europe', *Review of Business and Economics*, 54(2): 179–208.

[50] Ibid., at 179–208.

[51] eBay (2016), 'Small Online Business Growth Report', January 2016.

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IT.[52] Cloud computing also underpins the capacity for people to work remotely, using laptops to access software and files stored in the cloud. This can also facilitate global collaboration, sharing, and innovation.

The range of uses of cloud computing underscores the importance of connectivity and cross-border data flows.

3.3 The internet of things

The internet of things (IoT) refers to the ability of everyday objects to connect to the internet and to send and receive data.[53] The IoT also generates a large amount of data and collecting such data and turning them into knowledge is a key benefit.[54] Again, maximizing the opportunities of the IoT requires the ability to move data across borders – to collect data in one country, combine them with data from other countries, and to analyze them in a third country (another driver of big data).

The IoT has applications across industries. For example, businesses already use sensors in factories to increase the efficiency of operations to track goods and manage distribution centers, reducing delivery times and overheads.[55] For example, Vestas – the Danish wind turbine company – collects data from globally situated turbines and analyses them in Denmark to better understand the impact of temperature, wind speeds, and air pressure on turbine performance, and to make precise service and maintenance schedules. A system of global data also allows Vestas to manage its global supply chains, including by alerting warehouses of needed parts that can then be shipped to the turbines in need of repair.

Sensors will also contribute to improved health outcomes. For instance, people wearing sensors transmit a steady stream of data on vital health signs that allow for the identification of health problems earlier and to target responses. The IoT is also giving businesses the ability to better understand customer needs and to improve the value of their products. For example, French insurer AXA's smart home hub uses the IoT to give households real-time protection against burglars, fire, floods, and gas leaks.

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According to the Mckinsey Global Institute, 'virtually every type of cross-border transaction now has a digital component'.[56] The open nature of the internet and

[52] M. Graf, J. Hlavka, and B. Triezenberg (2016), 'A Change is in the Air, Emerging Challenges for the Cloud Computing Industry', Rand Working Paper WR-1144, March 2016, p. 19.

[53] US Federal Trade Commission Staff Report (2015), 'Internet of Things, Privacy and Security in a Connected World'.

[54] Chun-Wei Tsai *et al.* (2014), 'Data Mining for Internet of Things: A Survey', *IEEE Communications Surveys & Tutorials*, 16(1): 77–97.

[55] T. H. Davenport *et al.* (2012), 'How "Big Data" Is Different', *MIT Sloan Management Review*, 52 (1): 44.

[56] McKinsey & Company (2016), *Digital globalization: The New Era of Global Flows*.

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the ability to move data globally mean that even when activity appears local, cross-border data flows may still be involved. For instance, data stored in a data facility in Chile might still be backed-up in the US.[57]

4.1 *Defining digital trade*

Despite the importance of data for trade, there is no commonly agreed definition of what is digital trade. The WTO Work Program on Electronic Commerce limited its consideration to 'the production, distribution, marketing, sale, or delivery of goods and services by electronic means'.[58] The USITC developed a broader definition of digital trade as 'US domestic commerce and international trade in which the internet and internet-based technologies play a particularly significant role in ordering, producing, or delivering products and services.'[59] An even broader definition includes how cross-border data flows enable digital trade, either through the cross-border movement of data flows themselves as a form of trade or through productivity gains from using digital services that make firms more competitive domestically and overseas.[60] This paper takes a broad view of what is digital trade. The following outlines the key elements of digital trade.

4.2 *Expanding trade using digital platforms*

Businesses can have their own website or use digital platforms to become global. This is about purchasing online and having the goods delivered offline. The ancillary services that platforms provide, such as consumer ratings and online payments, build trust and facilitate the international transactions. Already, around 12% of global goods trade is via international e-commerce.[61]

Digital platforms provide a particular opportunity to overcome barriers that have prevented participation by small businesses in international trade.[62] For instance, having a website gives small businesses an instant international presence without having to establish a physical presence overseas – often not an economically viable option. Access to cost-effective data-based services is another important enabler for small businesses, including online advertising and communication services, cloud computing, and access to critical knowledge and information on

[57] D. Greer (2013), 'Big Data Security, Privacy Concerns Remain Unanswered', *Computerworld*, 3 December 2013.

[58] WTO (1998), Work Programme on Electronic Commerce (1998), WT/L/274, 30 September 1998.

[59] USITC (2014), supra n. 22, p. 29.

[60] J. P. Meltzer (2016), 'Maximizing the Opportunities of the Internet for International Trade', E15 Expert Group on the Digital Economy – Policy Options Paper, E15 Initiative, Geneva, International Centre for Trade and Sustainable Development (ICTSD) and World Economic Forum.

[61] Ibid.

[62] J. P. Meltzer (2014), 'Supporting the Internet as a Platform for International Trade: Opportunities for Small and Medium-Sized Enterprises and Developing Countries', Brookings Working Paper 69, February 2014.

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foreign markets.[63] In fact, the challenges involved in obtaining access to information on foreign markets and any regulations are a key barrier to small businesses engaging in international trade.[64]

Small businesses in developed and developing economies also use internet services such as YouTube and social networking sites such as Facebook to advertise and expand their customer base.

Perhaps the most immediate trade opportunity for small businesses is using internet platforms such as eBay, Mercardo Libre, or Alibaba. For instance, small businesses using eBay to sell goods almost immediately become global players. Take the EU for example, where only 12% of small businesses in retail are engaged in international trade, while 93% of EU firms on eBay have cross-border sales, and these are not only within the EU.[65] For example, in France, 60% of small businesses on eBay sell to four continents.

4.3 Digital services trade

Services can be purchased and consumed online. This is particularly true for IT, professional, financial, retail, and education services.[66] As noted, new digital services, such as cloud computing, have also been developed, and are becoming crucial business inputs.[67] Moreover, some goods that were imported are now being traded as digital services, e.g., software, books, and movies.

4.4 Bundling digital services with goods exports

As noted, data collection and analysis are allowing new services (often also provided online) to add value to goods exports. For example, data collected from sensors on mining and farming equipment allow manufacturers to improve the efficiency of the equipment and thereby increase its value .

Digital services are also increasingly key inputs into manufacturing processes. This includes commercial services such as research and development (R&D), design, marketing, and sales. A 2016 PricewaterhouseCoopers survey of more than 2,000 companies identified data and data analytics as the key for successful transformation to smart manufacturing.[68] This reflects the importance of digital

[63] OECD (2009), 'Top Barriers and Drivers to SME Internationalization', Report by the OECD Working Party on SME and Entrepreneurship, OECD, Paris.

[64] B. Schoonjans, P. Van Cauwenberge, and H. Vander Bauwhede *et al.* (2013), 'Formal Business Networking and SME Growth', *Small Business Economics*, 41: 169–181.

[65] Ebay (2015), 'Empowering People and Creating Opportunity in the Digital Single Market', eBay report on Europe's potential, October 2015.

[66] United States International Trade Commission, 'Digital Trade in the US and Global Economies, Part 2, Investigation 332-540', Pub. No. 4485, August 2014, p. 42.

[67] United States International Trade Commission, 'Global Digital Trade 1: Market Opportunities and Key Foreign Trade Restrictions', Pub. No. 4716, August 2017, pp. 58–66.

[68] PricewaterhouseCoopers (2016). 'Industry 4.0: Building the Digital Enterprise', 2016 Global Industry 4.0 Survey.

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services in manufacturing for increasing productivity and the capacity to compete domestically and overseas.[69] Growth in digital trade will also require effective IP protection for content delivered online, as well as a balanced IP framework to enable digital platforms.

4.5 Increased participation in global value chains

For many economies, participation in global value chains (GVCs) is an important avenue for engaging in international trade. More than 50% of trade in goods and over 70% of trade in services is in intermediate inputs.[70] Global data flows underpin GVCs, creating new opportunities for participation in international trade.[71] The global internet and data flows enable businesses to plug into these GVCs to offer their own specific service. However, digital technologies, such as 3D printing could also lead to some re-locating of production.[72] Data and digital technologies are affecting GVC participation in several ways. As noted, in many respects the development of global value chains has been made possible by global connectivity and cross-border data flows that enable communications and can be used to coordinate logistics.[73] Digital services are themselves part of global value chains. There is also a trend to increase the use of imported services inputs in manufactured goods exports, suggesting that digital services are also being traded within GVCs.[74]

5. Digital trade barriers

As the opportunities presented by digital technologies grow, governments and regulators have to determine how to benefit from going digital while maintaining the integrity of their domestic regulations. Against this backdrop, there has been significant growth in data localization measures globally.[75]

There are various forms of data localization. They include measures that do not permit the transfer of data outside national borders; measures that allow cross-border transfers but require a copy to be maintained domestically; and requirements such as to obtain the prior consent of data providers before personal data can be transferred overseas.

[69] B. Hoekman and A. Mattoo (2008), 'Services Trade and Growth', Policy Research Working Paper No. 4461, World Bank, Washington DC; X. Liu, A. Mattoo, Z. Wang, and S.-J. Wei (2017), 'Services Development and Comparative Advantage in Manufacturing', Unpublished manuscript.

[70] OECD (2012), 'Mapping Global Value Chains', TAD/TC/WP/RD(2012)9.

[71] R. Baldwin (2016), *The Great Convergence: Information Technology and the New Globalization*, Boston, MA: Harvard University Press.

[72] K. de Bacher and F. Dotothee (2017), 'The Future of Global Value Chains', OECD Science, Technology and Innovation Policy Papers, 41, July 2017.

[73] E. Helpman (2011), *Understanding Global Trade*, Cambridge, MA: Harvard University Press.

[74] Miroudot and Cadestin (2017), supra n. 4, at 16.

[75] M. F. Ferracane (2017), 'Restrictions on Cross-Border Data Flows: A Taxonomy', ECIPE Working Paper No. 1/2017, p. 2.

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For example, Turkey requires internet payment services, such as PayPal, to store data in Turkey for ten years. Vietnam requires domestic internet service providers (ISPs) to store all data originating within Vietnam for at least 15 days and a recent Decree requires data localization by over-the-top service providers.[76] The Reserve Bank of India has proposed requiring payment system operators to store data locally and is considering requiring localization of data stored in the cloud.[77] Developed countries are also implementing data localization measures. For instance, Australia prevents health data to be transferred overseas.[78]

Data localization measures are being implemented for a range of reasons. Some interventions reflect concerns that moving data outside the country undermines domestic regulatory goals. Take privacy, for instance, where the ability to move personal data to a jurisdiction with lower privacy protection can undermine domestic privacy standards. The EU General Data Protection Regulation (GDPR) which came into effect in April 2018, prohibits businesses that collect personal data in the EU from transferring them outside the EU unless the receiving country has an equivalent level of privacy protection.[79] Some governments take the view that requiring data to be stored domestically can reduce risks of cyber theft. Governments also censor the content that can be accessed online, with such restrictions often justified on moral or religious grounds. In Iran, censorship aimed at creating the 'Halal internet' limits access to content deemed offensive to Islam. China blocks access to 11 of the top 25 global sites among an estimated 3,000 prohibited foreign websites.[80] This is done in part to restrict access to political speech directed at the Chinese Communist Party. Other localization measures are done for commercial reasons. For example, some governments require data to be held locally in order to support a local IT industry or to support the growth of domestic internet champions. China for instance blocks or degrades internet access in part to support the development of local champions. For example, blocking access to Google and Facebook has been to the benefit of Baidu, Renren, and Sina Weibo.

There are also other relevant trade barriers. For instance, domestic licensing or other market access services restrictions affect the ability to deliver services online. A lack of international standards for the development of smart manufacturing can limit the interconnection of distributed manufacturing facilities and

[76] Vietnam Decree No. 72 /2018/NC-CP amending and supplementing Decree No. 72/2013/ND-CP on Internet Services and Online Information; over-the-top refers to services that bypass traditional telecom and media distribution channels – e.g. Skype or Netflix.

[77] Reserve Bank of India Notification, 'Storage of Payment Systems Data', RBI/2017-18/153.

[78] Personally Controlled Electronic Health Records Act 2012, Section 77.

[79] General Data Privacy Regulation Article 45. Personal data can also be transferred under binding corporate rules and standard contractual clauses, and in a limited number of other circumstances, see article 47.

[80] USTR National Trade Estimates Report 2017, pp. 89–90, https://ustr.gov/sites/default/files/files/reports/2017/NTE/2017%20NTE.pdf.

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services, hampering export opportunities. Inefficient customs procedures, barriers to express delivery services, and tariffs also raise the costs of exporting goods that are purchased on digital platforms.[81]

6. Digital governance using international trade law

The economic opportunities of digital trade, the implications for domestic regulation from global data flows, and the negative externalities associated with data localization requirements underscore the need to develop digital trade governance. This section analyzes the extent that WTO rules provide a framework for digital trade governance, along with more recent rules on digital trade in FTAs.

6.1 Digital trade rules in the WTO

The rules of the WTO are relevant for digital trade, even though at the time the WTO was being negotiated in the early 1990s, the internet barely existed. However, WTO rules are limited in their ability to address the range of opportunities and challenges presented by digital trade. The General Agreement on Trade in Services (GATS) is particularly significant given the increasing scope for trade in digital services. This includes cloud computing, internet searches, platforms and digital payment solutions .

The GATS covers all services sectors except for those 'supplied in the exercise of governmental authority'.[82] The GATS also covers four modes of services delivery: (a) from the territory of one member into the territory of another member (mode 1); (b) from the territory of one member to the service consumer of any other member (mode 2); (c) by a service supplier of one member through commercial presence in the territory of any other member (mode 3); and (d) by a service supplier of one member through presence of natural persons of a member in the territory of any other member (mode 4).[83] When it comes to which modes are relevant for digital trade, in *US–Gambling* the panel and Appellate Body held that the cross-border supply of online gambling was a mode 1 service delivery.[84] However, other modes of delivery can be relevant. For instance, in *China–Electronic Payments*, China's mode 3 commitments also covered the delivery of electronic payment services.[85] The WTO Annex on Telecommunications paragraph 5(c) also includes a

[81] Meltzer (2014), supra n. 62.
[82] GATS art. 1(3)(b).
[83] GATS art. 1.2.
[84] Panel Report, *United States – Measures Affecting the Cross-Border Supply of Gambling and Betting Services* (*US–Gambling*, WT/DS285/R (10 November 2004)), paras. 6.285–87; Appellate Body Report, *United States – Measures Affecting the Cross-Border Supply of Gambling and Betting Services*, WT/DS285/AB/R (7 April 2005), para. 215.
[85] WTO Panel Report, *China – Certain Measures Affecting Electronic Payment Services* (*China – Electronic Payments*), WT/DS413/R, para. 7.575.

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commitment to allow services suppliers to use public telecommunications transport networks for the movement of information within and across borders.

Significantly and as noted, GATS modes of delivery are technologically neutral. This means that a mode 1 commitment for instance applies to 'all means of delivery, whether by mail, telephone, internet, etc.', unless otherwise specified in a Member's schedule.[86] The GATS framework contains general obligations that apply to all services, such as the Most-Favored Nation (MFN) commitment. There are also specific GATS commitments that only apply where members have scheduled a commitment. Such commitments are required for market access and national treatment commitments to apply. Moreover, horizontal exceptions to the MFN commitment can also be made and reflected in member's schedules. As a result, whether many of the key GATS commitments apply first requires determining whether the member introducing the trade restriction has scheduled a GATS commitment.[87] Making this assessment in the digital trade context can also require determining whether new digital services such as cloud computing, internet search, or online gaming fit within the classification system for scheduling GATS commitments.

When services were being scheduled during the Uruguay Round in the early 1990s, most WTO members used the UN Provisional Central Product Classification (CPC Prov.) System or the Services Sectoral Classifications List[88] (or a combination of both). The CPC Prov. was finalized in 1991 when the internet barely existed. While the CPC Prov. has since been updated, the older CPC Prov. classification remains the basis for members' GATS commitments. Relevant services sectors for trade in digital services are in telecommunications, audiovisuals, computer and related services, data-based services, and financial services.

Most WTO members have made limited GATS commitments in areas such as banking, insurance, and professional services.[89] In contrast, members have made relatively liberal commitments in areas such as computer services. For example, the EU and many other countries' commitments on computer-related services and database services have no restrictions on market access or national treatment. This liberal attitude may reflect, as noted above, that governments prepared their GATS commitments in the early 1990s, when cross-border digital delivery of search, audiovisuals, cloud computing, and other services had not achieved the scale that exists today.[90]

Yet, the GATS was concluded over 20 years ago and failure to update the services commitments limits the application of this agreement to digital trade

[86] WTO Panel Report, *US–Gambling*, para. 6.285; WTO Appellate Body Report, *China-Audiovisuals*, WT/DS363/AB/R (21 December 2009), para. 364.

[87] WTO Appellate Body Report, *US–Gambling*; WTO Appellate Body Report, *China–Audiovisuals*.

[88] WTO Services Sectoral Classification List (1991).

[89] A. Mattoo and S. Wunsch (2004), 'Pre-empting Protectionism in Services – the WTO and Outsourcing', World Bank Policy Research (2004).

[90] S. Wunsch-Vincent (2006), *The WTO, The Internet and Trade in Digital Products: EC–US Perspective*, Oxford: Hart Publishing, pp. 90–91.

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issues.[91] For instance, it is not clear whether 'new' digital services such as search engines, cloud computing, or online gaming, which did not exist when commitments were scheduled, are nevertheless covered by members' GATS schedules. WTO members have different views on this. The US and the EU are of the view that by focusing on the intrinsic nature of the service rather than the means of delivery that the development of genuinely 'new' services is rare.[92] For instance, according to the EU, cloud computing is a computer service that fits within CPC 843, and the fact that it is delivered over the internet does not change the substance of the service.[93] In a similar vein, Canada has argued that as the CPC is comprehensive and covers all services, then any 'new services' will either map onto existing CPC classifications or fall within the residual 'other' services category.[94]

This view that the CPC Prov. covers new digital services is consistent with the notion of technological neutrality – that GATS scheduled commitments are not negated because the means of delivery changes. As a result, focusing on services end-use, rather than the means of delivery, makes it rare to find a truly 'new' service, or so the argument goes.[95] However, this is not a complete answer as some GATS commitments were not scheduled from an end-use perspective, such as postal and courier service which are based on the nature of the service supplier rather than what is actually being supplied.[96] Canada and the EU in their 2017 FTA include an Annex stating that the national treatment, MFN, and domestic regulation obligations do not apply to 'a measure relating to a new service that cannot be classified in the CPC Prov.[97]

Another issue that arises with respect to classifying services under the GATS is with how to classify businesses that bundle various services to provide an online service.[98] This issue arose in *China–Electronic Payments* where the panel agreed with the United States that the service at issue – electronic payment services for payment card transaction – was an integrated service that consisted of five services integrated to provide a single distinct service.[99] Turning to whether electronic payment services had been scheduled by China as a GATS commitment, the

[91] L. Tuthill (2017), 'Implications of the GATS for Digital Trade and Digital Trade Barriers in Services', *DigiWorld Economic Journal*, 107: 114.

[92] WTO Committee on Specific Commitments, 'Report of the Meeting Held on 18 September 2014, Note by the Secretariat', S/CSC/M/71; see also Shin-yi Pent, 'GATS and the Over-the-Top (OTT) Services – A Legal Outlook', *Journal of World Trade*, 50(1): 10–13.

[93] WTO Committee on Specific Commitments, supra n. 92, para. 1.6.

[94] Ibid., para. 1.3.

[95] R. Zhang (2015), 'Covered or Not Covered: That Is the question', WTO Working Paper ERSD-2015-11, 7 December 2015, p. 9.

[96] Ibid., p. 10.

[97] 'Comprehensive Economic and Trade Agreement between Canada and the European Union and Its Member States', Annex 9-B.

[98] Mitchell, supra note 14.

[99] WTO Panel Report, *China – Electronic Payments*, para. 7.61.

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panel found that all those services necessary to provide the integrated service are included within the relevant GATS sector or subsector.[100]

Having established that a WTO member has restricted data flows needed to deliver a service scheduled under the GATS, it is necessary to determine which GATS obligation such a measure violates. The Appellate Body finding in *US–Gambling* that a complete prohibition on the online supply of gambling services was a 'zero quota' in breach of GATS article XCI:2(a) market access obligation, could mean that a data localization measure that restricts data flows is a zero quota inconsistent with that member's GATS market access commitment.[101] Data localization measures that increase the burden on foreign suppliers such as by requiring a local presence could be inconsistent with the GATS national treatment commitment.[102]

In the event that a prima facie GATS violation is established, the GATS Article XIV exception provision allows WTO members to justify such measures where it is necessary to achieve an enumerated list of public policy exceptions. WTO members are likely to justify data localization measures as being necessary to protect public morals (GATS Article XIV(a)) or as necessary to secure compliance with laws and regulations not inconsistent with the GATS, including those relating to the prevention of deceptive and fraudulent practices (Art XIV(a)(i) and the protection of the privacy of individuals (art. XIV(c)(ii).

The WTO Appellate Body has found that whether a measure is 'necessary' requires 'weighing or balancing' factors including the contribution of the measure to the policy goal, the importance of the common interests, or values protected by the measure as well as the impact on imports.[103] Here is where the contribution of the measure to its objective is assessed. Evidence that data localization can undermine goals such as strengthening cyber security and privacy could support a finding that some data localization measures are not 'necessary'.[104]

In the event that the measure passes this weighing and balancing, the complaining WTO member could then seek to show that there is a less trade restrictive alternative that could achieve the responding WTO member's goal. The Appellate Body has found that 'to qualify as a genuine alternative', the proposed measure must not only be less trade restrictive than the original measure at issue, but should also 'preserve for the responding member its right to achieve its desired level of protection with

[100] Ibid. at para. 7.180; D. Crosby, 'Analysis of Data Localization Measures under WTO Services Trade Rules and Commitments', E15 Policy Brief, March 2016, p. 4.

[101] WTO Appellate Body Report, *US–Gambling*, paras. 238, 251.

[102] H. P. Hestermeyr and L. Nielsen (2014), 'The Legality of Local Content Measures under WTO Law', *Journal of World Trade*, 48(3): 588.

[103] WTO Appellate Body Report, *Brazil – Measures Affecting Imports of Retreaded Tyres*, WT/DS33/AB/R, December 2007; WTO Appellate Body Report, *US–Gambling*, paras. 306–308.

[104] A. Chander and P. Le Uyen (2014), 'Breaking the Web: Data Localization vs. the Global Internet', UC Davis Legal Studies Research Paper Series No. 378, April 2014, p. 5.

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respect to the objective pursued'.[105] Here, the complaining member could seek to show that the measure's goal could be achieved in ways that is less restrictive on digital trade, including ways that reduce restrictions on cross-border data transfers.[106]

Having established that a restriction on data flows is 'necessary' under GATS Article XIV, it would still need to be assessed for consistency with the requirement in the chapeau that it is not 'applied' in a manner that constitutes a 'means of arbitrary or unjustifiable discrimination between countries where like conditions prevail, or a disguised restriction on trade in services'. The WTO Appellate Body has stated that the assessment of the consistency of a measure with the GATS Article XIV chapeau is about 'locating and marking out a line of equilibrium between the right of a Member to invoke an exception and the rights of other Members under varying substantive provisions'.[107] The focus on the application of the measure emphasizes how the measure works in practice rather than the measure's justification.[108]

6.2 *Other WTO agreements applicable to digital trade*

In addition to the GATS, there are other WTO agreements relevant for digital trade. These include the General Agreement on Tariffs and Trade (GATT), which applies to goods purchased online and delivered in physical form across borders. As a result, tariffs matter for some forms of digital trade. Where digital trade transforms goods trade into trade in a service - such as with books, software, music and video – the GATS could apply instead of the GATT. This can have perverse outcomes in terms of the trade rules which then apply, as GATT commitments tend to be more comprehensive than under GATS.

The GATT is also relevant when it comes to trade in IT products such as the cables, servers, and routers which have been essential for the development of the global internet.[109] In this respect, the WTO Information Technology Agreement I and II reduces tariffs on technologies that enable digital trade, including the technologies needed for internet access and use. Under the first ITA 1996, 81 WTO members representing 97% of global trade in ICT products agreed to reduce tariffs to zero on a range of ICT goods. In 2015, 54 members concluded an expanded ITA.

The WTO Technical Barriers to Trade (TBT) Agreement is also relevant. The TBT agreement includes MFN and national treatment obligations as well as a

[105] WTO Appellate Body Report, *European Communities – Measures Prohibiting the Importation and Marketing of Seal Products*, WT/DS4-00/AB/R, 22 May 2014, para. 5.261.

[106] J. P. Meltzer and P. Lovelock (2018), 'Regulating for a Digital Economy: Understanding the Importance of Cross-Border Data Flows in Asia', Brookings Working Paper 113, March 2018, for a discussion of how to achieve legitimate policy goals while minimizing restrictions on cross-border data transfers.

[107] WTO Appellate Body Report, *US – Gambling*, para. 339.

[108] WTO Appellate Body Report, *US–Shrimp*, WT/DS58/AB/R (12 October 1998), paras. 115–116.

[109] Burri (2017), supra note 14. at 76.

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commitment to base domestic technical regulation on international standards where they exist.[110] Technical standards could have a range of implications for digital trade, including in areas such as standards for broadband networks, regulations on encryption, privacy, and data storage.

The importance of effective protection and enforcement of intellectual property rights as an enabler of digital trade underscores the ongoing relevance of the WTO Trade-Related Aspects of Intellectual Property Rights (TRIPS) Agreement.

The coming into effect in 2017 of the WTO Trade Facilitation Agreement (TFA) should support e-commerce sales of goods by reducing the costs of moving goods through customs, which are particularly significant for digital trade in goods of lower value and in small quantities. For instance, the TFA includes commitments to establish procedures that allow the submission of imports documentation prior to arrival with the aim of expediting the release of goods upon arrival,[111] and the requirements to publish online applicable laws, regulations, and procedures affecting trade.[112]

The WTO has also contributed to creating an enabling environment for digital trade by fostering competition in the telecommunications markets, which has contributed to expanding internet access and reducing its cost. The WTO Telecommunications Reference paper[113] includes pro-competitive regulatory principles for the telecommunications sector aimed at preventing major telecommunications suppliers from engaging in anti-competitive practices.

The WTO also includes commitments to the free flow of data across borders. As discussed, where a service market access commitment has been made then Members cannot block flows of the data required to deliver that service. In addition, the Understanding on Commitments in Financial Services includes a GATS Annex on financial services stating that members will not 'prevent transfers of information or the processing of financial information, including transfers of data by electronic means.'

Since 1998 at each WTO Ministerial and most recently at the 2017 Ministerial Conference in Buenos Aires, members have agreed to maintain a moratorium on applying customs duties to electronic transfers.[114]

The opportunity to use existing WTO commitments to address barriers to digital trade has yet to be widely tested using the WTO dispute settlement system. Yet, this may change. The US, Japan, Canada, and Australia have raised in the WTO their concerns over the impact of China's cyber security laws on trade in ICT

[110] TBT Agreement, Art. 2.1 & Art. 2.4.
[111] WTO Trade Facilitation Agreement, Art. 3.
[112] WTO Trade Facilitation Agreement, Art. 1.1 & 1.2.
[113] www.wto.org/english/tratop_e/serv_e/telecom_e/tel23_e.htm.
[114] WTO Work Programme on Electronic Commerce, Ministerial Decision of 13 December 2017, WT/MIN(17)/65, 18 December 2017.

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products.[115] In September 2017, the US outlined to the WTO Committee on Trade in Services its concerns about the impact of China's cyber security law on US services exports, noting that many US services exports covered by China's WTO accession agreement are not feasible without access to data.[116] The US has also requested consultations with China over certain intellectual property (IP) issues with regard to discriminatory enforcement of IP rights and licensing requirements.[117] Most recently, the European Union has requested consultations with China over forced technology transfer requirements.[118]

6.3 WTO e-commerce negotiations

The negotiation of new digital trade rules in the WTO remains under consideration. Since 1998, the WTO has a Work Programme on Electronic Commerce where e-commerce issues are discussed but it is not a forum for formal negotiations.

At the WTO ministerial meeting in Argentina in December 2017, 49 WTO members, including the US, the EU, Japan, Canada, Korea, China and Brazil issued a Joint Statement on Electronic Commerce, which included agreement to 'initiate exploratory work together toward future WTO negotiations on trade-related aspects of electronic commerce.'[119] At the 2019 World Economic Forum meeting in Davos, 76 countries including the US, China the EU and Australia agreed to launch ecommerce negotiations at the WTO.[120]

6.4 Digital trade rules in FTAs

The failure to make progress on developing digital trade rules at the WTO has refocused attention on developing such rules in bilateral and plurilateral/regional trade agreements. In fact, there are at least 70 FTAs that include an e-commerce chapter, which has been traditionally driven by the US, Australia, and Singapore.[121] Yet, this is changing as more developed and developing countries realize what is at stake. For instance, Colombia and Costa-Rica have also included robust e-commerce chapters in their FTAs.[122] The EU has been less ambitious when it comes to digital trade rules in FTAs. For instance, in the Japan–EU Economic Partnership Agreement, instead of a commitment to cross-border data flows,

[115] Members debate cyber security and chemicals at technical barriers to trade committee, June 2017, www.wto.org/english/news_e/news17_e/tbt_20jun17_e.htm.

[116] WTO Council for Trade in Services, Communication from the United States, 'Measures Adopted and under Development by China Relating to Its Cybersecurity Law', S/C/W/374, 26 September 2017.

[117] Request for consultations by the United States, *China – Certain Measures Concerning the Protection of Intellectual Property Rights*, WT/DS542/1, 26 March 2018.

[118] *China – Certain Measures on the Transfer of Technology*, WT/DS549/1/Rev.1 (9 January 2019).

[119] WTO Joint Statement on Electronic Commerce, 25 January 2019, WT/L/1056.

[120] WTO Ministerial Conference (2017), WT/MIN(17)/60.

[121] Wu (2017), supra note 15 at p. 6.

[122] Ibid. at p .7.

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there is agreement to revisit this issue within three years of entry into force of the agreement.[123]

The Trans-Pacific Partnership (TPP) Agreement – a 12 nation trade agreement before the US withdrew in January 2017 – included a comprehensive new e-commerce chapter. The remaining 11 parties have revived the TPP as the Comprehensive and Progressive Agreement on TPP (CPTPP), which includes the original TPP e-commerce chapter. More recently, the United States, Mexico, and Canada updated NAFTA – now the USMCA – which includes further commitments on digital trade.

Key new digital rules in CPTPP and USMCA include agreement to avoid data localization measures and to allow the free flow of information subject to a GATS Article XIV style exceptions provision.[124] The CPTPP and USMCA also include a commitment to not require companies to provide a source code as a condition of entering the market and to allow use of all devices on the internet.[125] These rules extend WTO rules to all data flows, irrespective of whether the data flow is for the delivery of a service subject to the trade agreement.

The CPTPP and USMCA also build on previous FTAs with respect to privacy and include a requirement for all parties to protect privacy and a best endeavors commitment to develop compatibility amongst domestic privacy regimes.[126] This commitment recognizes the need for regulatory cooperation in order to build confidence that commitments to cross-border data flows and effective domestic regulation can coexist.[127]

FTAs importance for digital trade goes beyond e-commerce chapters. Somewhat mirroring the scope of WTO agreements relevant for digital trade, relevant FTA chapters include those on IP, technical barriers, telecommunications, and market access rules and obligations for goods and services.

When it comes to IP for instance, CPTPP and USMCA include WTO plus commitments relevant for digital trade. One of these is a commitment to develop third-party intermediary liability regimes.[128] The CPTPP recognizes the need for 'an appropriate balance in its copyright and related rights systems, amongst other things by means of limitation or exceptions that are consistent with Article 18.65 (Limitations and Exceptions), including those for the digital environment…'[129] This in the first time such a provision has been included in an FTA, and it was not replicated in the USMCA. This provision aims to capture the US fair use exceptions to copyright – a principles-based set of exceptions which have helped create a

[123] EC 2017, Art. 12 (as of July 2017).
[124] CPTPP 2018, Art. 14.11; USMCA Art. 19.11, 19.12.
[125] CPTPP 2018, Art. 14.10 & 14.13; USMCA Art. 19.16 & 19.10.
[126] CPTPP 2018, Art. 14.8; USMCA Art. 19.8.
[127] A. Mattoo and J. P. Meltzer (2018), 'International Data Flows and Privacy: The Conflict and Its Resolution', *Journal of International Economic Law*, 21(4).
[128] USMCA Art 20.J.11.
[129] CPTPP 2018, Art. 18.66.

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regulatory environment in the US that has supported the development of a digital economy.[130] Such fair-use exceptions are also likely to be important when it comes to AI as the training data on which AI systems are built need to be copied and edited for use – and depending on how the data are collected, will need to rely on fair use exceptions to avoid liability for copyright infringement.[131]

While not about IP but certainly relevant in terms of shaping the scope of liability of internet platforms for the material they host, the USMCA also includes a commitment not to treat 'interactive computer services' as 'information content providers'.[132] The aim here is to distinguish between publishers of information, who are liable for the content they publish, and platforms which are not held liable for claims or instance of harm caused by the content they host.[133]

Building on the range of WTO agreements that are relevant for digital trade, FTAs also include commitments on standards, trade facilitation, and tariff reductions that support digital trade. When it comes to the development and use of international standards, the CPTPP and USMCA chapters build on the TBT agreement with a comprehensive set of obligations under the transparency sub-heading. New commitments on technical standards are potentially important for digital trade in a number of ways. For one, the development of smart manufacturing will be premised on interoperability within factories and between facilities located within North America (and globally).[134] Consistent standards for information flows, integration of units, and cyber physical integration will be needed to realize these opportunities.[135] The development of mutual recognition of domestic standards is also likely to be an important means for enabling interoperability between domestic standards in areas such as privacy, health, and education, while also supporting global data flows and digital trade opportunities. Finally, commitments on transparency in the standards-making process, always important, is particularly so now given the importance of standards for digital trade and the corresponding incentive for countries to use standards as non-tariff barriers. The CPTPP and USMCA make progress on all these fronts. For instance, commitments to ensure that domestic standards are based on international standards and for regular review of domestic standards are based on the TBT agreement. The CPTPP and USMCA strengthen commitments to mutual recognition amongst the parties. On transparency, these FTAs include specific requirements for notification and publication, opportunities for comment and input, as well as requirements to explain the objectives of the technical regulation, what alternative approaches were

[130] A. Chander (2014), 'How Law Made Silicon Valley', *Amory Law Journal*, 63: 639.
[131] *Authors Guild* v. *Google Inc*., 804 F.3d 202 (2nd Cir. 2015).
[132] USMCA Art. 19.17.
[133] Communications Decency Act of 1996, Pub. L. No. 104–104, sec 230; see also A. Chander (2014), 'How Law Made Silicon Valley', *Amory Law Journal*, 63: 650–652.
[134] PWC (2016), Industry 4.0: Building the digital enterprise.
[135] Lan Yu *et al.* (2016), 'Current Standards Landscape for Smart Manufacturing Systems', NIST, NISTIR 8107, February 2016.

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considered, and the merits of the selected approach. In addition, the CPTPP and USMCA include commitments on cryptography for commercial application. This includes requirements for the importer to transfer or provide access to a technology or key that is proprietary to the manufacturer or supplier and which relates to the cryptography of the product, as a condition for manufacture, sale, or distribution of the product.[136]

7. International Regulatory Cooperation

The global internet and cross-border data flows are transforming international trade and providing new opportunities for growth in productivity and jobs. At the same time, many governments are increasingly restricting cross-border data flows, which can undermine the economic and trade opportunities of digital trade. Often, data localization requirements are driven by legitimate non-protectionist goals, including protection of privacy, law enforcement needs, and cyber security concerns. Yet, governments are also restricting internet access and data flows to protect domestic companies – a form of digital protectionism.

International trade rules at the WTO and in FTAs provide key elements of a system of digital trade governance. The rules support cross-border data flows and access to information for international trade, while providing governments with the regulatory space to restrict cross-border data flows where this is necessary to achieve legitimate regulatory goals. This interplay between trade obligations and the exceptions provision provides governments with regulatory flexibility to discriminate and restrict data flows where it can be shown that it necessary to achieve other legitimate regulatory goals.[137] Yet, there are limits to the usefulness of such a rule/exception framework for governing digital trade. The most significant limitation is caused by the enormous quantities of data constantly being moved globally and which increasingly implicate a broad range of domestic regulations at a scale and pace that is not the case with the more traditional trade in goods or services.

The limits to trade rules alone in governing digital trade was highlighted by the recent example of Vietam, which as a party to the CPTPP has nevertheless introduced data localization measures, which it would likely seek to justify under the agreements exceptions provision. The expectation and concern is that, without more in terms of a governance framework for digital trade, digital trade commitments at the WTO and in FTAs will be observed in the beach, as governments rely on the broad exceptions provisions to continue to restrict data flows. It is the case that for a measure restricting data flows to satisfy the requirements of a

[136] CPTPP Annex 8.B Information and Communications Technology Products; USMCA Art. 12.C.2.

[137] See generally R. Howse, 'The World Trade Organization 20 years on: Global Governance by Judiciary', *European Journal of International Law*, 27(1).

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WTO or FTA exceptions provision, the measure must be 'necessary' – that a less trade restrictive option is not available. However, to satisfy the necessity test in the context of massive amounts of cross-data flows will often require what is in fact missing in terms of digital trade governance, namely, more convergence on international standards and regulatory cooperation.

What is also needed is convergence towards common principles and standards in areas such as privacy, cybersecurity, and consumer protection, along with mutual recognition agreements. Success here should give domestic regulators confidence that allowing data to leave their jurisdiction will not undermine domestic regulatory goals. In addition, the absence of such international regulatory cooperation will lead to unnecessary regulatory heterogeneity that will raise the costs for digital trade.[138] Failure to make progress on this second limb of digital trade governance will most likely result in continued regulatory bias towards data flow restrictions and data localization requirements.

Combining international regulatory cooperation with digital trade commitments in FTAs (and eventually in plurilateral agreements at the WTO[139]) could provide a framework for digital trade governance. Existing regulatory cooperation on some of these issues already underway in APEC and the OECD provides a foundation for making progress.[140] Trade agreements can also play a role by including commitments by the parties to engage in such a regulatory agenda. For example, USMCA includes a commitment by the parties to develop privacy frameworks that take into account, 'principles and guidelines of relevant international bodies' such as the APEC Privacy Framework and the OECD Privacy Guidelines, as well as a commitment to developing interoperability amongst the parties different privacy systems.[141]

8. Conclusion

The global internet and cross-border data flows are transforming international trade and providing new opportunities for productivity and growth in jobs. Underpinning much of digital trade is the global internet and cross-border data flows. Yet, governments are increasingly restricting cross-border data flows, which can undermine the economic and trade opportunities of digital trade. Restrictions on data flows and requirements for data to be localized are driven by a range of reasons, including protection of privacy, law enforcement, and

[138] D. W. Drezner (2008), *All Politics is Global: Explaining International Regulatory Regimes*, Princeton, NJ: Princeton University Press.

[139] See generally, T. J. Bollyky and P. C. Mavroidis, 'Trade, Social Preference and Regulatory Cooperation', EUI Working Papers RSCAS 2016/47.

[140] Mattoo and Meltzer, *supra* n. 127.

[141] USMCA Article 19.8.

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cyber security concerns. Some governments are also restricting internet access and data flows to protect domestic companies – a form of digital protectionism.

These developments underscore the need to develop a system of digital trade governance. Already, some of the key building blocks of such a system are present. The WTO includes commitments relevant to digital trade, such to the cross-border flow of data where a services commitment has been scheduled under the GATS. Bilateral and regional trade agreement increasingly include ecommerce or digital trade chapters and the CPTPPP and USMCA include robust digital trade rules. What is lacking is a parallel agenda aimed at giving domestic regulators confidence that achieving domestic regulatory goals will not be undermined by allowing data to leave their jurisdiction. In the absence of such regulatory cooperation, even where a government has agreed to strong digital trade rules such as in CPTPP, regulators are likely to continue to restrict cross-border data flows and require data to be localized, in which case governments will justify such outcomes relying on the trade agreements exceptions provision, risking these exceptions provisions becoming the rule.

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