

Trade, Law *and* Development

Upcoming:

Craig Atkinson & Nicolás Schubert, *Augmenting MSME Participation in Trade with Policy Digitalisation Efforts: Chile's Contribution to an 'Internet of Rules'*, 13(1) Trade, Law & Development (2021)

AUGMENTING MSME PARTICIPATION IN TRADE WITH POLICY DIGITALISATION EFFORTS: CHILE'S CONTRIBUTION TO AN 'INTERNET OF RULES'

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The Internet's potential to enable micro, small and medium-sized enterprises (MSMEs) to conduct international commercial transactions has yet to be fully realised. Small enterprises, especially MSMEs based in developing countries, continue to face substantial obstacles to their participation in trade. While International Economic Law has evolved amidst rapid globalisation and technological change, developing country MSMEs are frequently unable to achieve the benefits associated with trade liberalisation. As 'new generation' agreements introduce further legal complexity in both the number and scope of trade rules, this article investigates Chile's application of information and communications technology (ICT) to improve the accessibility and functionality of commercial policies. With an emphasis on computational approaches to trade policy design and delivery, the Undersecretary of International Economic Relations (SUBREI) of the Ministry of Foreign Affairs of Chile has launched a pilot programme to contribute to an open repository of rules in a digital form: an 'Internet of Rules' (IoR). Along with reference data, the computational expression and online publication of rules that may be 'in effect' or 'applicable' to cross-border transactions can improve access and use by people and machines alike. Against the backdrop of the country's history of reform and membership in the World Trade Organization (WTO), the Comprehensive and Progressive Trans-Pacific Partnership Agreement (CPTPP) and the Digital Economy Partnership Agreement (DEPA), the investigation articulates Chile's ongoing contribution to an IoR as well as the alignment of its policy digitalisation efforts with national development strategies.

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I. INTRODUCTION

Over the past 60 years, the story of Chile – once described as an ‘economic miracle’³ – provides a unique case of trade-led development through policy reform. Significant government intervention in the economy and protectionism, principal causes of initial turmoil, have given way to a liberalised market, industrial diversification and increased trade.⁴ In recent decades, a rapid expansion in exports has been a distinctive feature of Chile's economic achievements. Following unilateral import tariff reductions as well as consecutive processes of expanding bilateral and plurilateral trade relations, the country has been able to increase the export dynamism of its goods and services.⁵

As a proportion of Gross Domestic Product (GDP), Chile's exports have more than doubled from 13% in 1960 to 29% in 2020.⁶ In 1960, the country's exports totalled US\$ 490 million, of which 87% were derived from the mining sector. At that time, 53% of Chile's exports were to Europe, 37% to North America, 8% to Latin America and only 2% to Asia.⁷ When undertaking the same analysis using recent data, a contrast can be observed in Chile's export diversification and composition of its destination markets.⁸ Today, an active participant in global value chains (GVCs)⁹, Chile exports a variety of goods and services that total more than US\$ 67 billion.¹⁰ With a 58% share of exports, the Asian region has become Chile's primary destination market. Europe now represents just 13% of Chilean exports, while Latin America's share has grown to 13% and North America's has fallen to 15%.¹¹

Beyond macroeconomic indicators of success, Chile has another goal¹²: democratising access to the global economy for its micro, small and medium-sized enterprises (MSMEs).¹³ Although the country boasts approximately 7,600 enterprises that are directly involved in exporting activities, and account for 12% of national employment, obstacles remain to the participation of Chilean MSMEs in international trade.¹⁴ While the country has acted to implement modern ‘free trade’ policies, a disparity between the results of economic analyses and the reality of small enterprises has emerged. Official statistics do not reveal a perception that inequality has grown, and is growing, in Chile.¹⁵

³ Lebdioui, A. (2019), Chile's Export Diversification since 1960: A Free Market *Miracle* or *Mirage*?. Development and Change, 50: 1624-1663. <https://doi.org/10.1111/dech.12545>

⁴ Ibid.

⁵ See <https://www.subrei.gob.cl/docs/default-source/estudios-y-documentos/impactotratadosdelibrecomercio.pdf>

⁶ According to 2019 data from the World Bank, international trade (i.e., imports of goods and services + exports of goods and services) represented 56.8%, or more than half, of Chile's GDP. See <https://databank.worldbank.org/reports.aspx?source=2&country=CHL>

⁷ See <https://www.subrei.gob.cl>

⁸ OECD (2018), "Moving forward in Chile: A shared vision for the future", in *Production Transformation Policy Review of Chile: Reaping the Benefits of New Frontiers*, OECD Publishing, Paris, <https://doi.org/10.1787/9789264288379-7-en>

⁹ See <https://www.subrei.gob.cl/ejes-de-trabajo/cadenas-globales-de-valor-cgv>

¹⁰ See <https://databank.worldbank.org/reports.aspx?source=2&country=CHL>

¹¹ See <https://www.subrei.gob.cl/landings/beneficios>

¹² See <https://www.subrei.gob.cl/ejes-de-trabajo/home-comercio-inclusivo/pymes>

¹³ There is no internationally recognised definition of a MSME and Chilean law provides its own national classification. See Ley (Act) 20.416 - Ministerio De Economía, Fomento y Reconstrucción; Subsecretaría de Economía, Fomento y Reconstrucción <https://www.bcn.cl/leychile/navegar?idNorma=1010668>

¹⁴ See <https://www.subrei.gob.cl/landings/beneficios>

¹⁵ See <https://promarket.org/2019/11/19/the-reality-of-inequality-and-its-perception-chiles-paradox-explained/>

Simultaneously, technological advances have led to a fall in many of the natural barriers to trade (e.g., reductions in transportation times and costs) and the rise of a ‘digital economy’¹⁶. Yet, as natural constraints to international commerce are overcome, others are appearing to take their place. For instance, given a proliferation of ‘new generation’¹⁷ trade agreements, the human-made normative rules¹⁸ that apply in cross-border contexts are becoming more numerous, complicated to understand and difficult to operationalise. Many small enterprises remain unable to identify and comply with market access requirements – both tariff and non-tariff measures (NTMs) – or to utilise preferential terms, the result of lengthy trade negotiations that were intended to enhance their international competitiveness.¹⁹ Such legal and administrative compliance issues represent hurdles to MSME participation in trade.

However, the ‘network of networks’ – the Internet – represents humanity’s most significant means of communication and a mechanism that can be used to mitigate information asymmetries between different entities.²⁰ Also, as a near ubiquitous Information and Communications Technology (ICT), the Internet does not exist in a static configuration. Advances in the functionality of the Internet are creating possibilities for the separation of data, application and network control to allow users to interact and transact in new and transformative ways.²¹ In its present form, though, the Internet's potential to enable MSMEs to conduct international commercial transactions has yet to be fully realised.

In response to these conditions, and aligned with national economic and social development strategies, the Undersecretary of International Economic Relations (SUBREI)²² of the Ministry of Foreign Affairs of Chile has launched a pilot programme in collaboration with Xalgorithms Foundation²³ to create a freely accessible online repository of trade rules in a digitally executable form. Through its contribution, Chile aims to become the first jurisdiction to express and publish trade rules as ‘standardisable’ data packages (i.e., ‘Rules as Data’) that can be readily

¹⁶ The term ‘digital economy’ was coined in 1995 by Don Tapscott and typically refers to an economy and economic activity enabled by computer technologies (e.g., conducted via the Internet and the World Wide Web). See https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3512353

¹⁷ Also referred to as ‘second generation’ agreements, the scope of ‘new generation’ rules between countries has grown to address matters not typically thought of as trade-specific (e.g., data flows and digital policy) and place greater emphasis on non-tariff issues. See Elsig, M., & Klotz, S. (2019). Behind-the-Border Measures and the New Generation of Trade Agreements: Technical Barriers to Trade and Sanitary and Phytosanitary Measures Compared. In J. Francois & B. Hoekman (Eds.), *Behind-the-Border Policies: Assessing and Addressing Non-Tariff Measures* (pp. 246-276). Cambridge: Cambridge University Press. doi:10.1017/9781108751698.011

¹⁸ Joseph Potvin describes a rule as, “any practical, logical or ethical association between what ‘is’ and what ‘ought’ to be, that is asserted among two or more people. It expresses compulsion, option or expectation through the normative terms MUST, MAY and SHOULD, or with their various negatives and synonyms. A rule is deemed to be ‘in effect’ for given dates/times and prerogatives based on identity and jurisdiction, and it is designed to be ‘applicable’ to particular circumstances.” See Potvin, J. et. al. (Forthcoming, 2021). Oughtomation. Article in partial fulfillment of a Doctorate in Administration (Project Management). Université du Québec. Canada.

¹⁹ Fliess, B. and C. Busquets (2006), “The Role of Trade Barriers in SME Internationalisation”, *OECD Trade Policy Papers*, No. 45, OECD Publishing, Paris, <https://doi.org/10.1787/246707602042>

²⁰ Internet Society, “Internet Society Global Internet Report 2019: Consolidation in the Internet Economy.” <https://future.internetsociety.org/2019/wp-content/uploads/sites/2/2019/04/InternetSociety-GlobalInternetReport-ConsolidationintheInternetEconomy.pdf>

²¹ Ibid.

²² The Undersecretary of International Economic Relations (SUBREI) is a public entity, dependent on the Chilean Ministry of Foreign Relations, whose purpose is to execute and coordinate the Government's policy in the field of International Economic Relations; the representation of Chile's interests in multilateral forums; and the negotiation and implementation of the network of free trade agreements, among other matters.

²³ Xalgorithms Foundation Inc. is a not-for-profit corporation with the purpose of providing services to the Xalgorithms Alliance. Participants in Xalgorithms Alliance have created functional free/libre/open source components for the development of an ‘Internet of Rules’.

fetched and utilised by any person using any software application on any platform.²⁴ Participants in the collaboration foresee these efforts as an incremental step towards the emergence of a what can be described as an ‘Internet of Rules’ (IoR).²⁵

Against the backdrop of Chile's contemporary history of policy reform and membership in the World Trade Organization (WTO), the Comprehensive and Progressive Trans-Pacific Partnership Agreement (CPTPP) and the Digital Economy Partnership Agreement (DEPA), this article examines the country's ongoing contribution to an IoR. As an extension of the existing Internet, the envisaged ‘digital public infrastructure’ provides a simple way for both humans and machines to interface with commercial rule systems. Chile’s contribution to an Internet of Rules is expected to stimulate economic inclusion and benefit enterprises of all sizes by significantly reducing the expertise needed to participate in international trade.

II. A CONTEMPORARY HISTORY OF CHILE'S TRADE POLICY

In the early 1970s, the policies of the Salvador Allende government were highly protectionist, and the Chilean market was, in effect, closed to trade and investment by *ad valorem* import tariffs of 1,000% across many goods categories. In 1973, a military coup overthrew Allende and installed Augusto Pinochet as a military dictator who would control Chile until 1990. Placed in charge of the economy, United States-educated Chilean economists known as ‘The Chicago Boys’ – proponents of University of Chicago economics professor Milton Friedman – advocated for open markets. By 1978, Chile would undergo significant reforms toward free trade.²⁶

Preliminary reforms to Chile’s trade policy were achieved by reducing and eliminating tariffs. These adjustments would be, in part, credited with helping Chile emerge from Pinochet's regime in 1990. The outcomes of trade liberalisation and the rise of democracy lead to significant output growth for Chile throughout the 1990s. Between 1991 and 1997, Chile's growth in GDP averaged an estimated 8%. Concurrently, the country negotiated a series of free trade agreements (FTAs) that, in spite of financial crises in the late-1990s, helped the Chilean economy to recover and begin growing by the start of the new millennium. Over the following decades, Chile’s output would grow by more than 120% by 2010 while the country’s trade doubled through fostering a network of 30 free trade relationships (as of 2021).²⁷

With its current portfolio of trade agreements, Chile has negotiated access to key markets on each continent and created potential for its enterprises to reach more than 4.2 billion consumers worldwide. As nearly 52% of Chilean exporters are MSMEs that are vulnerable to external shocks, and more than 2.7 million jobs in Chile depend directly or indirectly on trade, the country’s recent policy initiatives have been to prioritise market diversification.²⁸ Chile’s ‘new’ trade policy aims to play a strategic role in the economic sustainability of the country, while deepening participation in global markets and creating opportunities for its small enterprises.

²⁴ Potvin, J. et. al. (Forthcoming, 2021). Oughtomation. Article in partial fulfillment of a Doctorate in Administration (Project Management). Université du Québec. Canada.

²⁵ An ‘Internet of Rules’ (IoR) is created when computational algorithms can be readily transmitted from any independent source repositories within which they are maintained, to any applications that would use them. See <https://blogs.lse.ac.uk/businessreview/2018/04/26/disruptive-trade-technologies-will-usher-in-the-internet-of-rules>

²⁶ Juan Gabriel Valdés, *Pinochet's Economists: The Chicago School of Economics in Chile*, Historical Perspectives on Modern Economics (Cambridge ; New York: Cambridge University Press, 1995).

²⁷ World Bank. "Evolution of Chile's (nominal) GDP". See <https://datos.bancomundial.org/indicador/NY.GDP.MKTP.CD?locations=CL&view=chart>

²⁸ 62% of Chilean MSMEs export to a single country and 51% sell a single product abroad. See <https://www.subrei.gob.cl/ejes-de-trabajo/home-comercio-inclusivo/pymes>

A. THE LEGAL PROCESS OF ECONOMIC GLOBALISATION

Globalisation, understood as a process of increased interconnection between countries, not only refers to economic ties but also to legal dimensions. The first phase of modern globalisation, focused on economic growth, began during the early part of the 19th century and lasted until 1914. This phase of globalisation was facilitated by technological advances made during and after the industrial revolution (e.g., improvements in shipbuilding and communications).²⁹

In the 20th century, the international community found potential in economic cooperation through the development of 'Public International Law' – rules, norms and standards between countries – to build global understanding and peace. This purpose was reflected in institutional frameworks that predate the conclusion of World War II. Notably, in August 1941, the Atlantic Charter between the United Kingdom (UK) and the United States (US) set out 'common principles' for both countries.³⁰ Clauses 4 and 5 of the Charter refer to the importance of bringing about, "the fullest collaboration between all nations in the economic field..." and, "to further the enjoyment by all States, great or small... of access, on equal terms to the trade... needed for their economic prosperity."³¹ Following this trajectory in the post-World War II era, the Bretton Woods Conference of 1944 produced the World Bank and the International Monetary Fund (IMF) while the Dumbarton Oaks Conference (August - October 1944) yielded the structure for the United Nations (UN).

As a proposed framework for 'International Economic Law', the Havana Conference (November 1947 - March 1948) gave birth to the Havana Charter for an International Trade Organization (ITO).³² The Havana Charter presented 79 articles with a vision of an ITO that would reduce tariffs, eliminate quotas and preferences, discipline the use of other trade instruments and manage diverse subjects (e.g., labour rights, boycotts, exchange controls, subsidies, restrictive business practices, competition policy and commodity agreements).³³ While the ITO never came into existence, one of its goals was to improve global welfare based on liberalisation and national 'comparative advantage'.³⁴

In 1947, with Chile as a founding 'Contracting Party', this vision would be achieved as a result of multilateral trade negotiations under the auspices of the General Agreement on Tariffs and Trade (GATT).³⁵ The mandate of the GATT 1947 was to agree to rules and to serve as a venue of negotiation in reducing trade barriers, particularly tariffs. The GATT became the legal basis for international trade for the following decades and served as the platform for the Uruguay Round of negotiations (September 1986 - December 1993).

²⁹ Brandon Levy, "The Role of Globalization in Economic Development," SSRN Scholarly Paper (Rochester, NY: Social Science Research Network, September 14, 2012), <https://papers.ssrn.com/abstract=2233648>.

³⁰ H. V. Morton, *Atlantic meeting: An account of Mr. Churchill's voyage in H.M.S. Prince of Wales, in August, 1941, and the conference with President Roosevelt which resulted in the Atlantic Charter*, 1944.

³¹ WTO. "WTO | The History of Multilateral Trading System," accessed April 24, 2021, https://www.wto.org/english/thewto_e/history_e/tradewardarkhour41_e.htm.

³² Craig VanGrasstek, *The History and Future of the World Trade Organization* (Geneva, Switzerland: World Trade Organization, 2013).

³³ Joseph E. Stiglitz, *Globalization and the Logic of International Collective Actions: Re-Examining the Bretton Woods Institutions* (Oxford University Press, 2002), <https://www0.gsb.columbia.edu/mygsb/faculty/research/pubfiles/1468/1468.pdf>.

³⁴ Comparative advantage reflects a country's ability to produce a specific good or service at a lower opportunity cost than its trading partners. See <https://voxeu.org/content/cloth-wine-relevance-ricardo-s-comparative-advantage-21st-century>

³⁵ The General Agreement on Tariffs and Trade (GATT) entered into force on 1 January 1948.

The Uruguay Round formally concluded in April 1994 with the Marrakesh Ministerial Conference and, through its ‘Final Act’, led to the establishment of the World Trade Organization (WTO) in 1995.³⁶ The Uruguay Round not only transformed the GATT into a revised version (i.e., the GATT 1994), but also broadened the scope of negotiations through the General Agreement on Trade in Services (GATS), the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) and agreements in other policy areas (e.g., Rules of Origin).³⁷ The legal framework under the WTO now manages global economic interdependence and functions as a global forum for international trade and development.³⁸

Further agreements, that include direct references to trade and technology, have been negotiated since the establishment of the WTO Secretariat: the plurilateral Information Technology Agreement (ITA)³⁹ and the multilateral Trade Facilitation Agreement (TFA)⁴⁰. Initially concluded at the Singapore Ministerial Conference in 1996, the ITA currently involves 81 WTO Members as participants and covers approximately 97% of global trade in information technology (IT) products.⁴¹ Although Chile is not a participant in the ITA, the Agreement is an important legal instrument for trade in IT goods.⁴²

More recently, in February 2017, the TFA came into effect as the first multilateral agreement under the WTO since 1995. The TFA was negotiated to improve disciplines of the GATT, including for: 1) Freedom of transit, 2) Duties and formalities regarding import and export and 3) Publication and application of commercial regulations. Chile ratified the TFA in November 2016 and had fully implemented the Agreement by its 2017 entry into force.⁴³ The WTO system was strengthened by this new legal framework that, in addition to greater transparency and predictability, commits WTO Member countries to implement technology-based measures to assist exporters and importers in meeting compliance requirements. For instance, the TFA obligates Members to publish information on import, export and transit procedures to the Internet (Article 1.2). Commitments also refer to systems for electronic payment of duties/fees (Article 7.2) and deployment of a national ‘single window’ system⁴⁴ (Article 10.4). Member countries are expected to use ICT to the “extent practicable” to implement measures.⁴⁵

While comprehensive, the TFA’s focus on trade in goods does not address certain issues that stem from the shift toward e-commerce and a global digital economy. Further clarity is needed in key areas, including on the cross-border flow of data and digital standardisation (e.g., electronic

³⁶ Mitsuo Matsushita et al., *The World Trade Organization: Law, Practice, and Policy*, 3rd edition (Oxford: Oxford University Press, 2015).

³⁷ See https://www.wto.org/english/docs_e/legal_e/ursum_e.htm

³⁸ Mario Larch et al., “On the Effects of GATT/WTO Membership on Trade: They Are Positive and Large after All,” 2019, <https://doi.org/10.30875/7758b713-en>.

³⁹ See https://www.wto.org/english/tratop_e/inftec_e/inftec_e.htm

⁴⁰ https://www.wto.org/english/tratop_e/tradfa_e/tradfa_e.htm

⁴¹ Ibid. The ITA covers, *inter alia*, computers, telecommunication equipment, semiconductors, semiconductor manufacturing and testing equipment, software, scientific instruments, and parts / accessories.

⁴² See https://www.wto.org/english/tratop_e/inftec_e/itapart_e.htm

⁴³ <https://tfadatabase.org/members/chile>

⁴⁴ United Nations Economic Commission for Europe (UNECE) Recommendation No. 33 (Recommendation and Guidelines on establishing a Single Window) describes a single window as, “a facility that allows parties involved in trade and transport to lodge standardized information and documents with a single entry point to fulfil all import, export, and transit-related regulatory requirements.” See

https://unece.org/fileadmin/DAM/cefact/recommendations/rec33/rec33_trd352e.pdf

⁴⁵ See https://www.wto.org/english/docs_e/legal_e/tfa-nov14_e.htm

documents). To this end, negotiations on e-commerce and digital trade⁴⁶ have been ongoing under the WTO ‘Joint Statement Initiative (JSI) on Electronic Commerce’ since 2019.⁴⁷

B. THE CHILEAN RESPONSE

As the scope and complexity of trade relations are considerably greater today than when the Uruguay Round was concluded, recent WTO negotiations have sought to address an economic and developmental role for technology through modernised texts.⁴⁸ Yet, even though Chile has a strong multilateral vocation, was a founding contracting party to the GATT 1947 and has been a Member of WTO since 1995, the majority of the country’s efforts have focused on modernising other trade agreements (primarily arrangements that have been in force since the early 1990s).

Chile’s response to the legal process of economic globalisation has been to upgrade its trade relations in excess of minimum WTO commitments. The country has done so by broadening the issues covered by its trade policy.⁴⁹ Chile’s recent initiatives have included topics such as transparency, mechanisms to support MSME internationalisation, digital economy, digital products (e.g., software, music, video, electronic books), services and electronic certification (e.g., e-certificates of origin).⁵⁰ New arrangements have also prioritised environmental protection and climate change, the elimination of subsidies for agricultural exports, gender-based approaches in international trade, provisions for the protection of flora and fauna from illegal traffic, dispute resolution mechanisms and the harmonisation of Customs procedures.⁵¹

Since 2003, Chile has developed a policy strategy in the Asia Pacific region, signing trade agreements with Korea (2003), China (2005), the P4 (Brunei Darussalam, New Zealand and Singapore 2005), India (2006), Japan (2007), Australia (2008), Malaysia (2010), Vietnam (2011), Hong Kong SAR (2012), Thailand (2013) and Indonesia (2019) as well as extensions and modernisations of existing Agreements with India (2016) and China (2017). The latest additions to the list include the 11 country Comprehensive and Progressive Trans-Pacific Partnership Agreement (CPTPP) or TPP11 (2018) and the Digital Economy Partnership Agreement (DEPA) between Chile, New Zealand, and Singapore (2020).⁵²

1) COMPREHENSIVE AND PROGRESSIVE AGREEMENT FOR TRANS-PACIFIC PARTNERSHIP (CPTPP)

The CPTPP is a regional trade agreement (RTA) that includes the principles and contents envisaged in the previously negotiated Trans-Pacific Partnership Agreement (TPP). The CPTPP preserves the high standards of its predecessor and introduces modifications to attain a new level of balance for the interests of the 11 national Parties to the agreement (without the United States, and its support for certain initiatives, under the original TPP).⁵³ The new agreement is

⁴⁶ There is no standard definition of e-commerce or digital trade. According to the OECD, “there is a growing consensus that it [digital trade] encompasses digitally-enabled transactions of trade in goods and services that can either be digitally or physically delivered, and that involve consumers, firms, and governments. That is, while all forms of digital trade are enabled by digital technologies, not all digital trade is digitally delivered.” See <https://www.oecd.org/trade/topics/digital-trade/>

⁴⁷ See https://www.wto.org/english/news_e/news20_e/ecom_14dec20_e.pdf

⁴⁸ Matsushita et al.

⁴⁹ See <https://www.subrei.gob.cl/landings/beneficios>

⁵⁰ See <https://www.subrei.gob.cl/en/landings/depa>

⁵¹ Ibid.

⁵² See <https://www.subrei.gob.cl/acuerdos-comerciales/acuerdos-comerciales-vigentes>

⁵³ See <https://www.subrei.gob.cl/acuerdos-comerciales/acuerdo-transpacifico-tpp11>

‘progressive’ in scope and scale: it goes far beyond tariff reductions, representing 13.5% of world GDP and integrating a total population of 480 million people across its jurisdictional coverage.⁵⁴

The Government of Chile describes the CPTPP as the first RTA to incorporate a chapter on MSMEs (i.e., Chapter 24 – Small and Medium-sized Enterprises) with a purpose to, “expedite the internationalization of these companies in the Asia-Pacific area which, due to their size, productive weakness and high costs, have not been able to participate to their maximum potential in foreign trade. It will contain a committee of SMEs, instances of exchange of experiences and information (rules of origin, tariffs, trade and services, among others).”⁵⁵ Chile and other Parties (i.e., Canada and New Zealand) have committed to review the benefits of the Agreement for small enterprises on an ongoing basis.⁵⁶

Chapter 14 of the CPTPP is dedicated to e-commerce. Application of the e-commerce chapter is focused on measures, “adopted or maintained by any Party, that affect commerce by electronic means.”⁵⁷ It does not apply, though, to public procurement or information held or processed by or on behalf of a Party (or measures related to such information). One of the core commitments under the CPTPP is Article 14.4, ‘Non-Discriminatory Treatment of Digital Products’. Article 14.4 creates an obligation on electronic transmissions between Parties and prohibits, “granting less favourable treatment to digital products created, produced, published, contracted, commissioned or made commercially available for the first time in the territory of another Party. The same is applicable to digital products whose author, performer, producer, manager or owner is a person of another signatory Party.”⁵⁸

Under Article 14.11, and congruent with the Internet’s technical architecture, Parties to the CPTPP are committed to allow cross-border flows of information transmitted through electronic means.⁵⁹ This provision seeks to ensure that the Internet will continue to function in a decentralised manner as a conduit for communication, innovation and development. The Agreement also calls on Parties, under Article 14.19, to establish measures that allow for the use of trade administration documents in electronic format as a ‘functional equivalent’ to paper document versions in line with the principles of the United Nations Commission on International Trade Law (UNCITRAL) Model Law on Electronic Commerce (1996) and the Model Law on Electronic Transferable Records (2017).⁶⁰

2) THE DIGITAL ECONOMY PARTNERSHIP AGREEMENT (DEPA)

With an international trend toward ICT as an enabler of economic activity, Chile’s participation in the DEPA is aimed at heightening national responsiveness through policy coverage and dissemination. Parties to the DEPA have adopted a regulatory framework that allows the respective countries to promote their markets and collaborate in the future development of the digital economy.⁶¹ The Agreement was signed by three, relatively, small economies – Chile, New Zealand and Singapore – that each ‘punch above their weight’ in their commercial role on the

⁵⁴ Ibid.

⁵⁵ Ibid.

⁵⁶ Ibid.

⁵⁷ See <https://www.mfat.govt.nz/en/trade/free-trade-agreements/free-trade-agreements-in-force/comprehensive-and-progressive-agreement-for-trans-pacific-partnership-cptpp/comprehensive-and-progressive-agreement-for-trans-pacific-partnership-text-and-resources/>

⁵⁸ Ibid.

⁵⁹ Ibid.

⁶⁰ See <https://uncitral.un.org/en/texts/ecommerce/>

⁶¹ See <https://www.mfat.govt.nz/assets/Uploads/DEPA-Signing-Text-11-June-2020-GMT.pdf>

world stage and find common denominators in their perspectives on digital policy (e.g., non-discriminatory treatment of digital products and free cross-border flow of data).⁶²

All three countries have recognized that the digital transformation of the economy can be an important driver of inclusive economic growth and for achieving sustainable development, increasing the productivity of existing sectors and in creating new markets. The DEPA complements ongoing e-commerce negotiations at the WTO, the digital economy workflows through the Asia-Pacific Economic Cooperation (APEC) forum and is open for other countries to join.

In effect, the DEPA establishes a framework for legal cooperation that allows for the dissemination of information, knowledge, technology, culture and the arts, thus creating open and competitive markets between its Parties. With direct consequences for MSMEs, IT services exports are projected to grow as a result of Chile's expanding digital trade relations under the DEPA. Chile's exports of IT services totalled US\$ 350 million in 2018 and were carried out through 204 Chilean businesses (of which 118 were classified as small and medium-sized enterprises). Also, as e-commerce is projected to grow at a national average of 20% per year over the next five years in Chile, the country has taken an active role in designing the DEPA and promoting the benefits of the agreement.⁶³

Under the DEPA, Chile has worked on provisions that can be classified into three categories. The first category relates to the traditional notion of commerce (i.e., goods and services), including approaches to facilitate trade flows and the exchange of information between different actors. Through a second set of issues, Chile has advanced provisions to preserve a free, open, global, and secure Internet as the essential foundation for the digital economy. The third category covers policy areas that have become important for international cooperation in developing regulations to support legal-technical cross-border interoperability. More specifically, the Agreement addresses diverse topics that include artificial intelligence (AI), digital identification (digital ID), open data (e.g., national government data sources), data innovation, financial technology ("fintech"), regulatory technology ("regtech"), interoperability, internet access, digital inclusion and competition policy. Membership in the DEPA is expected to strengthen use of new technologies while promoting domestic innovation in Chile.⁶⁴

The DEPA constitutes a milestone in the modernisation of the Chile's trade policy and is the first international agreement with an exclusive focus on policies for the international digital economy. Additionally, in extending aforementioned provisions of the CPTPP, the Agreement will further advance 'paperless trade'⁶⁵, electronic invoicing (e-invoicing) and the exchange of best practices for the development of new technologies associated with logistics.⁶⁶ Likewise, DEPA also promotes the creation of novel business models for transportation, including standards to facilitate express shipments, reduce Customs documentation requirements, lower

⁶² Shopify describes a digital product as, "an intangible asset or piece of media that can be sold and distributed repeatedly online without the need to replenish inventory. These products often come in the form of downloadable or stream-able digital files." Debate remains on whether to treat digital products as goods or services.

⁶³ George Lever, "Cámara de Comercio de Santiago. Perspectivas Económicas Del Sector Comercio 2021," accessed April 22, 2021, <https://www.ecommerceccs.cl/wp-content/uploads/2020/11/Proyecciones-CCS-2021-so.pdf>.

⁶⁴ See <https://www.subrei.gob.cl/en/landings/depa>

⁶⁵ The United Nations defines paperless trade as, "trade taking place on the basis of electronic communications, including exchange of trade-related data and documents in electronic form." See

https://unece.org/fileadmin/DAM/cefact/GuidanceMaterials/WhitePapers/WP-PaperlessTrade_Eng.pdf

⁶⁶ See <https://www.subrei.gob.cl/landings/depa>

processing times and provide clarity on electronic payments (e-payments) as well as payment details (i.e., when processing an express shipment).

Ultimately, the DEPA is designed to be an inclusive agreement to ensure that the benefits of the digital economy are maximised in and across the jurisdictions of its Parties. Activities that help bring more people to digital commerce are especially promoted, including approaches to share expertise between governments. The Agreement also encourages national government consultation with civil society and the private sector. To disseminate information on the advantages of the DEPA, a dialogue (under Article 10.4: Digital SME Dialogue) has been launched with MSMEs based in signatory countries.

Table 1. Selected Policy Areas Under the CPTPP and the DEPA

Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP)	Digital Economy Partnership Agreement (DEPA)
<ul style="list-style-type: none"> • Cybersecurity • Consumer protection • Customs duties (i.e., tariffs) • Data flows • Data localisation • Express shipments • National e-transactions • Non-discrimination for digital products • Paperless trade • Personal data protection 	<ul style="list-style-type: none"> • Artificial Intelligence (AI) and emerging technologies • Competition policy • Digital identification (Digital ID) • E-invoicing, e-payments • Financial (“fintech”) and regulatory (“regtech”) technology • Internet access and digital inclusion • Interoperability • Logistics • Open data and data innovation

Source: Adapted from Honey, S (2021), “Asia-Pacific digital trade policy innovation”, I Borchert and LA Winters (eds) (2021), Addressing Impediments to Digital Trade, CEPR Press, pp. 217-239.

III. DIGITALISATION, TRADE AND DEVELOPMENT

Digitalisation refers to the process improvements that arise a result of ‘digitisation’: the conversion of analogue, often paper-based, data and information into digital forms.⁶⁷ It is because of digitalisation that the Internet and has a direct effect on both *how* modern commercial activity is conducted and *what* is traded in the world economy.⁶⁸ Whether for trade in tangible goods or digital products and services, cross-border data flows enable GVC processes for, *inter alia*, manufacturing, transportation, banking, finance, agriculture, and healthcare sectors. This can be seen in recent metrics, as the United Nations Conference on Trade and Development

⁶⁷ See <https://www.i-scoop.eu/digital-transformation/digitization-digitalization-digital-transformation-disruption/>

⁶⁸ Digitalisation has made it possible to purchase and deliver digital products directly online (e.g., software, audio or video content) in a single act.

(UNCTAD) reports that global e-commerce revenues⁶⁹ were US\$ 26.7 trillion in 2019, increasing 4% over 2018, and continued growth is expected.⁷⁰

The pace of digitalisation, catalysed by the Internet, continues to lower barriers to international markets for enterprises that have been historically marginalised by the global economy. In recent years, Internet penetration has increased worldwide, and Chile is no exception. In Chile, 70% of the population uses the Internet and, as of September 2020, the country's penetration of fixed and mobile internet (i.e., 3G + 4G) reached an annual growth rate of approximately 6.3%.⁷¹ With higher levels of adoption, the Internet has fostered the emergence of a 'digital economy' at domestic and global levels that is characterised by falling average costs, a wide range of production, low capital requirements, high rates of innovation and economies of scale in consumption.⁷² Digitalisation also allows the costs of storage, reproduction and distribution of digital products, once they have been created, to be so low that marginal costs may approach zero.⁷³

For development, these two factors – national access to reliable, high bandwidth, Internet and the characteristics of the digital economy – represent opportunities to augment the participation of Chile's MSMEs in trade through policy modernisation. As a first step, the country has already created mechanisms that promote the growth of MSMEs in a variety of market niches generated by the digital economy. To develop sectors, encourage digital entrepreneurship and promote a harmonised regulatory framework, Chile is also leading efforts in Latin America to move toward a 'Regional Digital Market' within the Pacific Alliance (PA).⁷⁴ However, the persistence of traditional challenges and the emergence of new obstacles for MSME inclusion suggest that trade digitalisation requires further advancements in policymaking.

A. LEGAL BARRIERS, MSMEs AND POLICY MODERNISATION

In classical economic theory, the concept of 'comparative advantage' can be used to illustrate the maximisation of the gains from trade.⁷⁵ Generally attributed to David Ricardo, comparative advantage explains, through abstraction, that nations should specialize production in sectors where there is a lower relative opportunity cost (i.e., lower marginal cost as compared to a trading partner) and trade in those goods.⁷⁶ As a basis for different models, comparative advantage can be used to demonstrate the economic effects of tariff rates and subsidies.⁷⁷ But, in reality, a complex regulatory environment creates costs that exceed the effect of any tariff rate as estimated 'on paper'.

A disconnect with macroeconomic analyses exists because, traditionally, policy models aren't designed to account for subjects (i.e., heterogenous enterprise size and capabilities) and

⁶⁹ Includes business-to-business (B2B) and business-to-consumer (B2C) sales, equivalent to 30% of global GDP for 2019.

⁷⁰ See https://unctad.org/system/files/official-document/tn_unctad_ict4d18_en.pdf

⁷¹ Subsecretaría de Telecomunicaciones de Chile, "Informe Trimestral Del Sector Telecomunicaciones – Tercer Trimestre 2020," https://www.subtel.gob.cl/wp-content/uploads/2021/03/PPT_Series_SEPTIEMBRE_2020_V0.pptx.

⁷² Richard Posner, "Antitrust in the New Economy," *SSRN ELibrary*, accessed September 12, 2011, <http://ssrn.com/paper=249316>.

⁷³ http://mddb.apec.org/Documents/2018/SOM/ISOM/18_isom_005rev1.pdf

⁷⁴ See <https://alianzapacifico.net/en/with-declaration-on-gender-equality-and-the-digital-market-of-the-bloc-concludes-the-pacific-alliance-summit/>

⁷⁵ Known as the 'Ricardian theory' of competitive advantage and widely considered to provide the first formal model of international trade.

⁷⁶ Ricardo, David. *On the Principles of Political Economy and Taxation*. London: John Murray, 1817.

⁷⁷ See <https://repositorio.cepal.org/handle/11362/33423>

conditions (i.e., interactional and transactional frictions) that exist at the micro level. Varying widely in size across different sectors (e.g., artisanal, light manufacturing, tourism, services and agriculture), individual MSMEs may be sole proprietors / entrepreneurs, small businesses with a limited number of employees or medium-sized enterprises with a significant number of employees. By their nature, in having access to less resources, MSMEs compete in disadvantaged position as compared to large enterprises.⁷⁸

Micro, small and medium-sized enterprises play an important role in Chile's economy: 3.1% of Chilean businesses are considered large enterprises, while 52.5% are small or medium-sized enterprises (SMEs) and 44.4% are characterised as microenterprises.⁷⁹ MSMEs are the 'backbone' of the country's economy and an estimated 1 million of these companies generate 70% of national employment.⁸⁰ Nevertheless, as a pillar of domestic social and economic sustainability, MSMEs contribute just 16% to Chile's GDP.

Whether based in developed or developing countries, as in the case of Chile, MSMEs also face many obstacles in accessing international markets due to, *inter alia*, inadequate skills, economic inequality and lack of financing / credit.⁸¹ As commercial policies are often written using technical legal language that most enterprises cannot understand or operationalise without expert guidance, small enterprises are especially affected by onerous regulations.⁸² On average, the WTO estimates that tariffs and regulations (i.e., NTMs) represent a minimum of 14% of trade costs.⁸³ The data indicates that trade costs are specifically higher for women, MSMEs and unskilled workers.⁸⁴ Further research shows that, under various FTAs, small enterprises lack the capabilities to comply with legal and administrative requirements to utilise preferential tariff rates, even in contexts that involve highly advanced economic arrangements such as in the European Union (EU).⁸⁵

These issues have been acknowledged by the WTO and UNCITRAL and both trade law bodies currently operate working groups, informal and formal respectively, to assess the position of MSMEs in international trade.⁸⁶ At the plurilateral level, trade agreements (e.g., CPTPP) have begun to feature provisions that refer directly to MSME inclusion.⁸⁷ And, across different fora, MSME-specific issues are being aligned with policy modernisation initiatives, such as for trade facilitation and paperless trade.⁸⁸ As an objective of trade facilitation reform is to create a clear,

⁷⁸ See <https://undocs.org/en/A/CN.9/WG.I/WP.92>

⁷⁹ See <https://www.subrei.gob.cl/ejes-de-trabajo/home-comercio-inclusivo/pymes>

⁸⁰ In accordance with Chile's legal definition, micro-enterprises are those with registered annual sales between 500 and 2400 UF; small enterprises, between 2,401 and 25,000 UF; medium enterprises, between 25,001 and 100,000 UF, and large ones, 100,001 or more. The *Unidad de Fomento* (UF) is a unit of account used in Chile. It is a non-circulating currency; the exchange rate between the UF and the Chilean peso is constantly adjusted for inflation so that the value of the *Unidad de Fomento* remains almost constant on a daily basis during low inflation. 1 UF is roughly US\$ 40 as of April 2021.

⁸¹ See https://uncitral.un.org/sites/uncitral.un.org/files/media-documents/uncitral/en/c_msme_1_uttamchandani.pdf

⁸² K. Kushnir, M. L. Mirmulstein and R. Ramalho, "Micro, small and medium enterprises around the world: How many are there, and what affects their count?", 2010, World Bank/IFC.

⁸³ See https://www.wto.org/english/news_e/news21_e/rese_30apr21_e.htm

⁸⁴ See <http://tradecosts.wto.org/>

⁸⁵ See <https://www.kommerskollegium.se/globalassets/publikationer/rapporter/2018/publ-the-use-of-the-eus-ftas.pdf>

⁸⁶ The international community has identified business law as a key pillar to improving 'legal empowerment' MSMEs as well as those in poverty who may rely on MSMEs for employment. See https://www.wto.org/english/tratop_e/msmesandtra_e/msmesandtra_e.htm and https://uncitral.un.org/en/working_groups/1/msmes

⁸⁷ See https://www.wto.org/english/tratop_e/msmesandtra_e/rtaprovisions_e.htm

⁸⁸ Trade facilitation is defined as the simplification, harmonisation and modernisation of import/export procedures.

concise and transparent framework that is consistent with international obligations, the UN conducts regular surveys⁸⁹ on government implementation of measures⁹⁰ for paperless and cross-border paperless trade. Measures for paperless trade allow enterprises to, “bridge the widening gap between regulatory and technological change while creating an apparatus for governments to increase revenues... approaches to reform entail that the rules of trade are not only well codified but expressed in ways that are adaptable to future needs and more functional.”⁹¹ When accessible and delivered via ICT, such measures can improve the capacity of MSMEs to participate in trade.

Table 2: Measures for Paperless and Cross-border Paperless Trade

Paperless Measures	Cross-border Paperless Measures
<ul style="list-style-type: none"> • Internet connection available to Customs and other trade control agencies at border crossings • Electronic Single Window system (TFA Article 10.4) • Electronic submission of customs declarations • Electronic application and issuance of Import/Export Permit • Electronic submission of sea cargo manifests • Electronic submission of air cargo manifests • Electronic application and issuance of Preferential Certificate of Origin • E-Payment of customs duties/fees (TFA Article 7.2) • Electronic application for customs refunds 	<ul style="list-style-type: none"> • Laws and regulations for electronic transactions (e.g., e-commerce law, e-transaction law) • Recognized certification authority issuing digital certificates to traders to conduct electronic transactions • Customs declaration electronically exchanged between countries • Certificate of Origin electronically exchanged between countries • Sanitary and Phytosanitary Certificate electronically exchanged between countries • Banks and insurers retrieving letters of credit electronically

*Source: Adapted measure categories from the 2019 UN Global Survey on Digital and Sustainable Trade Facilitation*⁹²

B. USING TECHNOLOGY TO ADDRESS THE ‘SPAGHETTI BOWL’ EFFECT

The ongoing proliferation of overlapping trade agreements – multilateral, plurilateral and bilateral – has created an effect or phenomenon that makes it difficult for non-experts to determine which specific rules may be ‘in effect’ or ‘applicable’ in a given context.⁹³ Described by Jagdish Bhagwati, who coined the term ‘spaghetti bowl’ in 1995, “the effect of the proliferation of preferential trading arrangements clutters up trade with discrimination depending on the ‘nationality’ of a good, with inevitable costs that trade experts have long noted...”⁹⁴ The pejorative tone of the spaghetti bowl in trade policy refers to the ‘tangle’ of potentially overlapping rule sets that may compromise the fluidity of international commerce.

⁸⁹ See <https://unfcsurvey.org/>

⁹⁰ See Table 2.

⁹¹ See <https://unctad.org/news/advancing-digitalization-trade-partnerships-national-trade-facilitation-committees-platform>

⁹² See <https://unfcsurvey.org/>

⁹³ Jagdish N. Bhagwati, “US Trade Policy: The Infatuation with FTAs,” 1995,

<https://doi.org/10.7916/D8CN7BFM>.

⁹⁴ Ibid.

Because legal complexity and the scope of international rules has increased with new generation agreements, enterprises face more than just barriers to conducting a single cross-border transaction. The spaghetti bowl phenomenon has grown beyond the confines of traditional regulation of trade in goods and services to include digital governance. For example, the EU's General Data Protection Regulation (GDPR) and several envisaged policies, including the Digital Markets Act (DMA) and the Digital Services Act (DSA), construct a plethora of rules of a different nature than trade policies that must be complied with in the context of business relationships between enterprises located in EU and non-EU countries.

To address such ambiguities, and to foster a conducive international business environment with trading partners, governments can develop market compliance-oriented programming. In particular, measures have been called for to implement, "specialized programmes to familiarize entrepreneurs with new markets, assisting them in creating links with other businesses of all sizes, and in complying with regulations and requirements."⁹⁵ These programmes often, "require careful planning and commitment... as well as the involvement of many different entities at various administrative and governmental levels."⁹⁶ As a component of such programmes, countries can introduce supportive, low-cost, technological infrastructure.⁹⁷

Although solutions for trade information (e.g., 'tariff finders', trade information portals) and operations (e.g., national single window systems) are becoming more widely deployed, emergent approaches to policy design and delivery are creating new ways to develop underlying legal-technical infrastructure. For instance, 'Computational Law' refers to different sub-fields of legal informatics, including the expression of rules in precise computable forms.⁹⁸ This branch, also described as 'Algorithmic Law', is primarily focused on the mechanisation of legal reasoning.⁹⁹ As a form of legal technology ('legaltech'), these approaches can allow humans and machines to, "apply rules and regulations to real or hypothetical cases without additional input from human legal experts... provide answers, not just documents; and they do so in an autonomous fashion."¹⁰⁰ In this way, Computational Law may encompass a variety of regulations.

To help solve issues that stem from different types and overlapping sets of policies, different use cases can be addressed by algorithmic forms of rules, including, "privacy and security matters, in intellectual property rights management... in electronic commerce (e.g. import/export restrictions..."¹⁰¹ As the digitalisation of the economy and digital trade expand, the challenge of effective regulation becomes tied to meeting '*what is regulated*' with a comparable level of technology in '*how it is regulated*'. For example, ICT can allow, "governments to fill practical gaps with digital solutions... to perform tasks that regulators simply cannot... Computational Law can stand in as a prophylactic counterbalance to technological threats, that may empower both

⁹⁵ See <https://undocs.org/en/A/CN.9/WG.I/WP.92>

⁹⁶ Ibid.

⁹⁷ "Making the Law Work for Everyone", Volume I, Report of the Commission on Legal Empowerment of the Poor (2008) https://www.un.org/ruleoflaw/files/Making_the_Law_Work_for_Everyone.pdf

⁹⁸ Michael Genesereth, Computational Law: The Cop in the Backseat, White Paper, CodeX—The Stanford Center for Legal Informatics (2015).

⁹⁹ As an algorithm reflects a process or set of rules to be followed in calculations or other problem-solving operations, especially by a computer. See <https://www.scl.org/articles/3716-from-algorithmic-law-to-automation-friendly-legislation>

¹⁰⁰ Stanford CodeX (2021), "What is Computational Law?" <https://law.stanford.edu/2021/03/10/what-is-computational-law/>

¹⁰¹ Ibid.

legislators and individuals.”¹⁰² For governments, Computational Law can help to supplement regulation for, of and by technology (often referred to as ‘regtech’ in this context).¹⁰³

C. PRODUCING AND PUBLISHING COMPUTATIONAL RULES

Research from the Organisation for Economic Co-operation and Development (OECD) Observatory of Public Sector Innovation (OPSI) indicates that a number of jurisdictions have begun to produce legislation in computational forms to support governance process improvements.¹⁰⁴ To date, in countries that include Canada, France and New Zealand, policy digitalisation efforts have primarily focused on ‘coding’ rules (e.g., personal income tax, benefits and entitlements) to enable policy delivery via web-based platforms.¹⁰⁵ Through such ‘Rules as Code’ (RaC) approaches, “governments create an official version of rules (e.g. laws and regulations) in a machine-consumable form... to be understood and actioned by computer systems... integrated in the rulemaking process and complementing the existing, human-readable form.”¹⁰⁶ Because of the disparate methods employed by different jurisdictions, RaC initiatives are presently limited to platform specific, non-interoperable, rule sets at national and sub-national levels.¹⁰⁷

Yet, through technical collaborators located around the world, the Internet interconnects networks and computers to transmit and receive data. Akin to the system of international economic governance between countries, the Internet is a set of networks and software elements that allow exchange through protocols and standards.¹⁰⁸ To extend the functionality of the Internet for the standardised transmission of rules, an emergent general-purpose computational method known as ‘oughtomation’¹⁰⁹, “gives any entity, across a digital network, the capability to author, publish, discover, fetch, scrutinize, prioritize and optionally automate normative messages about rules which are deemed to be ‘in effect’ for given dates/times and prerogatives (identities and jurisdictions), and that are ‘applicable’ when facts exhibit in relation to particular activities and circumstances.”¹¹⁰ In this tabular, algorithmic, form, the logic of rules is fulfilled by criteria or data. Therefore, rules expressed using the oughtomation method can be considered ‘Rules as Data’ (RaD).

Providing functional inputs for any system, the oughtomation method avoids the RaC approach to initially express rules in a ‘code’ form (i.e., siloed into a given programming language). In contrast, oughtomation presents a way to express rules as a platform-agnostic data package. The method gives effect, “to must, may and should assertions amongst individual and organisational

¹⁰² Riva, G. (2020). The Potential and Limitations of Computational Law for Data Protection. MIT Computational Law Report. Retrieved from

<https://law.mit.edu/pub/thepotentialandlimitationsofcomputationalawfordataprotection>

¹⁰³ METI (Ministry of Economy, Trade and Industry), Governance Innovation: Redesigning Law and Architecture for Society 5.0 <https://www.meti.go.jp/press/2020/07/20200713001/20200713001-2.pdf>

¹⁰⁴ Mohun, J. and A. Roberts (2020), “Cracking the code: Rulemaking for humans and machines”, *OECD Working Papers on Public Governance*, No. 42, OECD Publishing, Paris, <https://doi.org/10.1787/3afe6ba5-en>

¹⁰⁵ Atkinson, C. and B. Stevens (2020) “Digitalising Trade Facilitation Implementation: Opportunities and Challenges for the Commonwealth” Trade Hot Topics. London: Commonwealth Secretariat.

¹⁰⁶ Mohun, J. and A. Roberts (2020), "Cracking the code: Rulemaking for humans and machines", *OECD Working Papers on Public Governance*, No. 42, OECD Publishing, Paris, <https://doi.org/10.1787/3afe6ba5-en>

¹⁰⁷ Ibid.

¹⁰⁸ Janet Abbate, *Inventing the Internet* (MIT Press, 2000).

¹⁰⁹ According to the Xalgorithms Foundation website, “The ‘oughtomation’ method, and ‘an Internet of Rules’ were jointly conceived and operationalized by Joseph Potvin, Bill Olders and Don Kelly.” See <https://xalgorithms.org/team>

¹¹⁰ Potvin, J. et. al. (Forthcoming, 2021). Oughtomation. Article in partial fulfillment of a Doctorate in Administration (Project Management). Université du Québec. Canada.

agents to... use upcoming action data to filter rules on the Internet, map the data to input/output tables in the rules... and then, determine out how the action must, could or should be carried out.”¹¹¹

Thus, an ‘Internet of Rules’ (IoR), “is created when computational algorithms can be readily transmitted from any independent source repositories within which they are maintained, to any applications that would use them.”¹¹² This infrastructure can enable computational rules system integration and process automation on a global scale as well as accommodate the dynamic nature of the Internet and changes in laws and regulations. In complement to the method, Xalgorithms Foundation has developed software components under ‘free, open and libre’ licenses¹¹³ so that any person or entity can express and publish normative Rules as Data online.¹¹⁴

IV. CHILE'S CONTRIBUTION TO AN "INTERNET OF RULES"

In October 2020, following a workshop hosted by SUBREI and the Xalgorithms Foundation, participants agreed to begin collaborating in an initiative to digitalise commercial policies of Chile and its trading partners. Through a pilot programme, Chilean stakeholders have started to provide technical know-how and conceptual design inputs toward the publication of the first rules to a digital rule repository that will, in effect, establish an IoR. Under the model, SUBREI, on behalf of the Government of Chile, will also assist Chilean academic institutions in joining the collaboration.¹¹⁵

The emphasis of the pilot is to apply the oughtomation method, in conjunction with software, to enhance the accessibility and functionality of trade rules that are presently written in complex natural languages.¹¹⁶ The programme aims to make it easier for anyone to discover, understand and operationalise commercial policies as well as to enable cross-platform digital automation trade processes. The pilot will focus on policy digitalisation in three different areas, each with distinct objectives: 1) Goods, 2) Services and 3) Intellectual Property.

1) For goods, the objective is to express computational rules governing trade in particular product(s) to provide information and subsequently automate export/import processes (i.e., with one or more of Chile’s trading partners). The pilot will focus on mapping and expressing rules found in trade agreements that are relevant to a cross-border transaction involving each good, including, *inter alia*, utilisation of preferential tariffs (if applicable), certificates of origin or other documentation, certifications and authorisations required to market the product, transport documents and any additional data requirements to complete export/import processes.

¹¹¹ Ibid.

¹¹² <https://blogs.lse.ac.uk/businessreview/2018/04/26/disruptive-trade-technologies-will-usher-in-the-internet-of-rules/>

¹¹³ To be used for any purpose, adapted, modified and redistributed, Xalgorithms reference implementations are licensed Apache 2.0 and GNU Affero 3.0.

¹¹⁴ Joseph Potvin et al., “An Introduction to ‘Oughtomation,’” 2020, 4.

¹¹⁵ The first institution to join in the pilot is the Program of Law, Science and Technology of the Catholic University of Chile (UC). Other institutions are invited to participate.

¹¹⁶ According to Potvin, “Rules exist when communicated between ‘rule-makers’ and one or more ‘rule-takers’. A rule is ‘applicable’ only when specified facts are present, and is ‘in effect’ only within particular dates/times and jurisdictions. Rules are eventually amended or revoked, but they could be of unknown duration.” See Potvin, J. et. al. (Forthcoming, 2021). Oughtomation. Article in partial fulfillment of a Doctorate in Administration (Project Management). Université du Québec. Canada.

2) Services chapters of free trade agreements are particularly appropriate for computational expression. The core objectives of these texts are to ensure increased transparency and predictability of relevant rules and regulations as well as to improve market access and extend national treatment to foreign services / service providers in an increasing number of sectors. In this context, the pilot programme will express the conditions under which market access is granted for sector and subsector commitments so that existing business opportunities or the possibility of improvements to the agreements can be determined quickly and easily.

3) In the field of intellectual property, geographical indications (GIs) provide an opportunity to test the use of the rule repository. The pilot will focus on systematising and automating the information and commitments on GIs contained in trade agreements. This could serve as a basis to develop future GI registry systems based on the commitments contained in FTAs.

A. IMPLEMENTATION OF A PILOT PROGRAMME FOR TRADE

Providing a modern legal framework, the DEPA addresses key policy areas (e.g., data innovation, open government data, 'regtech', e-invoicing, and emerging technologies) that can help to facilitate Chile's pilot programme at a national level as well as any future phases to include partners under the Agreement.¹¹⁷ The implementation of the programme will involve at least the following steps, definitions and actions: (1) Launch of a server to host the digital rule repository¹¹⁸ (previously established in March 2021), (2) Identification of specific rules for each of the three focus areas (i.e., goods, services and intellectual property rights) and (3) Expression, testing and publication of identified rules in a computational form. Auxiliary to 'writing' rules in natural language (trade policy 1.0) and the use of coded rules to enable Customs automation systems such as national single windows (trade policy 2.0), Chile will publish computational rules to the Internet in an accessible and standard way.¹¹⁹ This will enable use of the rules by any system, and compatibility with all semantic standards, via a repository of Rules as Data (trade policy 3.0).¹²⁰

Because Chile is a member of the WTO, several regional bodies and a total of 30 free trade agreements, the first rules to be published to an IoR through the pilot will not necessarily be derived from the DEPA itself (i.e., as a legal basis for Chile's contributions) but may come from other instruments such as bilateral agreements, the P4, CPTPP or multilateral texts and data sources (e.g., tariff schedules). As rules and complementary data are identified for each policy area, an ongoing task will be the creation of 'lookup tables' of data standards or nomenclatures (e.g., HS Codes for trade in goods) to be used in the pilot. Reference implementations of three software components co-designed by the Xalgorithms Alliance of contributors are complementary and supportive of these policy digitalisation efforts.

The implementation approach reflects a specific set of design virtues and principles. While the 'letter of the law' exists as text in a trade agreement, the rules of trade are delivered through proxies in various forms. Rules expressed using the 'Oughtomation' method are relatively isomorphic in comparison to proxy documents and can be executed by input data from

¹¹⁷ See Table 1.

¹¹⁸ For the purposes of the pilot programme, it is necessary to use a server or virtual machine that allows for the installation and operation of the software to express rules and to act as a node for publication of the example rules.

¹¹⁹ See Table 3.

¹²⁰ Joseph Potvin et al., "An Introduction to 'Oughtomation,'" 2020, 4.

forms/documents.¹²¹ As previously introduced, the ‘functional equivalent approach’ is based on an analysis of the traditional paper-based requirement with a view to determining how those purposes or functions could be fulfilled through electronic means. Also, Rules as Data do not reflect AI or imply inference. The approach is deterministic and enables simple, fast matching and filtering. Outputs of using the 'Oughtomation' method are auxiliary to written rules and only enhance accessibility and automation potential. Rules in these simple algorithmic forms do not make decisions or supersede the authority of parties involved in trade. They do, however, advance user access to rules to help stakeholders to interact knowledgeably and efficiently with such rules.

Table 3. The Version History of Trade Policy and Characteristics

Trade Policy 1.0 (Past / Present state)	Trade Policy 2.0 (Present / Future state)	Trade Policy 3.0 (Future state)
<p>Codification: Natural language forms of rules (e.g. International agreements)</p> <p>Means of Access: Interpretation of agreements Export / import guides</p> <p>Means of Compliance: Manual completion and submission of paper trade documents (e.g. Customs declarations)</p> <p>Expertise Requirements: High</p>	<p>Codification: Natural language and ‘hard-coded’ rules</p> <p>Means of Access: Export / import guides Trade Information Portals</p> <p>Means of Compliance: Paper-based documents Digital documents and Single Window Systems</p> <p>Expertise Requirements: Medium</p>	<p>Codification: Natural language forms of rules and auxiliary computational forms</p> <p>Means of Access: Any person or computer system via an ‘Internet of Rules’ (IoR)</p> <p>Means of Compliance: Data-elements found in paper and/or digital documents</p> <p>Expertise Requirements: Low</p>

Source: Adapted from Craig Atkinson, Disruptive Trade Technologies Will Usher in the ‘Internet of Rules’ (LSE Business Review, 2018).¹²²

B. ALIGNMENT WITH SOCIO-ECONOMIC DEVELOPMENT STRATEGIES

At present, Chile remains a developing economy with an internal market of approximately 19 million people that depend on international trade for prosperity.¹²³ In recent decades, the country has focused its policy interventions on areas where market failures and public goods exist, deepening its social and economic development strategies by pursuing institutional capacity, macroeconomic stability and trade openness. These policies have resulted in a degree of diversification, yielding growth in the Chilean economy and reducing poverty.¹²⁴ In compliment to existing strategies, Chile’s policy digitalisation efforts aim to democratise internationalisation of its MSMEs. This expected outcome of the country’s pilot programme is based on the hypothesis that, as information asymmetries are reduced, entities of all sizes will be able to realise the benefits associated with trade liberalisation.

¹²¹ From the Greek "iso" (equal) and "morphism" (shape or form), the concept of isomorphism can refer to whether or not a rule expressed as an algorithm is true to the logic of its natural language form.

¹²² See <https://blogs.lse.ac.uk/businessreview/2018/04/26/disruptive-trade-technologies-will-usher-in-the-internet-of-rules>

¹²³ See <https://databank.worldbank.org/reports.aspx?source=2&country=CHL>

¹²⁴ Osvaldo Larrañaga and María Eugenia Rodríguez, “Desigualdad de ingresos y pobreza en Chile 1990-2013,” December 2014, https://www.cl.undp.org/content/dam/chile/docs/pobreza/undp_cl_pobreza_cap_7_desiguypob.pdf.

The gains from Chile's economic development have not been entirely well distributed, in part, because of disparities in access to entrepreneurial opportunities. Through the development process, entrepreneurial activity has managed to consolidate itself in traditional sectors (e.g., agriculture, forestry, viticulture, and aquaculture) as well as expand to new sectors (e.g., manufacturing, IT services, and special interest tourism).¹²⁵ But, despite broad economic progress, existing policy frameworks alone are not sufficient enough to maintain productivity growth, improve labour market outcomes and address inequality. Furthermore, the COVID-19 pandemic has caused Chile's economic output to collapse: the country's GDP contracted by almost 6.0% in 2020.¹²⁶

Inequalities are partly the reason why Chile is currently undergoing a historical process that will define key issues regarding its governance, 'social contract' and economic model. In November 2019, as a consequence of the country-wide citizen demonstrations that began the month prior, a political agreement was reached to produce a new constitution (i.e., to replace Pinochet's 1980 constitution).¹²⁷ Amidst this social change, 'regulatory improvement' has become a fundamental strategy for strengthening Chile's economic and social equality. In general terms, regulatory improvement consists of changes that increase the quality of the legal system and its instruments. Regulatory improvements involve current and proposed legislation, as well as new laws to cover legal gaps. In other words, regulatory improvement is a procedure that, beyond mere deregulation, encompasses comprehensive change.¹²⁸

In the case of Chile, the stages of regulatory improvement for commercial sectors have consisted of precisely reviewing and adapting current rules, modifying those rules that are redundant (or that impose costs to induce non-compliance) and introducing new regulations (where required). Like any national system, Chile is not free from redundant regulations, nor has the country fully addressed regulations with a high relative cost for MSMEs. From a legal perspective, when designing and implementing economic development strategies, cost-effectiveness principles must be taken into account to strengthening entrepreneurial capacity in such a way that the costs of regulation do not exceed the benefits derived from it.

A regulation that is cost-effective contributes to equal opportunities, enhances the competitiveness of enterprises of all sizes and enables new ventures (with direct effects on the consolidation of employment, social and citizen participation). To the extent that small enterprises increase their productivity and become more competitive, as reinforced by an adequate system of rules, they improve their capacity to generate added value and to produce goods and services. Thus, with recovery from the COVID-19 pandemic in mind, Chile's policymakers have recognized a role for digitalisation and that the viability sectors is not only dependent on the opportunities that the market offers, but also on the legislation, regulations and rules applicable to enterprises.¹²⁹

¹²⁵ "Quinta Encuesta Longitudinal de Empresas (ELE5)," Ministerio de Economía, Fomento y Turismo, March 12, 2019, <https://www.economia.gob.cl/2019/03/12/quinta-encuesta-longitudinal-de-empresas-ele5.htm>.

¹²⁶ Banco Central de Chile, "Informe de Cuentas Nacionales de Chile. Cuarto Trimestre 2020," accessed April 21, 2021, https://www.bcentral.cl/documentos/33528/762418/CCNN_cuarto_trimestre_2020.pdf/c3b50bf3-0423-eed6-199f-080b2a9b9734?t=1616074414327.

¹²⁷ See Ley (Act) 21.200 <https://www.bcn.cl/leychile/navegar?idNorma=1140340&idVersion=2019-12-24>

¹²⁸ See <https://www.oecd.org/regreform/regulatory-policy/Policy%20Brief%20-%20Improving%20the%20Quality%20of%20Regulations.pdf>

¹²⁹ See <https://www.subrei.gob.cl/sala-de-prensa/noticias/detalle-noticias/2020/08/26/subrei-participa-en-seminario-ocde-enfocado-a-pymes-y-digitalizaci%C3%B3n-para-la-recuperaci%C3%B3n-econ%C3%B3mica>

V. CONCLUSION

Chile offers an important case study when examining the past six decades of trade and development in Latin America. Initially presenting the archetypical features of a developing nation, Chile was one of the first countries in the region to undergo comprehensive phases of policy reform. A number of lessons can be learned from the Chilean experience, most notably that an iterative approach to policy modernisation is needed to foster both economic growth and social inclusion.

In response to the dual processes of economic globalisation and technological change, Chile is taking steps to advance the participation of MSMEs in trade. Traditionally side-lined by the global economy, small enterprises as well as entire sectors can increase their competitiveness and realise new market opportunities through access to ICTs. One of the possible outcomes of further digitalisation, catalysed by the Internet, is a reduction in the barriers to trade in both tangible and digital products as well as services.

With the dematerialisation of traditional physical media (i.e., products) and processes into ones and zeroes (i.e., data) transported through a global network (i.e., the Internet), a digital economy has emerged. It is characterised by decreasing average costs, a wide range of production, modest capital requirements (in relation to what is available in capital markets), high levels of innovation and economies of scale in consumption.

While the concept of the digital economy remains ill defined, the shift from processing atoms to processing bits has overarching effects for Chile's development. In particular, the rules of trade have grown in number and complexity, thus creating barriers for enterprises that lack the means of compliance. At the same time, small enterprises are demanding a better distribution of the benefits that accompany international trade. To address to these needs, Chile is prioritising initiatives that improve access to and use of commercial policies.

Complementary to initiatives at the WTO and in regional fora, the country is pursuing its collaborations to expand the participation of MSMEs in international trade through policy digitalisation efforts. By contributing to an Internet of Rules, Chile is attempting to meet the global challenge of providing better legal-technical infrastructure for trade facilitation and digital trade.