



WORK PROGRAMME ON ELECTRONIC COMMERCE
THE ECONOMIC BENEFITS OF CROSS-BORDER DATA FLOWS

COMMUNICATION FROM THE UNITED STATES

The following communication, dated 14 June 2019, from the delegation of the United States is being circulated to the Members of the Council for Trade in Services.

1 INTRODUCTION

1. Over the past few years, several workshops, seminars and various submissions to the 1998 Work Programme on Electronic Commerce have raised the importance and relevance of cross-border data flows to the digital economy and to the e-commerce discussions at the WTO.¹ The following submission explores in greater detail the full extent to which the flow of data across borders has created new trade and economic opportunities while also discussing appropriate regulatory approaches or responses.

2. As a starting point, this submission is intended to review existing research and analysis on how data is used to create economic value, to explore aspects of the breadth and scope of data that is being collected, analysed, and used in the digital economy, and to provide useful context for future possible discussions in the WTO regarding policy measures that support digital growth while ensuring regulatory balance. Research carried out by the OECD has clearly demonstrated how the Internet and other information and communication technologies (ICT) are driving the development of new business models that are transforming how and where goods and services are produced and traded (OECD, 2017a and 2018). This submission draws heavily on OECD research and a review of literature in this area, which demonstrate that in this digital age, trade and production are heavily dependent on moving, storing, and using digital information (data), increasingly across international borders. The United States is interested in exploring opportunities to share this research with other WTO Members in greater depth as a follow up to this submission.

3. Discussions held under the Work Programme on Electronic Commerce have highlighted that the ubiquitous exchange of data, both within and across borders, has given rise to concerns by governments and citizens about the consequences of so much information being collected, transferred, and used. Concerns related to privacy and security have led to calls for more regulation of the Internet and data flows. As a result, governments are increasingly seeking to regulate the cross-border transfer of data, or requiring that data be stored locally.

4. The implications of these measures are not fully understood and have led to a polarized debate. On the one hand, there are concerns about the impact of the emerging measures on business activity and on the ability to benefit from digital trade; on the other hand, there are concerns about achieving legitimate public policy objectives, such as the protection of privacy. The challenge is to find the balance that enables key public policy objectives to be met while preserving the significant economic and trade benefits from data-enabled trade.

¹ See presentations at "Conference on the Use of Data in the Digital Economy" held 2-3 October 2017, and Communication by the United States, S/C/W/359 (17 December 2014).

5. To support further discussion in the Work Programme in this area, and consistent with Ministers' instructions to "reinvigorate our work",² the United States is seeking, through this submission, to contribute to Members' understanding of what data is and how it supports economic activity and trade.

2 DATA AND THE DIGITAL TRANSFORMATION

6. The effect of integrating digital technologies into everyday life and work has been nothing less than revolutionary. Digitalization has permeated every aspect of economic activity and its influence is only expected to continue to expand and accelerate. Digitalization is increasingly empowering consumers by giving them access to global information and products from all over the world. They benefit from better preference matching, lower prices, more variety, and greater convenience (USITC, 2013).

7. Digitalization has also given rise to new "information industries" such as cloud computing and data analytics, which are now making significant contributions to GDP (OECD, 2017b). The use of data has also transformed manufacturing by fostering a new production revolution and changing how food is grown and distributed. It is also transforming how development assistance providers approach and overcome key challenges in improving economic growth, health, disaster preparedness and other development priorities.

8. This digital transformation has resulted in an unprecedented increase in the flow of data both within and between countries. Estimates for global bandwidth use show an annual compound growth rate of approximately 40% between 2009 and 2013 (TeleGeography, 2015) with recent studies suggesting that data transfers were 45 times larger in 2014 than they were in 2005 (MGI, 2016). This translates into an estimated contribution of USD \$7.8 trillion to global economic activity, or 10% of global GDP (MGI, 2016). The pace of change shows no signs of slowing. The size of the Internet economy is expected to continue to grow for both developed and developing countries.

2.1 What is data?

9. As data increasingly becomes the lifeblood of economic activity and trade, it is important to understand what it is, how it flows and how value can be derived from its use. The Internet is a "network of networks," and, as such, it is reliant on the ability to transfer data across networks (Mandel, 2014). A file sent from one computer to another is first broken into "packets" of information and then transmitted through the network to a destination. Each packet may take a different route, depending on the size of the packet and the traffic in the network, and, upon arrival, the packets are reassembled to reproduce the original file.

10. It is the application of data that generates value to individuals, businesses, and the economy. For example, an Excel file with 100 personal shopping entries may occupy the same memory space as one with 100 personal health records but its underlying value is very different depending on the perspective of the final user (whether a supermarket or a health service provider). The value of data can also increase when merged to become greater than the sum of its parts. For example, linking the shopping entries to an interest in nutrition can target advertisements towards a health-conscious shopper. Moreover, with changing business dynamics, information that is not being used today can become valuable tomorrow.

11. As an economic category, data has been described as the new oil (The Economist, 2017), but this characterisation is misleading. Although an essential input into the economy, data is not scarce and therefore cannot be exhausted or easily monopolised. Moreover, the consumption of data by one person (or company) does not prevent its consumption by others: data can be replicated and transferred at virtually no cost. Attempting to ring-fence data within a specific territory, as if it were a scarce resource to be conserved, can be particularly self-defeating: the value of data is often only realized when it is integrated into broader, interactive systems using data sets that span different populations and territories. Excluding oneself from a rich, varied data environment might only deny

² See "Work Programme on Electronic Commerce", Ministerial Decision of 13 December 2017, (WT/MIN(17)/65, WT/L/1032).

an economy valuable insights and efficiencies that such interaction can produce. Data on health, weather, and soil are only a few obvious examples of data sets that benefit from global integration.

2.2 How do firms use data?

12. In a digitised world of global value chains (GVCs), firms are increasingly reliant on data to support their activities, whether to undertake research and development (R&D), coordinate production, or reach customers and suppliers. Cross-border flows of data have enabled the organisation of international production networks, helping generate the gains associated with global value chains (see OECD, 2013b and Kowalski et al., 2015). GVCs rely on data being moved across borders to provide overarching control and coordination of geographically dispersed processes. Companies use data from their affiliates around the world for a large number of internal, or back-office, tasks and even routine decisions. This can include moving human resources (HR) data to and from headquarters, sending data to R&D facilities located abroad, using cloud-based software, managing production processes and engaging in post-sale services. Efficient supply-chain management requires the smooth flow not just of goods, services, and capital, but also of ideas and managerial know-how (Baldwin, 2012).

13. Access to new, sophisticated, and competitively priced digital solutions can help increase productivity, whether through the use of productivity enhancing software and technology delivered through the Internet or the optimisation of use of current productive resources. In addition, the use of new digital solutions may help reduce supplier search costs and increase the reliability of contractual arrangements with international suppliers (Besedes, 2008), which can, in turn, reduce hold-ups in international transactions (Ornelas and Turner, 2008).

14. Moving data across borders is also an essential component of new and rapidly growing service supply models, such as cloud computing, big data analytics, and services tied to the emerging Internet of Things (IoT). These new information industries present new opportunities for businesses to engage in international economic activity. Flow of data can help firms more efficiently reach greater scale in the provision of such services, find new customers across distant markets, and integrate into expanding or new value chains, and it can be a conduit for the delivery of services that were previously hard to trade (e.g. medical or accountancy services).

15. Data is used both as input into production and the delivery of goods and services as well as output when, for example, embodied in digital products or services. The use of data is ubiquitous, spanning the entire economy. We can no longer think of data as an issue concerning ICT firms, and, importantly, the gains associated with the cross-border use of data could be particularly beneficial to SMEs and firms in developing countries. In fact, the most substantial efficiency improvements of digital technology often accrue to non-ICT sectors, such as health care, transportation, and even agriculture (MGI, 2016).

2.2.1 What types of firms use data?

16. As is increasingly evident, data is relevant to every sector of a modern economy, from agriculture to transportation to manufacturing. The firms initially most exposed to cross-border data flows are those operating in ICT sectors (which are increasingly integrated with all other sectors). Examples include those involved in: cloud computing, where information is stored and processed on remote servers that may not be in the same country as the user accessing them; big-data analytics and processing, where large datasets, often originating from different countries, are compiled and analysed to inform business decisions or research outputs; Internet advertising, where companies sell or use individualized or aggregated consumer behavior information about online purchasing or Internet browsing behavior; or video-streaming channels or services where information on viewing preferences can help shape future supply of shows.

17. However, cross-border data-use is not limited to technology or ICT firms. In their day-to-day operations, firms in all economic sectors use electronic payment systems for international transactions, Internet-based advertising and retailing to reach global customers, and cloud computing. Production of goods and services includes moving information in every step of the process.

For example:

- Large-scale mining operations now routinely manage and even control mining assets (trucks and mining equipment) on a cross-border basis.
- Car manufacturers are increasingly offering personalized services based on information related to driving behavior which can alert the driver to mechanical faults or traffic information. Often the processing of this information is centralized in a country other than that where the car is being driven.
- In aviation, performance data are collected mid-flight in order to identify potential maintenance issues and alert ground-crews to any issues before the plane lands.
- Traditional services, particularly when conducted on a cross-border basis (i.e., through mode 1), are invariably reliant on data transfers. Advisory businesses, such as accounting or legal firms, may need to transfer personal information such as purchases by clients, or personal documentation on employees. Firms engaging in medical diagnostic services often supply the diagnostics online to the client, but may also require the transfer of medical history documents. Likewise, medical research organisations investigating cures for diseases rely on health data being gathered across the globe and analysed centrally.
- In the agriculture sector, "datafication" is occurring with the increased capacity of sensors to transpose the real world into machine readable format. Although agriculture is often represented at the lower end of the digital technology adoption spectrum, processes in agriculture and food are increasingly digitised. For example, data gathered by sensors on soil moisture, combined with weather forecasts, soil mapping, and crop information can be used for the automatic optimisation of an irrigation system. Increasingly, data is used to respond to growing consumer demands for production information. Product packaging can now include the name of the farmer who produced the product, or the laborer who picked the fruit that is being sold. This helps consumers make purchasing decisions and opens up new possibilities for responding to, and charging premiums for, a range of consumer preferences in relation to how goods are produced.

2.2.2 How does data benefit SMEs and developing countries?

18. International data transfers have enabled the creation of a new breed of SMEs: "micro-multinationals" that are "born global" (MGI, 2016). Access to free or competitively priced online business services contributes to their competitiveness, helping SMEs overcome traditional barriers to engaging in international trade. For example, cloud computing allows SMEs to access IT services with little upfront investment and therefore quickly scale up their IT function in response to changes in demand. Better and faster access to critical knowledge and information can also help SMEs overcome informational disadvantages and compete on a more even footing. Finally, the Internet and international data transfers help SMEs improve their ability to secure and fulfil global contracts and access global supply chains, as well as reach consumers without a local presence in multiple markets. As a result, SMEs are increasingly becoming lead firms within GVCs and connecting with other SMEs as providers of inputs (Meltzer, 2015).

19. The opportunities provided by the digital age are not limited to firms in developed countries. In developing countries, Internet access is increasingly available on mobile devices, which opens a range of new economic opportunities. Mobile devices are being used to contact customers, execute financial transactions, establish client databases, and coordinate just-in-time supply chain deliveries at home and abroad. Firms in developing countries can overcome the high costs of engaging in international trade through their use of data-enabled digital solutions helping them to conduct market research, make strategic decisions and stay in touch with customers globally. Firms in developing countries are also able to access technologically sophisticated and competitively priced digital business inputs that may not be available in the domestic market, such as legal, financial, and accounting services, thereby improving their ability to compete globally. All these opportunities are based on access to, and the movement of, data across borders.

20. According to the Asia-Pacific MSME Trade Coalition (AMTC), the use of digital technology can lower export costs of MSMEs by as much as 40 percent for manufacturers and 82 percent for service

providers. AMTC members have identified cross-border data restrictions as one of four key regulatory issues of particular concern for MSMEs, recognizing that laws that limit the ability of companies to move data freely across borders can affect the opportunities for Internet-enabled trade. The Coalition notes that smaller firms can be shut out of the domestic and international Internet economy completely if they cannot access affordable computing and data services (Asia Pacific MSME Trade Coalition 2018).

2.2.3 Innovation and utilization of digital technology to expand economic opportunities

Digital advancements are driving innovation across the financial and electronic payments sector

21. Kenya's mobile phone-based financial services platform M-Pesa recently launched a service that allows its users to send and receive money globally. M-Pesa is a mobile phone-based payment and money transfer service that relies on the cross-border transfer of data. It "allows users to deposit money into an account stored on their cell phones, to send balances using SMS technology to other users (including sellers of goods and services), and to redeem deposits for regular money" (Jack and Suri, 2010). With the November 2018 rollout of M-Pesa Global, users can send and receive digital money balances to other users in East Africa, send and receive money globally with Western Union and other money transfer services, and transfer money directly to bank accounts in select countries (Safaricom, 2018).

22. A number of traditional African financial institutions are also leveraging technology to expand regionally. Ecobank, based in Togo and founded in 1985, now has branches in 33 countries, more than any other African Bank. Standard Bank of South Africa operates in 20 African countries, and United Bank for Africa based in Nigeria has a similar regional reach. Technology has been cited as a major factor in this regional expansion. Ecobank designs and processes data centrally, enabling it to provide services even where it does not have a physical presence. Ecobank's mobile application has over 5 million users (Economist, 2018).

Mobile Apps and Games

23. Development of mobile applications (i.e., "apps"), continues to be a growing business around the world. Chinese firms such as Tencent and Alibaba, as well as the Indian firm Jio, are among the top app developers by worldwide downloads. The demand for downloadable apps is also growing across diverse markets, with China, Brazil, India, and Russia making up four of the top five download markets in the world. Entrepreneurs across the globe are creating applications for Apple and Android platforms.

24. A study by the Progressive Policy Institute estimated that in 2015 Vietnam had roughly 29,000 "App Economy" jobs across the country, the largest in the ASEAN region. A similar analysis for Latin America found that in 2016 Argentina had approximately 33,250 jobs in this field, including large technology firms such as MercadoLibre, Despegar, Globant, and OLX. The App Economy includes those developing the applications as well as the sales people, project managers, database programmers and related workers. The app industry in Vietnam includes local programmers and firms as well as foreign invested firms from Japan, the United States and elsewhere (Mandel 2015).

25. Mobile apps that facilitate business in the sharing economy have also spread rapidly in developing countries. Singaporean firm Grab acquired the U.S. firm Uber's operations in Cambodia, Indonesia, Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Vietnam in early 2018. Go-jek in Indonesia and Ola in India are other examples of mobile based apps that rely on the ability to process user data centrally while providing transportation services in multiple economies.

Audio Visual Innovation

26. The USITC has recently examined the market for digital music, encompassing streamed or downloaded content such as recorded songs, concerts (live and recorded), online radio, and podcasts. Digital streaming has overtaken all other modes of music consumption to become the largest driver of growth for the music industry. Similar to video, technology advances and changing consumer habits have led the music industry from a traditional per-song and per-album model to formats that provide unlimited streaming content. This change has largely been spurred by the spread of smartphones and advancements in cloud technologies that support large-scale data

storage and transfer. Cloud technology has enabled music streaming companies to provide consumers with seamless access (whether subscription- or advertising-supported) to a global catalog of music without costly storage requirements (USITC 2017).

27. There are several regional music streaming services in Africa, including Mdundo (Kenya), Spinlet (Nigeria), iRoking (Nigeria), Tigo Music (Tanzania), and Simfy Africa (South Africa). These platforms focus on regional African content and enable local musicians to reach larger audiences. Music streaming platforms like these rely on cross-border data flows to supply users with content. In November 2018, Universal Music Group struck a licensing deal with Boomplay, a fast-growing African music streaming service available in Nigeria, Ghana, Kenya, Tanzania, Rwanda, Uganda and Zambia. Boomplay is owned by Transsion Holdings, a Chinese manufacturer that overtook Samsung in 2018 to become the number one smartphone company by sales in Africa.

3 EMERGING REGULATORY CHALLENGES

28. Digitalization is increasing the scale, scope, and speed of trade, allowing firms to bring new products and services to a larger number of digitally connected customers across the globe. It also enables firms, notably smaller ones, to use new and innovative digital tools to overcome barriers to growth, helping facilitate payments, enabling collaboration, avoiding investment in fixed assets through the use of cloud-based services, and using alternative funding mechanisms such as crowdfunding. The lifeblood of this new economy is data.

29. One key issue governments are grappling with is treatment of personal data. Businesses use different types of data in their operations: corporate data, end-customer data, human resources data, merchant data, communications data, and technical data (to name but a few). Much of this data can be considered "personally identifiable," defined by the OECD Privacy Framework (and reflected in many national laws) as "any information relating to an identified or identifiable individual (data subject)." This implies that if one aspect of a piece or set of data is identifiable, then all aspects of that data become personal. Conflicting definitions of what is considered personal data across different jurisdictions (National Board of Trade, 2014 and 2015a) further complicate efforts to define the boundaries of what is and what is not personal. As a concept, personal data is therefore hard to pin down, with the potential for emerging regulation to affect data beyond that traditionally considered personal in any given country.

30. Beyond differently defining personally identifiable information, varied regimes can also result in disparate rules regarding how data must be processed. While there is some global consensus around privacy standards, such as reflected in the OECD guidelines, this regulatory fragmentation can lead to increased compliance difficulties and costs. The trade impact can be significant, since firms increasingly rely on data transfers in support of their business activity and, in many instances, such data transfers relate to personally identifiable data subjects. The National Board of Trade (2015) highlights the following ways in which personal data is used by firms:

- **Research and development** increasingly require coordinating researchers, scientists, designers and IT specialists working in different places and sharing ideas, information, prototypes and test data.
- **Human resource management** is important for the coordination of multinational activity. Much of the data involved in human resource management processes is of a personal nature.
- **Coordinating processes of production and supply chain management.** Exercising overarching control and coordination across geographically spread-out production requires moving data across different locations to organize input flows of goods and services, working with subcontractors and suppliers, and handling internal operations. This requires, *inter alia*, sending data about inventories, sales, demand forecasts, order status, human resources and production schedules, much of which may relate to an individual person.
- **In-plant production.** As production becomes increasingly mechanised, data transfers are needed to instruct robotics. Sensors, on the work floor, send real-time data that can then be analysed and used to take action. Increasingly, such in-plant production requires the transfer of data which contains personal information: data used in the actions by employees working alongside robots (so-called "cobots") need to be transferred. In the case of

agricultural supply chains, firms are increasingly sharing information with consumers about the persons engaged in the process of producing and delivering agricultural products.

- **Sales and post-sales.** Firms are always searching for customers and they often rely on advertising and data gathered from previous customers or researchers. Increasingly, firms are specialising in after-sales services the efficient provision of which requires monitoring the performance of sold products in view of handling maintenance, repairs, and spare parts. There is also a component of consumer interaction of usage of products sold which involves moving data.

31. Apart from privacy concerns, sensitive business data is also attractive to malicious actors, and governments are actively considering regulations, best practices, standards and frameworks to enhance security. Whether to protect personal data, or other commercially sensitive data, one approach has been prohibit its export, on the assumption that local storage and processing is less risky. In fact, the opposite is often the case: well-developed processes and technologies, bringing to bear specialized expertise economies of scale in cybersecurity, often make foreign storage and processing superior to what can be obtained in many local markets.

32. Given companies' need to move data across borders to effectively participate in a digital ecosystem of data storage, processing, and analytics, disparate and sometimes conflicting regulatory requirements, such as those related to privacy and security, are a continuous and pressing challenge for governments and companies alike. In many ways, the challenge is not unlike that faced with respect to the safety or reliability of physical products, for which trade rules have long sought to provide practical solutions to enable trade: where possible, international standards can provide a common baseline a product or service must meet to be able to be traded.

33. Where national standards diverge, either based on differing values or the lack of an international consensus, mechanisms to ensure that national requirements are respected and can be enforced can be instituted between economies - so called "interoperability regimes." For security, there are now numerous ISO standards that companies can adopt to demonstrate compliance with consensus best practices. Privacy regimes have evolved more autonomously, but several interoperability regimes have emerged to address the trade challenge, most notably the Privacy Shield between the United States and the EU and the APEC Cross-border Privacy Rules system. Working to ensure that such mechanisms have a recognized status under trade rules - similar to the status of standards and mutual recognition arrangements - is one possible way to advance this issue.

4 CONCLUSION

34. Digital infrastructures such as the Internet evolved globally, but they raise challenges for domestic and international policy in a world where borders and regulatory differences among countries remain. Reaping the benefits of digitalization for trade will increasingly require international dialogue on approaches that ensure the interoperability of differing regulatory regimes, whether for data or other transversal issues. Trade agreements recognize Parties' right to regulate, but also seek to provide certainty that such regulation is achieved in a transparent manner, is applied in a non-discriminatory way, and, that it does not unduly burden trade.

35. This submission is designed to complement the ongoing negotiations for an ambitious agreement on e-commerce and digital trade. It is important that all WTO Members, whether or not they are participating in those negotiations, are informed about the various trade implications of cross-border data flows and policy responses to the challenges posed. Next steps in this endeavour could include inviting international bodies such as the OECD and APEC to present their latest work in this area to a future CTS meeting. The CTS could also examine the mechanisms being developed that address privacy issues in a manner that is least trade restrictive, allowing trade to flourish while preserving legitimate public policy objectives.

REFERENCES

Asia Pacific MSME Trade Coalition (2018) "Micro-Revolution: The New Stakeholders of Trade in APAC" February 2018.

Besedeš, T. (2008), "[A Search Cost Perspective on Formation and Duration of Trade](#)", Review of International Economics, Wiley Blackwell, vol. 16(5), pages 835-849, November.

Castro, D. and A. McQuinn (2015), "Cross-Border Data Flows Enable Growth in All Industries," ITIF report, February 2015.

The Economist (2017), "The World's Most Valuable Resource is No Longer Oil, but Data," 6 May 2017.

The Economist (2018), "Banking in Africa: Making waves," 16 June 2018.

Jack and Suri (2010), "Mobile Money: The Economics of M-PESA," <https://www.nber.org/papers/w16721.pdf>.

Kowalski et al., (2015), "Developing countries participation in global value chains and its implications for trade and trade related policies", OECD Trade Policy Paper No. 179, OECD Publishing.

Mandel, M. (2017) "The Economic Impact of Data: Why Data Is Not Like Oil" Progressive Policy Institute. For presentation at Data + Privacy Asia Pacific, Sydney Australia, 12 July 2017. Accessed 30th August 2018: http://www.progressivepolicy.org/wp-content/uploads/2017/07/PowerofData-Report_2017.pdf.

Mandel, Michael (2015), "Vietnam and the App Economy," Progressive Policy Institute, September 2015.

Meltzer, J. (2014), "Supporting the Internet as a platform for International Trade: Opportunities for Small and Medium-Sized Enterprises and Developing Countries," Working Paper 69, Global Economy and Development, The Brookings Institute, February.

Meltzer, J. (2015), A New Agenda for Digital Trade, e15-initiative overview paper on digital economy <http://e15initiative.org/publications/a-new-digital-trade-agenda/>.

McKinsey Global Institute (MGI) (2016), "Digital Globalization: The new era of global flows", McKinsey & Company, March 2016 available at: <http://www.mckinsey.com/business-functions/mckinsey-digital/our-insights/digital-globalization-the-new-era-of-global-flows>.

National Board of Trade (2014), "No Transfer, No Trade – the Importance of Cross-Border Data Transfers for Companies Based in Sweden," Stockholm: Kommerskollegium.

National Board of Trade (2015), No Transfer, No Production – a Report on Cross-Border Data Transfers, Global Value Chains, and the Production of Goods. Stockholm: Kommerskollegium.

OECD (2017a), "Digital Trade: Developing a Framework for Analysis", OECD Trade Policy Papers, No. 205, OECD Publishing, Paris. <http://dx.doi.org/10.1787/524c8c83-en>.

OECD (2013b), "Interconnected Economies: Benefiting from Global Value Chains," OECD Publishing, Paris. DOI: <http://dx.doi.org/10.1787/9789264189560-en>.

OECD (2017c), "The Next Production Revolution: Implications for governments and Businesses," OECD Publishing, Paris. <https://doi.org/10.1787/9789264271036-en>.

OECD (2017d), "OECD Digital Economy Outlook 2017," OECD Publishing, <https://doi.org/10.1787/9789264276284-en>.

OECD (2018), "Digital Trade and Market Openness" OECD Trade Policy Papers (forthcoming)

Ornelas, E. and J.L. Turner (2008), "Trade liberalization, outsourcing, and the hold-up problem," Journal of International Economics, 74 (1). 225-241.

Reuters, 2018: <https://af.reuters.com/article/africaTech/idAFL8N1XH3KJ>.

Safaricom, (2018), "M-Pesa Global," <https://www.safaricom.co.ke/personal/m-pesa/do-more-with-m-pesa/m-pesa-global>.

Telegeography (2015) "Global Bandwidth Research Service: Executive Summary" https://www.telegeography.com/page_attachments/products/website/research-services/global-bandwidth-research-service/0005/9474/gb15-exec-sum.pdf Accessed 11 April 2016.

The Economist (2017), "The world's most valuable resource is no longer oil, but data", 6 May 2017.

UNCTAD (2013), "Information Economy Report 2013 – The Cloud Economy and Developing Countries," United Nations Publications.

USITC (2013), "Digital Trade in the U.S. and Global Economies, Part 1," USITC Publication 4415, July 2013.

USITC (2017), "Global Digital Trade 1: Market Opportunities and Key Foreign Trade Restrictions," USITC Publication 4716, August 2017.

Van der Marel, E. (2015), "Disentangling the Flows of Data: Inside or Outside the Multinational Company?" ECIPE Occasional Paper No. 07/2015, European Centre for International Political Economy, Brussels: ECIPE.
