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Regulating the digital economy: Are we moving towards a 'win-win' or a 'lose-lose'?

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Regulating the Digital Economy: Are We Moving Towards a 'Win-Win' or a 'Lose-Lose'?

Padmashree Gehl Sampath*

Abstract

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The digital economy has been growing by leaps and bounds in recent years, mostly as a result of new digital technologies that are promoting a global transformation to industry 4.0. The resulting expansion of digital trade has sparked off a political and policy controversy on digital economy and e-commerce, where its boundaries stand and how best to regulate it. Policy discussions on the topic however do not take into account the true expanse of digital trade, which encompasses hardware, software, networks, platforms, applications and data as its core elements, and stretches the boundaries of e-commerce policy to trade in goods, services and intellectual property protection. This Article focuses on the challenges in regulating the digital economy, with a particular focus on development, and offers a discussion of the interdependency between the economic, social, personal and developmental aspects of digital trade for developing countries. Section II opens with a detailed discussion on key digital technologies and their plausible impacts on employment globally and industrial catch-up of particular importance to developing countries, to highlight the divisive nature of digital technologies. Section III then analyses the unfulfilled promise of a pro-development perspective at the WTO looking at how multilateralism has currently failed e-commerce. The incoherence between digital realities and the policy debates at the WTO are presented to show how the institution is losing effectiveness in the war between countries to legitimize national policies on a universal level in this important area of policy making. Norm-setting through FTAs is also analysed at length in section III of the article, which provides a comprehensive review of the plurilateral and bilateral policy developments in e-commerce. The ramifications for developing countries are discussed in the form of a couple of examples. Section IV presents some options for developing countries for the future at the national and international level.

Keywords: digital economy, e-commerce, industry 4.0, digital trade, robotics and process automation, artificial intelligence, 3D printing, manufacturing, development, trade, free trade agreements, digital industrial policy.

JEL Codes: L11, L23, L25, L41, L51, L81, L86, O19, O31, O33, O34, O38

I. Introduction

There is great euphoria and great fear surrounding digital trade and the rapid rise of e-commerce, both of which are key attributes of the fourth industrial revolution. Industry 4.0, as it is widely known, is underpinned by much more sophistry when compared to the three earlier revolutions that charted a new

* The author works at the United Nations Conference on Trade and Development (UNCTAD). The author is thankful to Carlos Correa (University of Buenos Aires and South Centre), Pedro Roffe (ICTSD) and Xavier Seuba (University of Strasbourg) for detailed comments on earlier drafts of this article. The author thanks several undisclosed industry sources (Global and Indian) that have commented on previous drafts of the article. The views and opinions expressed here are those of the author alone.

course for the world economy.[1] Fuelled by extreme connectivity and the gigantic expansion of cloud computing, industry 4.0 is a maze of complex technologies and applications that connect existing devices (mobiles, phones, tablets and laptops) to new devices (such as 3D printers) and innovations (most notably artificial intelligence, process automation and the internet of things).[2] These changes account for why digital trade has been growing leaps and bounds in recent times and why e-commerce discussions have re-occupied global centre stage.

The technological developments leading to industry 4.0 have been rapid and compressed in time, based almost wholly on digital models that rely on steady global internet flows but allow ubiquitous access to shared resources as per configurations, such as cloud computing, digital platforms and other digital services. Of these key technologies undergirding industry 4.0, a few - like big data analytics, robotics process automation (RPA), artificial intelligence (AI) and 3D manufacturing - are considered to be widely disruptive. Other technologies, such as blockchains are expected to bring in changes that are more foundational in nature.[3] All of these technological advancements have become important platforms for business no doubt, but at the same time, are touted to fuel radical shifts in the global industrial climate making the internet central, and perhaps one of the most important building blocks, for innovation in the future.

Each of these technologies is at a different stage of development right now and there is asymmetry of information on prospects and risks. While RPA and AI are two of the most viable technologies currently, 3D printing and block chains are not yet fully available on an industrial scale and cloud computing, currently at its infancy, is projected to grow exponentially in the coming years.[4] There are some forecasts on how digital technologies will change industry and society, which raise several important questions for the global economy in general and developing countries in particular. Most urgent amongst these are the potential impacts of the digital economy on jobs as a result of industry reorganisation in different regions of the world. A related longer term issue is how breakthroughs in digital technologies extend the frontier of scientific innovation further and increase the distance for industrial catch-up some more and what this means for structural transformation in a large number of middle and low income countries.

The brusque pace of technological progress in the digital economy has unfortunately not been matched by policy at the global level that could regulate its development in an effective manner and foreshadow potential negative impacts. One reason for this discrepancy is the breakneck speed of technological transformations that have led to an overhaul the existing digital environment during the last two decades.[5] As a result, although the WTO's Working Group on E-Commerce of 1998 successfully identified many of the fundamental issues,[6] it has not been able to find ways to generate consensus.[7]

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[1] Scholarship on the topic is widely in agreement that the fourth industrial revolution is somewhat different from the third revolution (which was characterised by the rise of the computers and the digital age), the second revolution (which was led by an increased degree of automation and mass production due to electricity) and the first industrial revolution (as characterised by the invention of the steam engine, roads and mechanical production).

[2] See Rumana Bukht and Richard Heeks, Defining, Conceptualizing and Measuring the Digital Economy, University of Manchester Development Informatics Working Paper 68 (2017), 2.

[3] Karim R. Lakhani and Marco Iansiti, The Truth About Blockchain, Harvard Business Review, Jan-Feb Issue, 2017.

[4] For an estimated timeline see: World Economic Forum 2016 'Deep Shift Technology Tipping Points and Societal Impact', Survey Report, September 2015, Global Agenda Council on the Future of Software & Society, http://www3.weforum.org/docs/WEF_GAC15_Technological_Tipping_Points_report_2015.pdf

[5] Schwab (2016) notes that digital technology has been unfolding at an exponential rather than linear pace with implications beyond just re-organising industry. See Klaus Schwab, *The Fourth Industrial Revolution,* (Davos: World Economic Forum, 2016), at 18.

[6] See in general, Mira Burri and Thomas Cottier, 'Introduction: Digital Technologies and International Trade Regulation' in Mira Burri and Thomas Cottier eds), *Trade Governance in a Digital Age* (New York and Cape Town: Cambridge University Press, 2012), 1-15.

Another reason for the stalemate in negotiations, despite the growing relevance and economic importance of digital trade, is the perception that some countries are moving ahead to secure gains of e-commerce and digital trade in a bid to protect existing dominant positions.[8]

The widening divide in policy positions on e-commerce was best evidenced at the 11th Ministerial Conference (MC11) of the World Trade Organisation (WTO), held in Buenos Aires from 11-14 December 2017. Although e-commerce became the hotly debated issue in the lead up to the Ministerial, a three way split was apparent between countries by November 2017. Broadly speaking, while a large number of developed countries wanted to liberalise global digital trade, developing countries were split into at least two groups. A first set of developing countries fought for a stand still on the consideration of new e-commerce topics in the WTO unless the main issues of the 1998 WTO Working Group were considered, while a second set of countries requested the WTO to help understand and harness the opportunities presented by e-commerce and digital trade.[9] In the end, despite the hard fight by the many developing countries and policy advocates to create a Gordian knot of preconditions to open e-commerce discussions in the WTO, especially linking it to the mandate of the 1998 WTO Working Group on E-commerce, the Ministerial ended with approximately 70 countries agreeing to begin exploratory work on trade-related aspects of e-commerce.[10]

Since the beginning of the Uruguay Round of trade negotiations, multilateral policy has served to secure export markets for a wide variety of knowledge goods in which industrialised countries have held competitive advantage for long.[11] From this perspective, the interim non-success of e-commerce negotiations - particularly without advancing many of the original issues of the 1998 Working Group on E-commerce – is a win for developing countries. But while this is a necessary step in advancing a more global, development friendly e-commerce regime (or regimes), it is only the beginning and may not be sufficient to secure development friendly terms for e-commerce at the global level.

There are a number of reasons why. To begin with, the digital economy is not well understood by most, and policy discussions and decisions do not capture its value appropriately or assign it in any meaningful way. The internet and the way it serves as the backbone for commerce and innovation creates a great overlap between trade, individual privacy and development (including national security), but the

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[7] See generally Sacha Wunsch-Vincent and Arno Hold, 'Towards Coherent Rules for Digital Trade: Building on Efforts' in Mira Burri and Thomas Cottier eds), *Trade Governance in a Digital Age* (New York and Cape Town: Cambridge University Press, 2012), 179–221. A recent study notes that there is not even a universally accepted definition of the term 'digital economy'. Bhukt and Heeks (2017) note the extreme ambiguity prevalent around the digital economy that is described in policy and discussions without specifics, such as studies of the European Parliament that call the digital economy "…a "complex structure" or a "less as a concept and more as a way of doing things" (Elmsary et al, 2016). See Bhkht and Heeks, above note 2, at 4.

[8] Deborah James, 'Twelve Reasons to Oppose Digital Commerce Rules in the WTO', Tax Justice Network, 22 November 2017, https://www.taxjustice.net/2017/11/22/twelve-reasons-oppose-rules-digital-commerce-wto/, accessed 23 November 2017.

[9] Parminder Jeet Singh, 'MC11 E commerce Battle Lines Drawn Across Three Camps', 8586 *South-North Development Monitor*, Third World Network, 30 November 2017, available at https://www.twn.my/title2/resurgence/2017/324-325/cover03.htm (accessed 04 December 2017).

[10] Countries in this group include Australia, Japan, Singapore, the US, the EU, Costa Rica, Australia, and Russia, see ICTSD-BRIDGES Daily Update, WTO Ministerial: In Landmark Move, Country Coalitions Set Plans to Advance on New Issues, 14 December 2017, available at: https://www.ictsd.org/bridges-news/bridges/news/wto-ministerial-in-landmark-move-country-coalitions-set-plans-to-advance (accessed 14 December 2017).

[11] Ruth Okediji, 'The International Relations of Intellectual Property: Narratives of Developing Country Participation in the Global Intellectual Property System. 7 *Singapore Journal of International and Comparative Law*, 315-385; Carlos M. Correa, *Intellectual property rights, the WTO and developing countries: the TRIPS Agreement and policy options,* (Zed books: London, 2000); Annette Kur, 'International Norm-Making in the Field of Intellectual Property: A Shift Towards Maximum Rules?' Max Planck Institute for Intellectual Property, 2014, available at: http://www.ip.mpg.de/fileadmin/ipmpg/content/personen/annette_kur/madrid_08032.pdf (accessed 16 July 2017)

scramble for digital gains currently does not create a balance between these three goals.[12] To safeguard individual privacy and developmental interests, what will matter in the future is a sustained capacity on part of developing countries to engage in policy discussions on digital trade based on a coherent perspective of their domestic welfare interests. This calls for an informed discussion on the boundaries of digital trade, the relevant digital technologies and their impacts on developing countries. Secondly, free trade agreements (FTAs), which have stepped in to fill in the vacuum created by the impasse in the WTO Working Group provide an alternate universe of e-commerce regulations since the early 2000s. As of September 2017, over 90 FTAs had specific e-commerce provisions of which 57 FTAs contained dedicated e-commerce chapters or detailed provisions related to e-commerce.[13] Consequently, digital trade as it stands today is not unregulated or self-regulated but selectively regulated, raising several questions on what developing countries can do and achieve on the side, and whether there is still sufficient room left.

This article focuses on the challenges in regulating the digital economy from the perspective of development, and offers a discussion of the interdependency between the economic, social, personal and developmental aspects of digital trade for developing countries. It argues that there are at least two important reasons why the digital economy and the growth of e-commerce marginalise development concerns. The first reason is the polarised and uneven nature of the growth of digital technologies, which is majorly centred in the industrial world and relies on industrial capacity for use and profit generation. The second reason for the marginalisation of development interests, this article argues, stems from the structure of multilateralism today, which continues to be a conduit to legitimise national policies of industrialised countries on a universal level in some key areas of policy.[14] These policies, now pursued through a large number of FTAs, have led to the emergence of a new kind of norm-setting for e-commerce that bypasses the agenda of the 1998 Working Group on E-commerce to a large extent. The e-commerce templates in FTAs generate a new form of instability in international norm setting by limiting policy space of countries to promote national digital regimes. But it can also serve as a precursor of legal, institutional innovation and policymaking of a kind that re-institutes certain defensible norms that balance trade with development and individual privacy interests. The article, in the last section, explores how and in what ways developing countries can institute such defensible norms both in national policies and through collective action at the international level.

Section II opens with a detailed discussion on key digital technologies, and their plausible impacts on employment and industrial catch-up, to highlight the divisive nature of digital technologies. Section III then analyses the unfulfilled promise of a pro-development perspective at the WTO looking at how multilateralism has currently failed e-commerce. In this section, the incoherence between digital realities and the policy debates at the WTO are presented to show how the institution might have become a means to legitimize national policies of industrialised countries on a universal level in this important area of policymaking. Norm-setting through FTAs is also analysed at length in section III of the article, which provides a comprehensive review of the plurilateral and bilateral policy developments in e-commerce. The ramifications for developing countries are discussed in the form of a couple of examples. Section IV presents some options for developing countries for the future at the national and international level.

This article defines the digital economy as the sum total of activities that go into the creation of ICT (internet and communication technologies) infrastructure on the one hand, and those that promote the use of ICTs for economic purposes. The digital economy moves beyond the traditional ICT or software industry to include all electronic (and database) based trade and services that are non-technical in nature but rely on the internet and employ software infrastructures. In this context, the expansion of cloud

[12] See Anupam Chander and Uyen P. Le, 'Data Nationalism', 64 *Emory Law Journal* 3(2015), 677-739.
[13] Mark Wu, 'Digital Trade-Related Provisions in Regional Trade Agreements: Existing Models and Lessons for the Multilateral Trading System', Inter-American Development Bank and ICTSD, November 2017.
[14] See for example, Ruth Okediji, 'Public Welfare and the Role of the WTO: Reconsidering the TRIPS Agreement', 17 *Emory International Law Review,* (2003), 845–48.

computing has been critical since it helps spread connectivity[15] and the rise of big data analytics, RPA and AI have brought many traditional sectors into the purview of e-commerce, such as health, agriculture and retail trade. But digitisation has only just begun, and a large number of future new sectors are anticipated to emerge that either build on existing traditional sectors or are completely new, at the technological frontier, such as quantum computing and nanotechnology.[16] Almost all, if not all, of these digital economy activities are broadly captured under the lattice of e-commerce or electronic commerce, which denotes all economic transactions that unites industries, applications, users and sellers of economy activities on the internet.[17]

II. The Digital Economy and its Multifaceted Impacts

The digital economy's recent expansionary trends are evident in its current and projected economic valuations. As of 2016, it was estimated that global e-commerce website sales were above USD 22 trillion, with projections that it will expand to USD 27 trillion by 2020.[18] Much of these new gains are from a 're-boom' in e-commerce, where companies benefit by providing new kinds of services and applications based on digital technologies that are applied to industry. Amazon for instance is thriving on revenues from Amazon Web Services, which according to recent estimates, accounted for 74% of its operating income.[19] But on the whole, a number of uncertainties persist on who benefits, how and what this will mean for the future. This section discusses the main digital technologies, its multifaceted nature and potential divisive impacts for developing countries.

A. Current and Future Digital Technologies

The list of potential applications that digitisation provides can be quite long but they are all based on three kinds of digital technologies that are re-defining e-commerce landscape today: big data analytics, automation (RPA) and artificial intelligence (AI), and digital manufacturing. Blockchain technology is the newest kid on the block; however, analysts studying technological innovation in the digital space believe that a blockchain revolution may still be several years away.[20]

1. Big data analytics

Big data is a term that "…[d]escribes large volumes of high velocity, complex and variable data that require advanced techniques and technologies to enable the capture, storage, distribution, management,

[15] Accenture estimates that public cloud computing reached US$70 billion in 2015 alone. See Mark Purdy and Paul Daugherty, Why AI is the future of growth, Accenture, 2016, p.11.
[16] Other new sectors, such as subscription e-commerce are also on the rise. See the discussion in Jay I. Sinha, Thomas Forscht and Thomas T. Fung, How Analytics and AI are Driving the Subscription E-Commerce Phenomenon, MIT Sloan Management Review, 01 December 2016.
[17] In the WTO's Working Group on E-commerce, e-commerce is " …[u]nderstood to mean the production, distribution, marketing, sales or delivery of goods and services by electronic means." (see WT/L/274, 30 September 1998., Adopted by the General Council on 25 September 1998). According to the OECD, e-commerce - as the production, advertising, sale and distribution of products via telecommunications networks – is both dependent upon trade and transforming the way in which trade is conducted (see http://oecdobserver.org/news/archivestory.php/aid/421/E-commerce_and_trade: resolving_dilemmas.html). Also see Mann, Catherine. L. "Electronic Commerce in Developing Countries: Issues for Domestic Policy and WTO Negotiations", in Robert Stern (Ed.), Services in the International Economy, University of Michigan Press, 2001. Insert page number.
[18] Gfluence, Who tops the Big 15 E-commerce market in 2017 - US or China?, Gfluence, February 19, 2017; https://gfluence.com/ecommerce-predictions-2017-happening-top-15-markets/, accessed 13 August 2017.
[19] Economist, E-Commerce: There be Giants, Special Report on E-commerce, 28 October 2017.
[20] See Lakhani and Iansiti, above note 3.

and analysis of the information".[21] Data has since long been available but cloud computing has transformed the big data situation particularly because platform vendors make it possible now to set up data clusters in the cloud that can be accessed by users[22] with a user-based pricing system that often does not require software licenses.[23]

The internet, as a consequence, is generating a staggering large amount of data each second and companies often find themselves flooded by data generated from the various services offered on the internet, such as search engines, other websites, landing pages, online platforms and social media.[24] These data flows can help to systematically map customer behaviour, competition trends, price comparisons (thereby showing ways to cut costs), among others,[25] thereby serving as the backbone for a large number of new activities, including the generation of new business models that rely on matching products to customers' better thereby increasing firm-level profits, technology forecasts (what the consumers might be interested in, what are becoming trend setters) that help firms tweak product pipelines or change R&D strategies, and other forms of business analysis and insights.[26] In a wide variety of sectors such as health care[27] firms that can use or own big data stand to have certain advantages, including stocking product pipelines appropriately or planning better on where to invest their R&D, or devising new personalised innovations using the IoT.

But all data are not equal; and the value of data is dependent not on access but on data mining capabilities.[28] Data based on internet surfing can be used to promote products personalised to consumers' tastes. Companies such as Google allow vendors to place advertisements on other sites accessed by the same users using this kind of surfing history to target them further on topics of personal interest.[29] Such data is different from what can be collected when customers establish user accounts and leave traces of personal choices, such as on Amazon over a period of time, or with Facebook and Twitter, which have even more intricate information on individuals through their constant reactions on 'like', 'share' and 'post' actions. This kind of data on interactions that are conducted in an enclosed environment makes it possible to construct individual behaviour using relatively large historical datasets on people that contain their actions, likes and dislikes and details of personal lives. Such data is a critical input for artificial intelligence (see next section).

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[21] TechAmerica Foundation's Federal Big Data Commission, 2012, quoted in Amir Gandomi and Murtaza Haider, Beyond the Hype: Big Data Concepts, Methods and Analytics, International Journal of Information Management, Vol. 35, 2015, p. 137-144, at p. 138.

[22] Typically through big data tools like Hadook or Spark.

[23] Amazon, for instance, offers cloud services through Amazon Web Services. Some applications although available on cloud require user licenses, such as word-editing or other such process software that can be downloaded for use. Such data is usually governed by the terms of the cloud services provider that one chooses.

[24] Daniel Newman, Data Analysts and Scientists More Important Than Ever for the Enterprise, Digitalistman, 28 April 2017. Available at: http://www.digitalistmag.com/author/daniel-newman, accessed on 17 August 2017.

[25] Tesco, the UK supermarket chain, for instance is well known for datamining to decipher customer purchase patterns to suggest new products.

[26] For example, a large number of supermarkets or online platforms have big data sets collected through store cards or customer accounts that can be used to understand and track consumer behavior. This not only helps to create better sales strategies, it also provides insights into what other forms of products can be suitable, what the fears, preferences and likes of customers generally are, apart from shedding light on the general lifestyles.

[27] Wullianallur Raghupathi and Viju Raghupathi, Big Data Analytics in Health Care; Promise and Potential, Health Information Science and Systems 2014, pages 2-3. Available at: http://www.hissjournal.com/content/2/1/3 accessed 25 August 2017.

[28] Velocity, variability and volume are three challenges aspects of big data management, and it is well acknowledged that issues of unreliability of data are also a big problem. See Amir Gandomi and Murtaza Haider, Beyond the Hype: Big Data Concepts, Methods and Analytics, International Journal of Information Management, Vol. 35, 2015, p. 137-144.

[29] For example, if one googles for 'best hotels in Greece' on Google, advertisements on Greece or holidaying in Greece are likely to show up on the other websites regularly used by the individual.

2. Automation and artificial intelligence

Robotics process automation (RPA) and artificial intelligence (AI) are generally used to denote a variety of algorithmic techniques that make it possible for computers and machines embodying computers to mimic human actions.[30] RPA can help streamline a large number of tasks that are routine but extremely essential in the information technology sector, such as updating customer profiles, filling out timesheets and other such administrative tasks that were needed for upkeep and maintenance. RPA software can be programmed to deal with such tasks automatically thereby eliminating the need for human intervention, within and beyond the IT industry.[31]

Big data provides fodder for AI, where learning is based on information on interactions, preferences and a history of repeated actions that allow for the tracing of historical behaviour. This helps to create machines that perform routine tasks, or even mimic 'learning' or 'problem solving', in ways that can augment human capabilities.[32] The kinds of data that are useful for AI are those that are available through user created online accounts on various e-commerce platforms or what reveals strong personal preferences along with other data on the individuals (such as in social media). Algorithms built using such data allow for several variations of AI innovations, such as assisted intelligence (when you are involved to a large extent but the machine conducts the activity) or autonomous intelligence (when the machine can function on its own, learn and systematically store the learnt actions to inform future behaviour). Important examples of autonomous intelligence are driverless cars, or services such as IBM Watson Software, which is an AI platform for business that provides a variety of solutions – from the creation of virtual agents to conduct business to developing more intelligent irrigation systems for vineyards.[33]

AI is expected to drive growth in at least three ways: by creating a virtual workforce, by augmenting existing skills and workforce in the economy and through newer innovations that use AI.[34]AI is already in use quite extensively in the retail business, an interesting example of which is the German firm Otto that uses a learning algorithm generated by CERN originally to forecast a week before what its customers will order. This system, working at 90% certainty, has enabled the firm to generate extra profits.[35]

3. Additive and direct digital manufacturing

Additive manufacturing, or more popularly rapid manufacturing or 3D printing (3DP) relies on two main kinds of software: a 3D computer-aided design (CAD) or any other 3D software that creates the digital model and a 'slicing software' that cuts the product into numerous cross-sectional layers that are each less than a millimetre thick.[36] Once the digital model is ready, the final product can be fabricated by adding

[30] Mirjana Stankovic, Ravi Gupta, Bertrand Andre Rossert, Gordon I. Myers and Marco Nicoli, Exploring Legal, Ethical and Policy Implications of Artificial Intelligence, White Paper of the Global Forum on Law, Justice and Development, Draft September 2017. http://www.globalforumljd.org/sites/default/files/resource/Artificial%20Intelligence%20White%20Paper%20Draft%205Oct2017.pdf

[31] For instance RPA software can be programmed to administer personal information questionnaires for human resource recruitments, thereby allowing such personnel to be employed elsewhere within firms.

[32] Stankovic et al, above note 30, at 6.

[33] See the IBM Watson Website: https://www.ibm.com/watson/ai-stories/index.html

[34]Purdy and Daugherty, above note 15, at 13-14.

[35] The Economist, 'How Germany's Otto Uses Artificial Intelligence', April 12, 2017.

[36] Barnatt, Christopher (2014), "3D Printing – Second Edition", published by explainingthefuture.com

different materials, on a layer-by-layer basis, with the help of a 3D printer.[37] Products can be produced in several ways, such as polymerisation, use of a bonding agent, melting and laminating making transmission of data the main issue in 3D printing as opposed to transportation of goods in conventional manufacturing.

3D printing shortens several stages of manufacturing (such as design, prototyping and product layout, all of which are created digitally) and also enables production to be tailored on individual design specifications. Since the cost of printing one additional unit is little or nothing once the digital model is ready to be fabricated, 3D printing can fundamentally change manufacturing by making it scale independent. When additive-manufacturing technologies can also be used for the large-scale manufacture of end-use components they are called direct digital manufacturing (although term 3D printing is used to denote all such variations in common parlance).[38] Direct digital manufacturing provides for tailor-made solutions with higher or even low volume production loads. What will become important in this context for the future is that digital manufacturing enables digital archiving of the design and manufacturing information associated with that particular spare part, which can be transferred electronically anywhere in the world for part production, and therefore has important implications for global enterprises.[39]

4. Block chains

Block chain is an internet-based, peer-to-peer network that was originally created for the bitcoin currency in 2008 to allow for the issuance and record keeping of online currency transactions. But the technology has uses that go far beyond that given its capacity to store and distribute digital information without the risk of copying. It can be programmed to create a digital ledger of all economic transactions of value of any kind and can work across any number of digital devices connected on a network. Any system based on blockchains will allow for the digital ledger to be replicated in a large number of identical databases, each hosted and maintained by an interested party. All information serves as a kind of a digital spreadsheet of transactions on the common database that is automatically updated in a way that is impossible to edit or forge.

Block chains are predicted to replace normal contracting mechanisms, allowing them to be concluded and monitored digitally and stored in transparent databases that cannot be edited or tampered with.[40] The potential for expansion of this technology is immense: since every digital transaction has a signature, the technology can help eliminate all intermediary functions offered by lawyers, bankers and other kinds of brokers.

B. The Divisive Aspects of Digital Technologies

Until recently, the internet has been considered widely to be a leveller of sorts in that it promotes democratic participation, increases networking and efficiency thereby reducing costs of production and supports trade creation. New digital technologies and growing e-commerce, while exhibiting all of these characteristics, have unrivalled capacity to create new divides, particularly by re-organising job markets and employment prospects, and by increasing the costs for catch-up for developing countries.

1. General Impacts on Job Creation and Employment

[37] Kommerskollegium, Trade Regulations in a 3D Printed World: A Primer, National Board of Trade, Sweden, 2016, p.8.
[38] Ian Gibson, David Rosen, Brent Stucker, Additive Manufacturing Technologies, Springer Publishers, 2015, p. 375.
[39]Ibid, at 375.
[40] Lakhani and Iansiti, above note 3.

In years to come, the widespread use of 3D printing is expected to bring in a sea change in the way the manufacturing sector has historically been perceived[41] at least in three important ways, calling into question the manufacturing-led development model for the future. Firstly, it is expected to make manufacturing scale-independent, as a result of which even small quantities of any good can be produced profitably. This is expected to lead to re-shoring of industrial activities to its headquarters or main location where applicable. Secondly, existing studies forecast that if 3D printing continues to expand, it will lead to a reduction in the trade of manufactured goods in favour of the export of raw materials only, and an increase in trade in services, because 3D printing moves the design and engineering of the products from a typical manufacturing activity to a services activity.[42] Finally, this could also mean a decrease in the volume of total trade eventually because apart from the design and engineering components, 3D printing also eliminates a large number of intermediary trade operations that are common to traditional manufacturing, such as the supply of spare parts, transport, assembly, and so on, which can all be potentially integrated into the main process directly now.

Discussions on how drastic or imminent these changes are should consider the fact that at this point of time, despite the fact that 3D printing is in use in some sectors such as medical devices, the jury is still out on whether 3D printer will became a fearful force in the near future. Particularly, the widespread optimism on the use of the technology has been dropping in the past two years.[43] This is because 3D technologies that are now freely available in the market are rather outdated[44] and the 3D printing market that employs new technology is rather concentrated with 3D Systems Corp (NYSE: DDD) and Exone (NASDAQ: Xone) in the lead. It is estimated that professional industrial 3D systems can cost anything up to 1 million USD,[45] making high costs a deterrent for wide scale industrial use, which can only be resolved with the introduction of more competitively, priced industrial systems in the years to come. A recent survey conducted in 900 companies in 12 countries based in Western Europe, USA, China and South Korea concluded that 40% of all companies considered high costs to be a deciding factor while investing in industrial scale-3D production systems.[46] The survey found that Chinese and South Korean manufacturers were the most active in applying the technology for end production on a mass scale, with one in every two Chinese companies expected to use 3D printing for production by 2021.[47]

In contrast to 3D printing, RPA and AI are already widely being exploited in industry with tangible effects for now and the future. There are multiple studies that forecast that RPA will lead to the creation of new jobs,[48] as will the greater use of AI.[49] AI is expected to be a game changer in many sectors, but mainly information technology, financial services, banking, retail and health care. While reliable data on the topic corresponding to different regions of the world is yet to emerge, two important preliminary conclusions can be drawn. In the short term, the quest for greater productivity, efficiency and profits

[41] Mary Hallward-Driemeier and Gaurav Nayyar, Trouble in the Making?: The Future of Manufacturing-Led Development, World Bank, 2017.
[42] Kommerskollegium, above note 37, at 20.
[43] This view was taken by most industry sources interviewed for this article as well.
[44] Hornick (2015) notes that around 16 patents on core 3D printing technologies, particularly those related to Material Extrusion, Powder Bed Fusion and Vat Photopolymerization expired in 2013-14, but this only means that 3 D printing that is 20 years older is now widely available for use. See John Hornick, 3D Printing Will Rock the World, US Library of Congress, South Carolina, 2015.
[45] Ernst and Young, How will 3D Printing Make Your Company the Strongest Link in the Value Chain, 2016, p. 15.
[46] Ibid, at p. 15.
[47] Ibid, at p.11.
[48] Martin Ford, Rise of the Robots: Technology and the Threat of a Jobless Future, Basic Books, 2015.
[49] Purdy and Daugherty, above note 15; PWC, What's the Real Value of AI for your Business and How can you Capitalise?, 2017.

across sectors might be accompanied by rendering some kinds of job redundant.[50] For example, if a global company is able to create a RPA platform that addresses all its maintenance issues, it may eliminate the need for certain kinds of human operated call centre functions.

But in the longer term, both RPA and AI are predicted to lead to job shifts or concentration of human skills from certain occupations within firms (such as human resources or routine software management) to other occupations such as those focusing on data analytics, robotics engineers and other forms of technology specialists that will support increased digitisation. In addition to these kinds of changed labour demands, it is estimated that the expansion in cloud computing at the industrial level for instance, will generate a demand for a significant amount of workforce to functions related to cloud computing hardware and software.

2. A Note on Individual Privacy and National Security

Given big data's relevance for AI, firms not only need free flow of data, but are investing into building capabilities in data analysis that has become part of their investment portfolios.[51] Data control is expected become a major driver of business, thereby worsening the existing nature of industry concentration and strengthening the superstar firms that have emerged in a variety of sectors globally.[52]

But at the same time, greater flow of data comes with spam, malware and cyber-attacks, which call for internet filtering to minimise these risks.[53] Big data also raises the question of personal security of individuals transacting on the internet and whether or not information related to them can be shared and used to create new applications without explicit consent. In a bid to safeguard citizen's rights, a large number of countries have national regulations on how data on their citizens/ data collected within the country through internet transactions should be treated. Such data localisation laws that require data to be stored within national borders are often used to ensure that the data flows generated within a given country are not transferred beyond its borders. A large number of countries have enacted (or are in the process of enacting) such policies, including Argentina, Australia, Belgium, Brazil, Bulgaria, Canada, China, Columbia, Cyprus, the European Union, Finland, France, Germany, Greece, India, Indonesia, Malaysia, Nigeria, Russia and South Korea.[54] Broadly speaking, data localisation can range from mandating all data to be localised, or simply ask for localisation of one or some of the following: personal data, health, accounting, financial and tax data, government and public data, telecommunications data or

[50] PWC, Will robot Steal Our Jobs: The Potential Impact of Automation on UK and Other Major Economies, 2016. https://www.pwc.co.uk/economic-services/ukeo/pwcukeo-section-2-automation-march-2017-v2.pdf, accessed 19 August 2017.

[51] According to some estimates, the extent of business spending on 'analytics', a term that refers to data mining to search for patterns and relationships had increased by 72% in the USA alone already in 2012. See SAS Accenture, Getting your Money's Worth with Analytics, White Paper, 2012.

[52] On the impacts of market concentration in global markets, see UNCTAD, 'Beyond Austerity: Towards a New Global Deal', Geneva, 2017. The concept of 'superstar firms' was first introduced by Rosen (1981), arguing that in markets where a quality advantages exist, a small number of suppliers would dominate the market and command most of the returns. See Sherwin Rosen, 'Economics of Superstars." 71 *American Economic Review* 5(1981), 845–58. This "winner takes all" idea is further explored in the current industrial landscape by David Autor, David Dorn, Lawrence F. Katz, Christina Patterson and John Van Reenen, 'Fall of the Labor Share and the Rise of Superstar Firms' MIT Working Paper, No 2, 2017.

[53] Joshua Meltzer, The Internet, Cross-Border Data Flows and International Trade, Issues in Technology Innovation, Center for Technology Innovation at Brookings, No. 22, February 2013.

[54] See Nigel Cory, 'Cross-Border Data Flows: What are the Data Barriers, and What do They Cost?' (Information Technology and Innovation Foundation, 2017), at 20. Chander and Le conduct an analysis of seventeen countries with data localisation measures, see above note 12.

other forms of processes or services such as online publishing or online gambling that bypass normal distribution channels.[55]

Such measures are highly polarising and policy positions oscillate between two extreme views. There are those that argue that the free flow of data is critical for trade and innovation, calling for a harmonisation of regulatory standards and legal certainty.[56] According to many who advocate this perspective, arbitrary national regimes that seek to control the flow of cross border data are inimical to economic growth because they put pressure on enterprises to adapt and the lack of certainty on protection of intellectual property also creates uncertainty for innovation in digital technologies.[57] Many others perceive that data control will determine the future of industries and technologies and the call for harmonising legal regimes and promoting digital trade will benefit incumbents in countries that hold competitive advantage in these technologies right now with prejudicial impacts for developing countries.[58]

3. Particular Impacts on Developing Countries

Economic gains from digital technologies are of two kinds: those that accrue from developing and pioneering these technologies and related e-commerce applications and those that accrue from applying them to industrial production. Currently, a large number of developing countries are marginalised on both fronts.

First of all, existing data shows that large parts of RPA, AI and 3D companies are all located in a handful of countries, namely, countries of Western Europe, USA, China and South Korea. As of 2015, not only were most robotic companies were located in the developed world,[59] most companies that use robotics process automation in production were also located in the industrialised countries. The link between the use of digital technologies and growing e-commerce gains is also anecdotally supported by estimates of world retail shares in e-commerce, which show that the top 15 markets are almost exactly the same where new digital technologies are concentrated, with the exception of Mexico, Brazil and India.[60] In a preeminent strike to safeguard first mover advantages and related gains, countries with pioneering digital technology firms have been quite policy savvy in terms of enabling the creation of knowledge goods based on data mining through various incentives – this has, in fact, set the stage for the emergence of AI and RPA technologies.[61] Policy regimes in many countries have expanded the reach of intellectual

[55] Ibid, at 20.

[56] See for example, United States International Trade Commission (USITC),' Digital Trade in the US and Global Economies: Part 1 Investigation,' No. 332-521, 2013; United States International Trade Commission (USITC),' Digital Trade in the US and Global Economies: Part 2 Investigation, No. 332-540, 2014; Chander and Le, above note 12; Mira Burri, The Regulatory Framework for Digital Trade in the Trans-Pacific Partnership Agreement, In Roffe, P. and Seuba, X. (Eds), Current Alliances in International Intellectual Property Lawmaking: The Emergence and Impact of Mega-Regionals, A CEIPI-ICTSD Publication Series, September 2017.

[57] See Meltzer, Above note 53.

[58] See Shamel Azmeh and Christopher Foster, 'The TPP and the Digital Trade Agenda: Digital Industrial Policy and Silicon Valley's Influence on New Trade Agreements', London School of Economics, Working Paper Series No. 16-175 (2016).; Deborah James, above note 8.

[59] While 40 companies situated in the USA, the other countries with some level of robotic industrial capacity were Germany (8 companies), Japan (5), UK (5), China (5), France and Canada (4 each), followed by South Korea (3), Italy (3) and Switzerland (2). See Andrew Keisner, Julio Raffo and Sacha Wunsch-Vincent, Robotics: Breakthrough Technologies, Innovation, Intellectual Property, Foresight and STI Governance, 2016, Volume 10, No. 2, P. 7-27, at p. 10-11.

[60] Data from emarketer.com, in Gfluence, Who tops the Big 15 E-commerce market in 2017 - US or China?, Gfluence, February 19, 2017; https://gfluence.com/ecommerce-predictions-2017-happening-top-15-markets/, accessed 13 August 2017.

[61] In many of the countries that have previously actively encouraged or permitted open data policies that allow the use of government data by the private sector to create knowledge goods, there is a debate on whether this marks a

property rights (IPRs) as they relate to e-commerce in this process, which is discussed at length in the next section.

Secondly, the presence of some level of industrial capacities is a pre-condition to benefit from new digital technologies and industry 4.0, given that these are technologies and innovation that automate and connect *existing* industrial capacity. Economic growth, in other words, is dependent on how capable countries are in absorbing these technologies and applying to existing industry.[62] Disaggregated studies available up to now also show that savings from digital technologies are more likely to accrue in large-scale industrial activities and in some technology-intensive sectors such as automotives and computer technology where applications and returns abound, and less likely in other sectors such as ready-made garments or agro-processing.[63]

The gains from applying digital technologies to industry can indeed be quite vast with potential to reverse some of the sluggish growth trends that have plagued a large number of industrial countries over the past decade. Global consultancy firms have come up with several estimates and forecasts on the transformative changes that can be expected as a result of AI, RPA and cloud computing.[64] The extensive use of RPA in production is predicted to boost global GDP by 14% (or USD 15.7 trillion) by 2030. China is forecasted as the country most likely to benefit from a GDP boost (26% by 2030) followed by North America (14% by 2030), although many other regions will also see some benefits. Africa for example, is forecasted to derive 5.6 % if it's GDP through the greater use of AI by 2030, while Latin America is expected to gain 5.4% of GDP.[65] The report estimates that the sectors most likely to benefit are financial services and health care, as AI will increase productivity immensely in these sectors.

But disturbing truths lurk beneath the current geographical distribution of technology creation and industrial production. An important aspect of the digital economy that sets it apart from other previous developments is that while previously technologies were inputs to the process of industrialisation, industry 4.0 makes industrialisation and structural diversification a pre-requisite for countries to participate in, and benefit from, the digital economy.[66] This implies that:

(a) The effects of digitisation are dependent on the level of development of countries: For those developing countries with some level of industrial capabilities that are engaged in sectors such as automotives and information technologies, the quest for industrial productivity through RPA and AI at the global level will render certain kinds of outsourced jobs redundant. This is a trend that is ongoing in the IT sector in India[67] and industry consolidation through process automations is

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failure on part of governments to extract returns to the public for investing in big data. See Ruth Okediji, 'Government as Owner of Intellectual Property? Considerations for Public Welfare in the Era of Big Data', 18 *Vanderbilt Journal of Entertainment and Technology Law 2(2016), 331-362, at 333.*

[62] See Purdy and Daughterly, above note 15.

[63] UNCTAD, Beyond Austerity: Toward a New Global Deal, United Nations: Geneva and New York, 2017.

[64] Accenture for example, estimates that public cloud computing reached US$70 billion in 2015 alone with a huge capacity for expansion and further growth. See again Mark Purdy and Paul Daugherty, above note 15, at 11.

[65] PWC, above notes 49 and 50.

[66] This is not surprising given that new e-commerce gains, in large parts, rely on electronically trading what is being manufactured. Many studies therefore estimate that the gains from AI, for example, will be dependent on how diversified an economy is. PWC, above note 49, at 13.

[67] The past two years have seen a tremendous rise in process automation in the IT industry, which is evidenced by the layoffs in the Indian IT sector. Before the end of 2017, seven of the largest Indian companies (Infosys Ltd, Wipro Ltd, Tech Mahindra Ltd, HCL Technologies Ltd, US-based Cognizant Technology Solutions Corp. and DXC Technology Co., and France-based Cap Gemini SA), which account for approximately 1.24 million jobs in the Indian market are expected to let go of 4.5% of their workforce. See Varun Sood, Seven Top IT Firms to Lay Off 56,000 this Year, New Tech and Trump's Policies Blamed", Hindustan Times, 19 July 2017, available at: http://www.hindustantimes.com/business-news/seven-top-it-firms-to-lay-off-56-000-this-year-new-tech-and-trump-s-policies-blamed/story-nDPfhZ3taX0WkE3sJotVwM.html, Accessed 21 August 2017.

expected to continue, with consequences for other emerging countries, predominantly in Asia and Latin America. In the course of the changes introduced by 3D printing, RPA and AI the gains will mostly accrue to the original equipment manufacturers (OEMs) within existing global value chains.[68]

(b) For countries with little industrial capacity, it is only artificially reassuring that digital technologies are not being applied and jobs will not be displaced in the immediate future. A more balanced account of the ongoing is that countries that do not possess wide-spread industrial capabilities, for example least developed countries, or do not engage in specific sectors where digital technologies are being widely applied, will not see any effects. A rather longer-term corollary of this is far more critical to note: the absence to apply such technologies excludes countries' from being able to use digitisation for economic growth.[69]

A wide range of job opportunities is predicted as countries expand the use of digital technologies. It is anticipated that if not all; almost all the jobs that will be replaced will be created in other domains of industry. This job creation potential is conditional on the presence of highly skilled and supple labour that can be moved from firm-level operations that are expected to become redundant to other areas of specialisation that will facilitate the industrial transformation to hybrid production systems where machines and humans work side-by-side. Most of these jobs will be in areas such as data analysts, robotics process automation engineers, cloud computing experts, and inter-disciplinary task managers, and economies are called upon to prioritise STEM education, which is expected to play a critical role in enabling such skills creation.[70] As an example, the immediate job attritions in the IT sectors in India could potentially be made up with adequate training and re-skilling of these employees in upcoming areas of the digital economy, such as cloud computing and data analytics.

III. E-Commerce and the Failure of Multilateralism: Incoherence Between Policy and Reality

It is befuddling to review the developments at the WTO on e-commerce, especially in light of the severity of the nature of issues raised by the digital economy as reviewed in the previous section. At the WTO, a startling shortcoming of the e-commerce policy debate has been the incongruence between what the digital economy is, where its boundaries stand, and how best to regulate it. In other words, digital technologies show the true expanse of digital trade as one comprising hardware, software, networks, platforms, applications and data as its core elements, thereby stretching the boundaries of e-commerce to trade in goods, services and intellectual property protection. But this far-reaching scope of the digital economy is often not taken into account in policy discussions, as a result of which much of the debate on the topic has unfortunately focused mainly on trade in services. Some of these discrepancies, as exacerbated by individual country positions on e-commerce, have led to the abandonment of the issues identified by the 1998 Working Group on E-commerce. Section A below discusses the key issues in the policy debate on e-commerce at the WTO. Section B highlights how this insidious nature of trade politics has promoted a caustic blend of bilateral agreements and national policies that further the interests of some countries in the global digitisation agenda.

A. The Incoherence Between Digital Realities and Policy Debates at the WTO

Tracing the debate from the start, it would seem that few strides have been made in the WTO since the original accession by member States to the General Agreement on Trade and Tariffs (GATT) and the General Agreement on Trade and Services (GATS) as part of the Uruguay Round. An important development is the Information Technology Agreement, which seeks to promote 'maximum trade in

[68] Current forecasts confirm this conclusion; see for example, Ernst and Young, above note 45.
[69] See Purdy and Daughterly, above note 15.
[70] See for instance: http://www.azcentral.com/story/money/business/jobs/2017/09/04/how-artificial-intelligence-robotics-could-transform-jobs-10-years/574501001/

information technology products' in pursuit of which, the agreement provides for zero tariffs on a select range of IT products, including computers, telecommunications equipment, semi-conductors and their manufacturing components, software and data-storage equipment.[71] This Agreement, adopted at the Singapore Ministerial Conference of the WTO in 1996 by 29 countries, had expanded to 82 signatories by 2015.[72]

But at a more general level, a critical issue for countries while negotiating at the WTO has been whether e-commerce and new forms of digital outputs –particularly digital services - should be categorised as part of the General Agreement on Trade and Tariffs (GATT) or the General Agreement on Trade and Services (GATS) or both.[73] Divergent positions have existed from the start on whether e-commerce is a good or a service, what extent of protection it should have, and how the various kinds of internet-based transactions and digital goods can be classified.[74] Since e-commerce became a significant phenomenon only in the late 1990s, the WTO Work Programme on E-commerce was created in 1998 to address the issues in this relatively new area at the time. Despite the progress made under the Work Programme, members have been unable to resolve core questions, namely:[75]

- Agree on a clear and permanent moratorium on electronic transmissions;
- Clarify as to whether the GATS rules and specific commitments there under are applicable to delivery of electronic services;
- Clarify as to whether electronically traded services fall under Mode 1 or Mode 2;[76]
- Make progress on clarifying and scheduling new services that have arisen in the context of e-commerce since 1998;
- Agree on a classification of digital products (whether they fall under the GATT or GATS)
- Determine 'likeness' issues for application of MFN and national treatment, particularly between electronically provided services and traditional services;
- Decide whether the GATS Article VI applies to e-commerce (on domestic regulation); and
- Decide to what extent the exceptions provided under Article XIV GATS apply to e-commerce.

What has been really problematic in the GATS is its classification of products in the schedules, which emanates from the UN Provisional Central Product Classification. Although the said UN Classification has been updated since then, the GATS still operates with the 1991 version, which offers the choice of (a) computer and related services, (b) value-added telecommunication services, (c) entertainment

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[71] For different perspectives on the ITA, see generally, Nichael Anderson and Jacob Mohs, 'The Information Technology Agreement: An Assessment of World Trade in Information Technology Products', USITC working papers, 2009; Dieter Ernst, 'Is the Information Technology Agreement Facilitation Latecomer Manufacturing and Innovation: India's Experience', East West Center Working Papers No. 135, November 2013.

[72] Mira Burri, 'Current and Emerging Trends in Disruptive Technologies: Implications for the Present and Future of EU's Trade Policy', Paper for the Directorate-General for External Policies of the European Union, 2017, at 15. Burri also notes that in 2015, 50 members of the ITA agreed on its expansion to cover 201 product lines that are valued at over 1.3 trillion USD per year (see at 15).

[73] The GATT is applicable equally to all trade, whereas the GATS allows countries to determine market access and national treatment as specific commitments that are made on a sectoral basis, incumbent on trade negotiations (Articles XVI-XVII of GATS).

[74] See for example, Usman Ahmed, Brian Bieron, and Gary Horlick, Mode 1, Mode 2 or Mode 10: How Should Internet Services be Classified in the General Agreement on Trade and Services?, Current Topics in International Law, Boston University School of Law, 2015. Available at: https://www.bu.edu/ilj/2015/11/24/mode-1-mode-2-or-mode-10-how-should-internet-services-be-classified-in-the-global-agreement-on-trade-in-service/#_ftn18, accessed 29 August 2017.

[75] For a full discussion (of which these bullet points provide a summary) see Sacha Wunsch-Vincent and Arno Hold, above note 7, at 4-5.

[76] Article 1.3 GATS on Definition of Services Trade and Modes of Supply provides for four different modes: Mode 1: from the territory of one member to the territory of another; Mode 2: in the territory of one member to service a consumer of another country; Mode 3: through an established commercial presence in the territory of another country; Mode 4: through the presence of a natural person.

or audiovisual services and (d) financial services for digital products. This has caused confusion regarding classification of products from the start. For instance, under the GATS, the commitments involving programming content were classified under audiovisual services, while those purely involving the transmission of information were classified under telecommunications.[77] Digital products and services are far more sophisticated today defying these nominal categories in a variety of ways, leading to even greater ambiguity on how items such as online games, cloud computing, search engines, mobile applications, internet platforms, internet of things are to be treated. For example, whether online games are part of audiovisual services or whether they fall under telecommunication services, or whether they fall simply under computer and related services can determine how many foreign providers can co-exist in the market and how they are treated within a country. Determining how each of these is classified entails serious consequences because GATS schedules provide for a number of modalities that all depend on the classification of products such as the kind of market access, exceptions, limitations on number, value and other kinds of restrictions, such as the amount of foreign capital that may participate in that sector.

While a number of WTO members have made far-reaching commitments for market access and national treatment of computer and related services, there are variations in the levels of commitments and many of the countries have not made commitments in the other sectors.[78] The number of sectors and sub-sectors that a country has committed to can determine the amount of national policy space they have left. A good example in this context can be found in the commitments to the category *computer and related services*, which comprises five listed sub-sectors in the GATS: consultancy services related to the installation of computer hardware, software implementation services, data processing services and database services, maintenance and repair; and other computer services. Assuming that a country commits to the sub-sector 'data processing services', this would mean that it can no longer limit market access or differentiate between local and foreign providers in the case of cloud computing providers while setting up its own digital infrastructure.[79]

The extent of liberalisation of the global regime for ecommerce hangs in the balance, which is dependent on whether electronically provided services can be classified as a service under the GATS, and whether they fall under mode 1 or mode 2. Classification as Mode 1 would allow countries to regulate the activities of providers of any services using the internet on jurisdictional and other grounds, and has been argued for by many developing countries. Mode 2 would mean liberalising the sector entirely on grounds that the customer initiates the transactions, leading to a full-fledged liberalisation of digital trade, as countries such as the USA have argued for.

The WTO Dispute Settlement Mechanism has helped clarify some of these issues in the *US - Gambling* case by stipulating that the electronic delivery of services through the internet fall well within the purview of the GATS and has classified it under Mode 1 by ruling on the likeness of electronic and traditional services. But some countries, such as the USA, have since long argued for a classification of the Internet as Mode 2, which would lead to a greater liberalisation of all internet-related markets, on the basis that it is ultimately a consumer-led decision to access the Internet (rather than one where the service provider initiates the transactions), and hence cannot be unduly circumscribed.[80] In the *China* -

[77] For a discussion on the confusion caused by these standards in the current context, see See Shin-yi Peng, GATS and over the top services: A legal Outlook, 50 Journal of World Trade 1 (2016), 21-46.
[78] Mira Burri, above note 72, at 16.
[79] Burri, above note 72, provides the example of search engines in this context, at 16.
[80] Usman Ahmed, Brian Bieron, and Gary Horlick, Mode 1, Mode 2 or Mode 10: How Should Internet Services be Classified in the General Agreement on Trade and Services?, Current Topics in International Law, Boston University School of Law, 2015. Available at: https://www.bu.edu/ilj/2015/11/24/mode-1-mode-2-or-mode-10-how-should-internet-services-be-classified-in-the-global-agreement-on-trade-in-service/#_ftn18, accessed 29 August 2017.

Audiovisuals case the WTO Dispute Settlement Panel has ruled that service commitments extend to all services delivered, including those on the internet.[81]

But these judgments do not provide a wholesome solution to the raging discussion around classification and treatment or set the boundaries of the expanse of the digital economy, or lay out some normative guidelines on how to balance trade, privacy and developmental interests. The moratorium on electronic transmissions is the only item that has been renewed repeatedly at the WTO, including at the Tenth Ministerial Conference of the WTO held in Nairobi in 2015 and the Eleventh Ministerial Conference of the WTO in Buenos Aires in 2017. It was also agreed in Nairobi in 2015 that a review of Work Programme on E-commerce would be conducted by member states to report at the 11th Ministerial Conference, which has now been reiterated in Buenos Aires.

B. Free Trade Agreements and the New Defacto E-Commerce Regime

One could argue that the need for policy in the digital economy has changed drastically since the early 2000s when breakthroughs in the development of the Internet of Things (IoT) sector occurred, when compared with the present, where business concerns in digital technologies have moved beyond simply creating value using the internet's resources. New business models rely on digital technology to exploit original and complex markets that promise increasing rates of return. The interdependence of various digital technologies for the development of such business models (and related innovations and applications) has created a two-fold need to: (a) lower national barriers to promote digital trade and (b) provide incentives to protect inventions that create value.[82] For instance, despite the serendipitous emergence of the IoT sector, different regulatory instruments have emerged since then to protect the IoT inventions and their wider applications. This pattern is traceable across several digital technologies, where initial policy vacuum has given way to national measures and FTAs in a bid to promote some level of policy harmonisation required for the widespread application and use of digital technologies.

FTAs have thus offered a means of advancing a digital policy agenda and significant strides in norm-setting have been achieved since the early 2000s. As of October 2017, there were a total of 445 free trade agreements concluded between countries, taking into account goods, services and accession separately.[83] It is estimated that over 80 of the 164 countries that are signatories to the WTO have all signed at least one agreement that contains e-commerce provisions, and at least 70 FTAs to date contain detailed e-commerce chapters.[84]

Prima facie, the FTAs have focused on a number of issues that remain sticky at the international level in e-commerce negotiations, such as the establishment of a permanent duty free moratorium on the import and export of digital products and electronic transmission, definition and classification, intellectual property protection on digital products and enforcement. But the most recent FTAs put forward regulatory templates on e-commerce and intellectual property protection that have advanced in leaps and bounds when compared to the issues that were abandoned in the WTO's Working Group on E-commerce, moving e-commerce norm-setting to a completely new level.

An assessment of the changes introduced by the latest FTAs shows that they might not just seeking to fill in policy gaps in e-commerce, but rather setting a normative bias in favour of extreme

[81] WTO Appellate Body Report, China - Measures Affecting Trading Rights and Distribution Services for Certain Publications and Audiovisual Entertainment Products (China-Audiovisuals), WT/DS285/AB/R, 19 January 2010, Paras 7.976 and Para 7.998.

[82] UBS, 'Extreme Automation and Connectivity: The Global, Regional and Investment Implications of the Fourth Industrial Revolution', White Paper for the World Economic Forum, 2016, p. 29.

[83] A dedicated RTAs database is available at http://rtais.wto.org/UI/PublicAllRTAList.aspx, accessed on 10 October 2017.

[84] Mark Wu, above note 13.

liberalisation of the digital economy; one that could be problematic for multilateral negotiations even beyond the standstill outcome of the 11th WTO Ministerial of 2017. A one-on-one mapping of the countries that have signed e-commerce related FTAs with the e-commerce revenues shows that 88 percent of the global e-commerce market is already covered by at least one FTA of this nature. This serves as a timely reminder of the risk that an alternate regulatory environment created by FTAs is beginning to become the default regime that can restrict policy space of countries in a number of ways. The most significant changes in this context are brought about by IPR protection, which deserve a special mention. This section discusses the impact of FTAs as norm-setters in this important area of policy and shows how they tilt the balance in favour of trade at the expense of development and privacy goals.

1. The Evolution of FTA based Norm Setting in E-commerce

Although the bilateral and plurilateral policy environment shows a lot of activity in e-commerce including in developing country-related FTAs, three countries – the USA, Singapore and Australia - have played an important role in the initiating and developing successively stronger e-commerce norms in FTAs.[85] A time line of the evolution of FTA-based norms is presented in table 1 below with some examples that correspond to each stage.[86] The earliest FTAs contain chapters on paperless trading and call upon parties to support electronic trade. A second ratcheting up of standards is evident starting from Singapore-Australia Agreement of 2003, where the trend of introducing chapters on e-commerce with detailed definitions, commitments to reduce trade barriers in e-commerce and a permanent duty-free moratorium on digital products was introduced. This was followed by a further liberalisation of the e-commerce provisions from the Korea-Singapore agreement of 2006. A complete liberalisation of e-commerce markets and digital trade is observable since 2013, where FTAs contain provisions that go beyond the WTO rules and cover a variety of issues that are related to the broader field of information technology such as telecommunications policy, information technology standards, cyber security, electronic signatures, electronic payment systems among others, in a bid to create a digital market place.[87] These FTAs view national regulations as a major barrier to digitisation and seek to create a liberalised digital economy.

Table 1: FTAs and the emergence of a defacto e-commerce policy regime[88]

FTA	**Generation**	**Rigour of E-commerce provisions**
First Generation FTAs	New Zealand-Singapore (2000), Japan and Singapore (2002), Japan-Philippines (2006)	Contain chapter on paperless trading. With basic framework on paperless trading, calls upon parties to support electronic environments for trade.
Second Generation FTAs	Singapore-Australia (2003), Thailand-Australia (2004), Thailand-New Zealand (2005)	Introduction of chapters on e-commerce referring to definitions, specific commitments to reduce trade barriers in e-commerce, and a permanent duty-free moratorium

[85] Wu, above note 13, at 7; Mira Burri, 'The Governance of Data and Data Flows in Trade Agreements' 51 University of California Law Review 65(2017), 65-132, at 99-100.

[86] The categories created in the table cannot be considered as straight-jacketed categories, they are an effort to classify the differences in the FTAs over time on this question to understand progression in policy making. There may be some FTAs which fall within two categories simultaneously – for example, the ACTA could perhaps be considered to be between 3rd generation and 4th generation FTAs in the context of the table.

[87] Burri, above note 85, at 101.

[88] This table builds on Rolf H. Weber, The Expansion of E-commerce in Asia-Pacific Agreements, E15 Initiative (Available at: http://e15initiative.org/blogs/the-expansion-of-e-commerce-in-asia-pacific-trade-agreements/) and the information available in the WTO's dedicated RTAs database (available at http://rtais.wto.org/UI/PublicAllRTAList.aspx)

		for digital products, along with paperless trading, consumer and data protection.
Third generation FTAs	Korea-Singapore (2006), ASEAN-Australia-New Zealand Tripartite PTA (2009),	These agreements propose a high level of bilateral liberalisation of digital trade, including defining digital products, granting permanent moratorium and non-discriminatory treatment of digital products. But they do not include MFN clauses.
Fourth Generation FTAs	Japan-Australia (2014), Japan-Mongolia (2015), Transatlantic Pacific Partnership (2017), TiSA (2016)	Contain complete liberalisation of e-commerce regulations, including MFN, introduce detailed enforcement provisions.

E-commerce has become a topic that is now tackled simultaneously in a number of chapters of these agreements in the most comprehensive manner. Trade in goods, trade in services, innovation and intellectual property protection and investment chapters of FTAs can contain provisions affecting e-commerce, in addition to dedicated chapters on e-commerce.

Recent FTAs, particularly the USA-South Korean Trade Agreement (KORUS) and the Transatlantic Pacific Partnership Agreement (TPP) are by far the most extensive in setting out a highly liberalised agenda with relatively few exceptions.[89] In these FTAs, the curtailment of policy space for e-commerce is also evident through restrictions on industrial policy. The Transatlantic Pacific Partnership Agreement, for example, has provisions that specify and restrict industrial policy options to countries in all sectors, including e-commerce. [90] Through such expansion, FTAs are fundamentally shifting the traditional balance between trade and regulatory issues set out by the Uruguay Round.[91]

2. FTAs and Intellectual Property Protection on Digital Products

IPRs management in the digital economy is extremely different and complex when compared to other technologies/ sectors. All manners of IPRs play a role in e-commerce, and many countries (such as USA and Canada) have provisions in national IP policies that allow digital outputs to be protected through a number of intellectual property instruments.[92] At a general level, all e-commerce systems, search engines

[89] Chapter 14 of KORUS on electronic commerce is not as expansive as chapter 14 in the TPP. Burri (2017) notes that [*T]he TPP template with regard to digital trade is distinct not only in its high standards but also in the breadth of issues covered that matter more or less immediately for the contemporary digital economy.* In Burri, above note 56.

[90] Along with an allowance for States to have their own regulatory requirements regarding the use of computing facilities, including requirements that seek to ensure the security and confidentiality of communications; the TPP agreement requires that there should be no requirement to *use or locate* computing facilities in a host territory as a condition for conducting business in that territory. There is also no obligation to require the transfer of, or access to, source code of software owned by a person of another State, as a condition for the import, distribution, sale or use of such software, or of products containing such software, in its territory.

[91] Padmashree Gehl Sampath and Pedro Roffe, The Transpacific Partnership Agreement: A Stroke of Genius or a Tragedy of Sorts, In Pedro Roffe and Xavier Seuba (Eds), Current Alliances in International Intellectual Property Lawmaking: The Emergence and Impact of Mega-Regionals, A CEIPI-ICTSD Publication Series, September 2017.

[92] IPRs have become common use in the digital economy in addition to the technology protection mechanisms that can be embedded directly into products or platforms, with the aim of helping the owners of the technology to manage it better such as encryption and watermarking, which are widely considered to be insufficient. See for example, The Digital Dilemma: Intellectual Property in the Information Age, Committee on Intellectual Property Rights and the

or technical applications on the internet are likely to be protected by patents or utility models. Copyright protection and patent protection (depending on context and jurisdiction) is available for software, website designs, website contents and certain kinds of digital products (such as virtual agents). In the United States of America, software can be protected as patents on the basis that the invention is not '…in the details of program writing but in the apparatus and method whose patentability is based on the claimed combination of components or steps'.[93] Databases, algorithms and source codes are usually protected through copyrights or sui generis database laws in some countries. Other business particulars, such as domain names, logos, product names, are generally protected by trademarks. Industrial designs can be used to protect webpages, graphics, user interfaces, and the designs of other digital products. In addition to all this, trade secrets can be used to protect many other hidden aspects of the technology that entails the real technological know-how.

The FTAs play an important role in advancing IPR interests of industrialised countries, by enabling the major trading partner to transfer their national regulatory template to the trading region. The USA, for example has successfully used FTAs to ratchet-up IPR provisions in a way that harmonises with its own national policy.[94] A number of differences exist between the FTAs initiated by the USA and by the EU, but a large number of recent FTAs outline obligations related to e-commerce mandating adherence to the WIPO Internet treaties of 1996; technological protection measures and rights management information; encrypted satellite signals; domain names; government use of software and Internet Service Providers. FTAs also focus increasingly on IPRs enforcement, by providing civil, criminal and administrative measures for enforcement of IPRs in the digital environment, and this trend is evident both in the context of plurilateral agreements such as the TPP and bilateral agreements such as the KORUS.[95]

3. How FTAs Shift the Policy Balance and Consolidate Existing Gains: Two Cases

The highly liberalised regime being created by FTAs cements existing gains and market shares of incumbent firms. It potentially promotes a global market, where with relatively concentrated industries; strengthened IPRs can lead to additional rent transfers without much evidence of innovation.[96] The following two cases offer some evidence, in the absence of systematic analyses in this regard, on how FTAs shift the policy balance in favour of uncritical trade.

a. The Case of Access to Source Code

Computer programs are made up of object codes (which people can see) and source codes (which are binary in nature). Source code, which contains the information underlying the invention, is protected using trade secrets, although patenting such inventions might also be an option.[97] In some jurisdictions such as the USA and Canada, even when patents are made available to software, the legal regimes allow the patentee to meet disclosure requirements without disclosing the source code based on a view that a functional description could be sufficient for a skilled computer programmer to replicate.[98] This

Emerging Information Infrastructure, Computer Science and Telecommunications Board Commission on Physical Sciences, Mathematics, and Applications, National Research Council, 2000.

[93] N. Telecom, Inc. v. Datapoint Corp., 908F.2d931, 941 (Fed. Cir. 1990).

[94] Gehl Sampath and Roffe, above note 91, at 112.

[95] Xavier Seuba, The Global Regime for the Enforcement of Intellectual Property Rights, Cambridge University Press, 2017.

[96] Dan Ciuriak, 'The Knowledge-Based and Data-Driven Economy: Quantifying the Impacts of Trade Agreements', CIGI Papers No. 156, December 2017, at 3.

[97] Tomkowicz notes for instance, that it was hostility of the software companies toward revealing their source codes that led to the open software movement in the first place. In Robert Tomkowicz, *Intellectual Property Overlaps: Theory, Strategies and Solutions,*(Routledge Publishing, 2013), at p.33.

[98] See Kenneth Canfield, 'The Disclosure of Source Code Patents in Software Patents: Should Software Patents be Open Source', 7 *The Columbia Science and Technology Law Review* 2005, 1-25 at 14.

assumption may not really hold good because a software's utility depends on the platforms on which it functions. The usual practice of keeping application platforms closed means that anyone seeking to replicate the software will not have the required programming interfaces.[99] As a result, as Tomkowicz (2011) notes: "…[b]y keeping application platform interfaces secret, the creator of the operating system makes it virtually impossible for third party application software providers to develop computer applications that are fully compatible with the closed platform operating system in terms of its functionalities."[100]

In reality, whether any program can be recreated or not depends on the complexity of that program and the availability of all information on digital platforms that it needs to be functionally compatible. Following such concerns and the growing use of software in all sectors, a number of countries require the disclosure of source codes for reasons such as taxes, finance, voting machines, among others. Some others call for access to source code with the government on grounds of national security, technology transfer, anti-competitive conduct and as part of government procurements.[101] Most recent FTAs, including the KORUS and the TPP, prohibit the partner from demanding disclosure to source code with a few exceptions, most notably security. Even apart from security reasons, this prohibition raises several important policy questions, namely:
(a) Does the availability and use of patents and trade secrets on software – without disclosing source codes - allow the inventors to stack intellectual property in ways that hinder others from constructing and replicating such information?
(b) Do existing patents on software that offer protection without disclosure of source code in some national regimes violate a fundamental principle of patent law, namely the grant of monopoly in return for making the underlying information of the patent available to future inventors? If so, should such patenting standards be widely proliferated through FTAs?
(c) With the spread of digital technologies to areas such as banking and finance, should patents be allowed without the disclosure of source code, as is the case in economies such as the USA?[102]

b. The Case of Data and its Treatment in FTAs

Free flow of data, while being a critical enabler of digital trade, is also a great asset. FTAs that liberalise digital trade between a dominant trading partner and other partner/partners fail to capture the unseen value of the data that can be accessed and used freely by the dominant partner in the trading region. There is also no clear assessment of the value of lifting a number of restrictions on e-commerce that promote unhindered data mining on part of the partner/s that have capacities.[103] In fact, FTAs grant several information advantages related to data that can not only create economic value but lead to severe deadweight losses through anti-competitive effects. Consider the following scenarios:

Scenario 1: Large global firms with large amounts of amassed information use the information to dictate their personal expansion, and proceed with acquisitions of other firms using such information advantages with the aim of ensuring greater profits and power. For example, as the Economist recently noted, Amazon used the data on transactions on its website to make business decisions such as the one to buy Whole Foods.[104] But with the control on Whole Foods, Amazon can collect an entirely different kind of data that clearly informs Amazon of consumer preferences in household goods. So as opposed to just

[99] These are called application programming interfaces in technical language, and are needed to understand and manage the international resources of the operating system and the application software.
[100] Tomkowicz, above note 97, p. 34.
[101] Third World Network, 'Some Preliminary Implications of WTO Source Code Proposal', Third World Network Briefings No. 4, November 2017, at 4-5.
[102] In the USA, financial patents can be granted without the disclosure of source code. In re Bilski, 545 F.3d 943, 88 U.S.P.Q.2d 1385 (Fed. Cir. 2008).
[103] One of the only studies on the topic that discusses how such value might be measured is Ciuriak, above note 96.
[104] Economist, E-Commerce: There be Giants, Special Report on E-commerce, 28 October 2017.

customer ordering of goods on Amazon (that related to Whole Foods) that allowed Amazon to deduce how profitable the company was for purchase, the current ownership of Whole Foods will allow Amazon to generate data on real preferences of products that customers like across entire segments, the goods where customers prefer other suppliers other than Whole Foods, etc. - taking the information advantage to an entirely different level.

Scenario 2: Large global firms use the information personally to offer new digital products such as IoT based on the data generated on their online platforms. None of the competitors are able to provide similar services with the same kind of efficacy not just in the static sense but also in the dynamic sense, because the new digital innovations help the incumbents to expand their market reach, enhance their data collection and retain market advantages (or resulting monopolistic positions). As an example, consider Amazon Dash, a new IoT, which is an IoT that customers can tag on their household appliances and automatically order. This is an automatic extension of its current customer base. But this IoT expands the reach of Amazon, provides a clear advantage to its products and customer base, on the basis of information that its competitors do not have, and will not be able to buy/ re-construct in any other way.

Such intrinsic information advantages that cement monopolistic advantages of firms go far beyond the concerns that were central to the digital revolution. For example, the example above confers to Amazon an advantage, which is very different from its competitive position as an online platform for trading products. In that context, when Amazon performs better when compared to other national providers, such as Flipkart, Myntra or Snapdeal in India for instance, it can be defended on competitive factors such as volume and supply discounts, supply chains with lesser margins, or other forms of automated process automation in Amazon that may enable it to provide the same/ similar goods for less.

Scenario 3: Large firms are able to sell the big data required to create AI, or other forms of new innovations, to the costliest bidders. In this case, if companies that have data currently are allowed to sell them, they will be sold to the highest bidder which invariably might be a global MNC operating in that particular segment. The anti-competitive effects of such data therefore can be enormous, leading to greater concentration of wealth and worse monopoly effects, in the absence of strong global competition policy to monitor.[105]

IV. Moving Ahead: Some Trade-offs, Dilemmas and Options for Countries

As this foregoing analysis shows, the post MC-11 situation is highly complex and ambidextrous. There is a lull after the storm that led to heated negotiations on e-commerce, but this might be the making or the unmaking of the e-commerce debate. Developing countries are at a crossroads in e-commerce policymaking. There is a need to create a clear and positive vision for e-commerce as part of national digital agendas that reflect their industrial aspirations. But at the same time, there is a need to address the current multilateral situation which suffers from two critical issues. First and foremost, the discussions on e-commerce in the WTO as they stand now, seem to lack legitimacy, and raise concerns as to whether the WTO can balance the needs of fostering trade with individual interests and development in this instance. Nevertheless, the interdependence of internet as a medium, the importance of reaching some consensus on cross-border data flows, and the need to balance needs of all countries calls on a collective solution to the problem. This final section presents some thoughts on what developing countries can do, and what steps can be taken to find a collective solution at the international level.

1. Digital Agenda Setting at the National Level

[105] Stiglitz (2016) noting the need to ensure competition – when firms are active across borders – as a "global public good" calls for competition policy to be part of a broad global cooperation framework. See Stiglitz, Joseph (2016), "Towards a Broader View of Competition Policy," lecture presented to the 4th BRICS International Competition Conference in Durban, November 2015.

In the future, all industrialisation will be digital industrialisation, and it is important for countries to consider and enact strategies at the national level that lay out a clear vision of how this is to be fostered. In enacting digital industrial policies, countries should focus on creating two kinds of essential capabilities that are required to benefit from the digital economy. A first set of capabilities are skills, knowledge and technical know-how of particular significance to Industry 4.0, such as data scientists, robotics process automation engineers and other such kinds of technology specialists. Inter-disciplinary skills, that is, those that combine technical expertise with specific plant management expertise that is required to combine, create and run the hybrid production systems will also become valuable in the years to come. A total of 28% of the 900 companies surveyed in the 12 industrialised countries on the viability of 3 D printing as an industrial option reported lack of qualified personnel as a main impediment to their decision making.[106] But these new forms of capabilities need to be built alongside traditional industrial capabilities that create routine skills and know-how in manufacturing, given that e-commerce, in large parts, is creating online markets for traditional goods and services. As a result, in the absence of capabilities to produce diverse forms of industrial outputs, countries will find it difficult to benefit directly from the boom in e-commerce in a way that it can be the fundamental force for any kind of transformation.

Other policy measures that countries should consider are: creating digital infrastructure, data localisation, internet filtering, internet censorship, access to source code and intellectual property protection.[107] Many of these measures – such as those controlling cross-border flows of electronic data – have existed since the 1970s.[108] Some existing studies show that there are a number of tradeoffs in enacting each of these measures; the most important one being that they may be ineffective means to achieve the goals of development, and the relative merits of options should be taken into account in devising national strategies.[109] A strong competition policy and enforcement authority will be critical to complement and enforce national digital agendas, given the various anti-competitive effects that data entails.

2. Collective Action at the International Level

FTAs and their increasingly strong focus on regulatory issues (investment, intellectual property and e-commerce) not only tilt the traditional balance of trade and non-trade issues, but also raise the question of normative rule setting. Rather than offering a choice of sequential bargaining, which has been proposed as an advantage of FTAs previously, [110] FTAs currently are always a "step ahead in a never ending story" on stronger protection and enforcement.[111] Even for countries that do not sign e-commerce related FTAs, the current FTA environment still creates ample scope for externalities in the form of anti-competitive effects, market concentration (globally) that will have bad effects for the global economy in the long run. There are a lot of questions that remain in the open such as data privacy; encryption technology; the development of secure payments systems; electronic contracts and taxation, which raise legitimate public policy questions and interface with other areas of domestic policy within countries. Trade officials will need to find answers that meet public policy objectives without restricting trade on the one hand, but also

[106] Ernst and Young, above note 45, at 15.

[107] See the EU's new digital industrial strategy that outlines several of the same priorities, in this context.

[108] Kuner notes that countries such as Brazil have had rules requiring prior consent for the use of international networks since 1976 and there were concerns in Germany, France, Canada and many other countries already in the 1970s in conjunction with the flow of electronic data through computers. Christopher Kuner, 'Data Nationalism and Its Discontents", Emory Law Journal (2015), 2089-2098, at 2091.

[109] Chander and Le, above note 12; See also Kuner, above note 108.

[110] See Philippe Aghion, Pol Antras and Elhanan Helpman, 'Negotiating Free Trade', 73 *Journal of International Economics* (2007): 1-30.

[111] Rita Matulionyte, ACTA's Digital Chapter: Remaining Concerns and What Can be Done?, in Pedro Roffe and Xavier Seuba (Eds.), The ACTA and the Plurilateral Enforcement Agenda: Genesis and Aftermath, Cambridge University Press, 2015, p. 115-142, at p.140.

ensure that they do not prevent the benefits of access and lower costs for industry and local firms that flow from it. These issues can only be resolved through international regulatory co-operation.

Collective action is required to create a fair and equitable normative basis for all digital trade. In the sphere of the internet, the disturbing trends in FTAs should potentially serve as a precursor of legal, institutional innovation and policymaking of a kind that re-institutes certain defensible norms to balance trade with development and individual privacy interests. A common, international level playing field is needed where these externalities and dependencies can be discussed, deliberated and resolved. What is required first and foremost is to reboot the discussion in a holistic manner with equal attention to development, equity and privacy concerns related to digital trade. In doing so, an important step is to reopen and fully consider the older e-commerce issues that were left open in the WTO's Working Group on E-commerce, in conjunction with an industry 4.0 view of the digital economy. In this context, developing countries should also insist that e-commerce issues related to security (cyber security, consumer protection) cannot be divorced from the larger questions of industry standards, classification, intellectual property, technological neutrality, among others.

In discussing the old and new issues of e-commerce and the digital economy, some key principles should be advanced as guiding pillars. These include:

1. Prioritising the safety of personal data while dealing with concerns related to industry, innovation, and security of nation states. The international framework should establish clear rules on privacy of personal data of all global citizens while creating a balance with industry and innovation, and safeguarding security of all countries. To this end, a set of data neutrality principles with the aim of protecting privacy and security concerns associated with data use could be proposed. A global data pool mechanism can be considered to allow all firms globally to use data for new technological innovations across all sectors. All existing data can be deposited in the data pool for use, dependent on a user fee, by the private sector worldwide. Such a mechanism would share data subject to privacy and security. The data pool can also be a platform for countries to share data and update insights on issues of global security.

2. *Fostering global trade and enabling competitive markets.* An international framework on e-commerce should establish and clarify the definition and scope of key terms such as digital products, the use of e-signatures, paperless trading, unsolicited electronic messages, encryption technology, the development of secure payments systems, among others, with a view to enabling global trade and fostering competitive markets. It should clarify issues of classification and application of e-commerce to new sectors such as taxation and finance. The borderless nature of the internet, the current corporate landscape, and the consumer protection dimension of all these measures reinforce the demand for a global competition authority with dispute settlement and enforcement to oversee digital trade. This proposal, which has been suggested in the past without success, should be revived in the context of promoting fair trade and reducing anti-competitive barriers.

3. *Facilitating the developmental needs of all countries.* The framework should have dedicated provisions that enable special and differential treatment for countries, providing sufficient degrees of flexibility, in order that countries can exercise policy space to create exceptions keeping with public interest and social welfare. Developing countries could propose to retain the choice to determine liberalisation based on sectors, or to create special provisions for certain sectors, in a manner available under the General Agreement on Trade in Services.

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