Introduction

The Trend of Datafication

We are rapidly moving toward a datafied world where our social activities are routinely transformed into machine-readable data.[1] Indeed, digital platforms today are capable of datafying more and more "subjects, objects, and practices"[2] – converting not only Facebook "likes" into social relationship profiles and shopping patterns into marketable records, but also other real-life events that were formerly unstorable into data. Increasingly, the term "datafication" is associated with platformization, which has been framed in the context of the penetration and influence of digital platforms.[3] Taken as a whole, nearly every aspect of our daily actions is being constantly and systematically harvested, turned into digital data, scaled and analyzed in real time, stored for the long term, aggregated, and sold. This is the phenomenon we are facing; it is growing, and we do not really know where it will lead us next.

Warnings about the perils of datafication are not new. The process of datafication has been critiqued by social scientists, who have underscored widespread issues surrounding the ways in which datafication causes problems, including, among others, digital inequality, information manipulation, data capitalism, algorithm discrimination, and privacy

[1] Coined by Mayer-Schönberger and Cukier in 2013, the concept of datafication has been understood as datafying a phenomenon into "a quantified format so it can be tabulated and analyzed." See generally Viktor Mayer-Schonberger and Kenneth Cukier, *Big Data: A Revolution That Will Transform How We Live, Work, And Think* (Harper Business 2013), at 78.

[2] Southerton defined datafication as "the process by which subjects, objects, and practices are transformed into digital data." Clare Southerton, "Datafication" in Laurie A. Schintler and Connie L. McNeely (eds), *Encyclopedia of Big Data* (Springer International 2022), at 358–360.

[3] Marcus Burkhardt et al., "Introduction" in Marcus Burkhardt et al. (eds) *Interrogating Datafication: Towards a Praxeology of Data* (Transcript Publishing 2022), at 12–13.

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intrusion.[4] Thought leaders like Cohen and Zuboff have reminded us how human experience is rapidly becoming raw material for datafication. Zuboff described datafication as "the application of software that allows computers and algorithms to process and analyze raw data" and claimed that the process of datafication "combined with (new and cheaper) storage technologies had translated 98 percent of the world's information into a digital format."[5] In her view, just as fat is rendered into oil, digital technologies are now designed to render our human actions into data: "Every time we encounter a digital interface we make our experience available to datafication."[6] Coined by Cohen as "information-era resources" and "information capitalism,"[7] human social interactions have now become "datafied inputs" for efficient exploitation and "profit extraction."[8] In Cohen's view, every day, we supply "raw material" to corporations, particularly big tech, and these firms then "translate" that raw data into a resource from which they can derive value.[9] Many critiques of datafication argue that from an economic perspective, it may unfairly benefit the rich and deepen the existing inequalities, and from a social perspective, it may violate personal dignity or autonomy.[10] As straightforward as it may be, some believe that "datafication is surveillance"[11] and caution that eventually, individuals are reduced to patterns of behavior and represented in algorithmically legible ways.[12]

To be sure, datafication today represents a paradigm shift as our society begins a new phase of the digital revolution. To date, however, scholarly literature on datafication has been dominated by discussions surrounding the risks and perils of such a trend. Assertions regarding "data colonialism" have reached an overwhelming level in the past few

[4] Southerton, supra note 2, at 358.
[5] Shoshana Zuboff, *The Age of Surveillance Capitalism: The Fight for a Human Future at the New Frontier of Power* (PublicAffairs 2019), at 187.
[6] *Ibid.*, at 233.
[7] Julie E. Cohen, *Between Truth and Power: The Legal Constructions of the Informational Capitalism* (Oxford University Press 2019), at 25, 37.
[8] *Ibid.*, at 16, 25.
[9] *Ibid.*, at 63–66.
[10] Salomé Viljoen, "A Relational Theory of Data Governance" (2021) 131 Yale Law Journal 573, at 581, 653.
[11] See, for example, Jasmine E. McNealy, "Sonic Privacy" (2022) 24 Yale Journal of Law and Technology 365, at 381.
[12] Viljoen, supra note 10, at 624.

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years.[13] Humanities and social sciences scholars,[14] among other disciplines, have focused on how our preferences can be monetized by big tech, how our everyday relationships with data are becoming "colonial," and how data capitalism, combined with surveillance, is intensifying inequalities. Nevertheless, voices from the international economic law arena have remained relatively quiet.[15] This is where this book enters into the fray – to map the contours of this datafied economy, and to ensure balanced policy that fosters innovation while addressing challenges. Global governance of datafication entails multifaceted endeavors. While the dangers inherent in datafication should be fully addressed, the potential benefits and promises under such a trend are equally important and should also be carefully considered when formulating public policies. After all, how datafication is conceptualized shapes how domestic and international law respond to its implications – including how to promote the potential benefits as well as mitigate potential risks and harms arising from associated datafication practices.[16] Digital technologies simultaneously do both good and harm.[17] We would be wrong to treat them as disastrous, and we would be equally wrong to embrace them without

[13] Nick Couldry and Ulises A. Mejias, *The Costs of Connection: How Data Is Colonizing Human Life and Appropriating It for Capitalism* (Stanford University Press 2019), at 83–112.

[14] See, for example, Mikkel Flyverbom, *The Digital Prism – Transparency and Managed Visibilities in a Datafied World* (Cambridge University Press 2019), at 32–33 (explaining the "extensive stream of digital traces" produced by datafication); Arne Hintz et al., *Digital Citizenship in a Datafied Society* (Polity Press 2019), at 1–19 (identifying the ways in which actors involve in the datafication process).

[15] Weber's pioneering contribution is devoted to questions entwined in the very fabric of international economic law, which serves as the greatest source of inspiration for this book. Rolf H. Weber, "Global Law in the Face of Datafication and Artificial Intelligence" in Shin-yi Peng et al. (eds), *Artificial Intelligence and International Economic Law: Disruption, Regulation, and Reconfiguration* (Cambridge University Press 2021), at 54.

[16] See generally Viljoen, supra note 10.

[17] For example, the concepts associated with the datafication process have long been actively used in industries such as insurance, banking, and human resources. See Douglas W. Arner et al., "The Future of Data-Driven Finance and Regtech: Lessons from EU Big Bang II" (2020) 25 Stanford Journal of Law, Business & Finance 245, at 255 (explaining how the financial industry has been datafied). See also Margarita Shilova, "The Concept of Datafication: Definition & Examples" (*Data Science Central,* June 2, 2018) <www.datasciencecentral.com/the-concept-of-datafication-definition-amp-examples>.

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reflection.[18] Depending upon the context, the term datafication can carry negative or positive connotations. We cannot talk about datafication without looking at both angles.

Challenges to Trade Governance

That said, the fundamental and foremost objective of this book is to explore datafication in the context of international economic law, with the assumption that international trade scholars and lawyers are more sympathetic toward datafication practices, whether digital trade liberalization or data capitalism. At its heart, this monograph is an attempt to systematically explain how international economic law may have contributed to the datafication ecosystem's architecture and may also help to change it. The tale I wish to tell in this book can best be summarized by the following two questions: Do trade rules perpetuate datafication practices and data capitalism in any manner? If so, what can be done to mitigate the damage?[19]

On these grounds, the setting of this book is regime-specific, focusing on international economic law and, more specifically, international trade law (noting that Chapters 1, 2, and 4 nevertheless address issues related to foreign investment). Over the past two decades, the (in)adequacy and even (ir)relevance of the conventional rules under the World Trade Organization (WTO), free trade agreements (FTAs), and bilateral investment treaties (BITs) in the governance of the digital economy have been at the center of discussions. Research on digital trade has mushroomed in recent years. The need to modernize relevant trade and investment rules to reflect technological developments is long overdue. Nonetheless, the current wave of data-driven innovations has placed the policy debates on digital trade and data governance into an even more challenging context. Datafication provides a new context that urgently demands further investigation in this research field. Core issues range from digital inclusion, critical infrastructure resilience, digital sovereignty, digital content moderation, and algorithmic transparency to privacy standards and

[18] Undeniably, datafying a wide range of phenomena into digital data for analysis has the potential to offer useful insights into digitally embedded lives and promote well-being. See Southerton, supra note 2, at 360.

[19] The author appreciates the insightful comments from the anonymous readers on this point.

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cybersecurity norms. These emerging challenges lead this book to reflect upon and critically assess the following set of analytical questions:

First, what is datafication? How does datafication extend beyond digitalization? What role has the world trade system played in the story of data capitalism's emergence and evolution? Should trade and investment regimes be reconceptualized and reconstructed to more effectively respond to a platform-based, data-driven economy shaped by various disruptive technologies? If so, how can we confront the trend of datafication as a whole, and what is the role of international trade agreements? Bearing in mind the "inherently imperfect compass" and "political limits" of international economic law,[20] what optimal cross-border arrangements will yield a broadly effective policy environment that accommodates trade interests while balancing human rights, data autonomy, national security, freedom of speech, cultural diversity, fair competition, algorithmic transparency, privacy and cybersecurity protection, and other non-trade interests?

Second, can existing trade rules remain relevant, and, if so, to what extent? Why do trade rules fall short in addressing growing concerns related to datafication? In recent years, additional digital trade disciplines have been recognized in the FTAs, which to a large extent serve as indicators of future digital trade negotiations. At the time of the writing of this book, WTO members participating in the Joint Statement Initiative on E-commerce (JSI on E-commerce) are wrestling with questions about how digital trade should be addressed in the multilateral trading system. How can we assess existing and future e-commerce and digital trade rules under the international trade agreements – be they relatively broad agreements with high standards and deeper commitments or narrow agreements with limited scope – in governing datafication?

Finally, how can we most effectively engage in international regulatory cooperation in the formulation of data policies? Additionally, how can we foster public–private multistakeholder collaboration? Meanwhile, sectoral policymakers from many jurisdictions are formulating the shape of a new paradigm for data governance. What are the regional and national solutions to these issues? In what ways have (domestic) regulators intervened? How can regulatory convergence be successfully facilitated? To put it more concretely, to what extent will the future of data

[20] This statement benefited from the anonymous readers' thoughtful comments.

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governance be influenced and even shaped by the key players, namely, the United States (US), Europe, and China? In this regard, will the private sector continue to assume an important role in the big data ecosystem? If so, why? In terms of Internet governance, inevitable clashes between multilateralism and multistakeholderism are imminent. How should (trade) governance arrangements respond to the trend of public–private convergence in the standardization process?

Structure of the Book

The structure of this book relies on network architecture, as illustrated by the International Organization for Standardization's Open Systems Interconnection (OSI) Reference Model,[21] which contains seven layers. Noting that the model is more than three decades old, it is still a relevant concept for creating a functional structure that can be used for regulatory purposes. By clustering and transposing the OSI technical model into the datafication context, this book is framed upon the three primary phases of the datafication process: infrastructure, application, and data flows. As shown in Figure 0.1, to better understand the relationship between datafication and international economic law, this book is divided into three main regulatory dimensions: first, the level of digital physical infrastructure that enables datafication (Part I); second, the level of digital applications and, in particular, the digital platform that drives datafication (Part II), and; third, the cross-border movement of data flows themselves (Part III). The three parts are technically bundled but, to a certain extent, legally separable, and they deserve independent analyses. Thus, the main premise of this book is the identification and investigation of the key issues associated with each conceptual phase, as each has its own challenges. Nonetheless, it goes without saying that full and complete comprehensiveness is impossible. Choices must be made, and some judgment calls are necessary.

With that caveat, we now turn to Figure 0.1 – a simplified datafication ecosystem. Vertically, the ecosystem has two layers from a regulatory point of view. The lower layer (Part I) is referred to as the network layer,

[21] Internet engineers typically adopt the International Standards Organization's Open Systems Interconnection (OSI) Reference Model to explain the network, which generally contains seven layers of function – 1. physical; 2. data link; 3. network; 4. transport; 5. sessions; 6. presentation; and 7. application. See, for example, IBM, "Networks" <www.ibm.com/docs/no/aix/7.1?topic=networks->.

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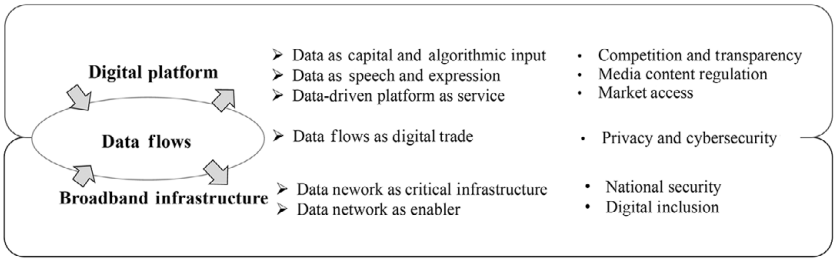


Figure 0.1 The interplay between datafication and international economic law

where the underlying telecommunications service function resides. The upper layer (Part II) is the application layer, where digital platforms such as social media reside. The data flow (Part III) takes place both vertically (between different layers) and horizontally (between different servers, applications, services, and facilities).[22] One interesting question regarding the structure is as follows: Given that digital application is contingent upon data flows, should not Part III come before Part II? Ideally, the issue of data flows should precede that of digital platforms. However, the flow of the book's arguments is easier to follow if the phenomenon of platformization can be explained before addressing the governance of "data flow" itself. At the end of the day, digital platforms are particularly potent data generators. When technically possible, they convert every bit of existence into data flows, which means that most aspects of our activities – whether at home or at work – become a part of the "flow." Because the framing of the book is rooted in the process of datafication, it is our hope that for those readers who are not familiar with this area, the foundation laid in the earlier parts of the book can provide a broader picture of how platforms control what becomes data (namely, what is being datafied),[23] how big tech drives profits using data, and how large-scale data reshapes the world.

The chapters in this book can be read separately. However, when read consecutively, they form a systematically conducted, holistic assessment of the interface between datafication and international economic law. Some chapters are meant to present the irony surrounding issues of

[22] Body of European Regulators for Electronic Communications (BEREC), "Draft BEREC Report on the Internet Ecosystem" BoR (22) 87 (June 9, 2022), at 10.

[23] See generally Angelina Fisher and Thomas Streinz, "Confronting Data Inequality" (2022) 60(3) Columbia Journal of Transnational Law 829.

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datafication at each phase, which are so intertwined that their independent solutions might lead to contradictions. For example, the simple fact that the greater the "digital inclusion" (Chapter 1), the greater the "data extraction" (Chapter 5) proves the merits of an overall investigation. This book should therefore be seen as a methodical effort to jointly address major problems at different phases of datafication. The identified structural features of the book seek to provide the necessary context, furnish an integrated overview of the datafication process relevant to trade lawyers, and offer in-depth analyses of topical issues pertaining to related fields.

Overarching Themes

Part I consists of two chapters, which explore the underlying networks supporting a platform-driven, data-fueled world. Chapter 1 introduces the "enabling" character of broadband infrastructures. The main line of inquiry is how best to tackle the issue of "trade and development" in the digital economy. It concludes with an examination of the issue of digital inclusion from a broader policy perspective. Chapter 2 focuses on the role of broadband networks as critical infrastructures, stressing the tension between the security resilience across the information and communication technology (ICT) supply chain and the digital ecosystem. Core issues include how much risk in the broadband network would amount to a danger to "essential interests," as well as how to distinguish between "legitimate" security measures and those that solely represent protectionism. The chapter also discusses how the movement of datafication affects the application of the general exceptions and security exceptions under the WTO and FTAs.

The focus then shifts to digital applications that drive datafication, highlighting the phenomenon of platformization. Overall, Part II of the book is dedicated to exploring considerations pertaining to the regulation of digital platforms. Chapter 3 deals with the market access for data-driven platforms. It argues that the WTO commitments effectively leave the door open for big tech companies. Thus, this chapter calls for new domestic regulations to address the potential risks and harms brought about by trends in datafication. The next two chapters turn to the specific regulatory concerns of digital platforms. They explore how platforms can be regulated when data operates as "speech" or "capital," as well as what roles international trade agreements can play. Chapter 4 discusses the issues surrounding media platformization. Content regulations involve a

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broad set of issues that may be subject to trade negotiations or dispute settlement. After demonstrating the need to regulate content moderation on social media and, more fundamentally, to alter the power distribution in the Internet ecosystem, this chapter points out the potential contradictions of these necessary reforms with the international trade regime. Chapter 5 continues to explore competition rules for data-driven markets. There are growing concerns about the abuse of dominant market position by platform monopolies. The gap in competition policies and enforcement among jurisdictions, however, will likely leave any competition authority ill-equipped to effectively address anti-competitive practices among the big tech companies. At the same time, datafication and algorithm-based decision-making work hand in hand. What are the ramifications, and what roles should international economic law assume in its efforts to ensure the adequate transparency of algorithmic systems to supervise how digital platforms moderate, rank, and recommend content to their users? This chapter examines the fragmentation of platform regulation, embarks on both research and reflection regarding how international coordination of platform governance should proceed, and argues that a great deal of political support is needed to ensure cross-border policy coherence.

Part III is dedicated to the governance of "data flow" itself, encompassing concerns related to privacy and cybersecurity. Chapter 6 examines issues surrounding cross-border data flows in the context of public–private convergence, addressing whether the emergence of a multiplicity of new actors facilitates co-governance, and, if so, to what extent a soft law approach can help balance the interests between privacy, security, and digital trade. After establishing that international economic law alone is not adequate in terms of privacy and cybersecurity governance, the chapter calls for the reconfiguration of the roles of the public and private sectors and advocates for a (new) global architecture to govern cross-border data flows. Finally, while each angle of this book is valid on its own merits, merging the major arguments of various angles presents the complete picture. This leads the author to summarize this book's findings and make an aggregate assessment of international economic law in an increasingly datafied world.

Technological Dimensions

Methodologically, the book must decide how best to describe the entire datafication ecosystem, which involves multivarious technologies. Should

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we have addressed the problems of blockchain? Or should we have prioritized the debates over generative pre-trained transformers (GPT)? Should this book broaden its technological dimensions to more comprehensively address the Metaverse? These questions are intimately linked to the objectives of this book. As elaborated above, the goal of this book is to address major problems at different phases of datafication. Such a goal can be explored through many transformative technologies, including big data analytics, the Internet of Things (IoT), artificial intelligence (AI), and blockchain, to name just a few. Nonetheless, this book attempts to maintain a high degree of generality and capture the entire debate without focusing on any particular technology. Of course, technology-based arguments make sense when the legal claims are closely tied to that particular technology. As this book is presented, certain technological features are more thoroughly addressed in chapters and parts where relevant, such as 5G communications in Part I, AI and algorithms in Part II, and big data analytics and the IoT in Part III.

Another reason that it is preferable to maintain a more general tone rather than taking a technology-specific approach is to preserve the arguments presented in this book. Technology is organic and is rapidly changing, and new technological advances will be developed before the ink on the pages of this book is dry. The more this book strives to be specific in terms of technological features, the sooner it becomes obsolete. This book was written during a period spanning from the summer of 2021 to the spring of 2023, with the goal of remaining current as of May 2023. However, as the Greek philosopher Heraclitus so aptly put it, "There is nothing permanent except change." This is especially true in the field of technology governance, with global and geopolitics as well as technological innovations constantly evolving. Recognizing that the "faces" of datafication change daily, it is even more important to govern what is in existence. Otherwise, its effects will continue to accumulate and will more than likely be amplified.

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