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Interoperability to foster open digital ecosystems in the BRICS countries

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Abstract: This paper aims to provide context and guidance for the development of open and competitive digital ecosystems. The paper briefly discusses the concept of digital ecosystems, provides an overview of the concept of interoperability, and makes some recommendations on how to enact interoperability based on the current state of development in the BRICS countries. The technical and legal dimensions of interoperability are detailed, fostering a holistic approach to this core principle that can be used as a tool for openness in digital ecosystems, encouraging value creation by all players, including new entrants, and preventing unfair value extraction by incumbents.

Keywords: BRICS countries, digital ecosystems, interoperability, legal interoperability.

1. Introduction: The New Digital Locomotives

In 1990, the landmark report of the South Commission, chaired by former Indian prime minister Manmohan Singh, represented a defining moment for the Global South, calling for South-South cooperation and consecrating the theory of the "locomotives of the South". The report emphasised that Global South countries could not expect former colonisers and imperialist forces to be the driver of their development: "the new locomotive forces have to be found within the South itself," it argued. Representing 41% of global population, 25% of global GDP and 20% of global trade, it is hard not to consider the BRICS as such locomotives.

Twenty years after the creation of the BRICS acronym, the fundamental goal of the grouping remains unchanged: to build a multipolar order where global governance and development can be led by the Global South for the benefit of developing countries. To achieve and enable such an ambitious goal, it has become clear to BRICS and non-BRICS countries alike, that digital technologies, digital governance, and digital policies have acquired a key role.

The digital transformation is completely reshaping our lives at an unprecedented pace. This transformation brings incredible opportunities but also enormous challenges. In such context,

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BRICS countries have demonstrated to be not only the "Locomotives of the South", but they have also demonstrated to be able of acting as drivers of innovations in terms of both digital technology and digital governance.

In less than a decade, the BRICS have evolved into regional or global leaders in digital technologies. As a telling example, it suffices to think that China, India, and Brazil have passed from being amongst the least connected countries in the world to global leaders in online payments, in eight years. Together, the BRICS have the potential to be the Digital Locomotives of the Global South.

Since the revelations of former NSA contractor Edward Snowden, the BRICS have also promoted numerous governance initiatives aimed at fostering global digital cooperation. In the aftermath of the Snowden revelations, Brazil convened the Global Multistakeholder Meeting on the Future of Internet Governance, better known as "NETmundial", held in Sao Paulo in 2014, which adopted an ambitious Multistakeholder Declaration [1]. Unfortunately, time has demonstrated that ambition alone is insufficient and must be accompanied with resources and stability to produce meaningful outcomes.

Aware of this, China has launched, also in 2014, a new global effort aimed at fostering cyberspace governance: the World Internet Conference (WIC), also known as "Wuzhen Summit." The conference, which is convened by Chinese authorities and held annually, providing a valuable venue for stakeholders to discuss solutions on a plethora of issues related to digital technologies.

India has also been the host of the Global Conference on Cyberspace (GCCS) in 2017; Russia is organising its mega "Artificial Intelligence Journey" conference since 2019; and South Africa has emerged as the most active African country in most Internet governance venues. Importantly, in July 2022, the first BRICS Digital Forum will be organised, under the Chinese presidency of the grouping, thus providing an extraordinary opportunity to BRICS countries to further discuss their approaches to digital technologies and governance and identify common grounds to enhance cooperation.

The initiatives spearheaded by BRICS countries demonstrate the enormous importance they attach to digital technologies and governance, but also to converging normative frameworks. It is increasingly evident

[1] Maciel, Marilia and Zingales, Nicolo and Fink, Daniel. NoC Internet Governance Case Studies Series: The Global Multistakeholder Meeting on the Future of Internet Governance (NETmundial) (January 1, 2015). Available at SSRN: https://ssrn.com/abstract=2643883

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that the BRICS have understood the value of interoperable digital technologies, allowing to exchange information and access or provide services globally, but also of interoperable norms, facilitating international trade while preserving national and digital sovereignty.

Preserving sovereignty and fostering openness are and should be seen as compatible goals if they are supported by legally interoperable frameworks. Legal interoperability can be achieved via many strategies, fostering convergent norms, providing similar levels of protection for users and similar obligations for producers of digital goods and providers of digital services.

Such legal interoperability should be at the basis of BRICS efforts to enhance their digital cooperation, while offering an alternative model of digital governance, driven by the Global South, but aimed at openness and inclusiveness. Importantly, as the works of the CyberBRICS Project have demonstrated, many digital policies and norms in the BRICS countries are already remarkably compatible.

To be real Digital Locomotives, BRICS have not only to understand but also to rely on interoperability, be it from technical or a legal perspective of the issue. Indeed, it is the opinion of the authors that a shared understanding of the concept and, ideally, the inclusion of interoperability policies within BRICS discussions has the potential to bring considerable social and economic benefits, expanding and strengthening the openness of the BRICS digital ecosystems.

To facilitate such challenging task, this paper provides an overview of the concept of interoperability and some recommendations on how to enact it, based on the research developed by the CyberBRICS Project and the Ecosystemic Antitrust in the BRICS project, run by the Center for Technology and Society at FGV. Before entering the analysis of the various aspects of interoperability, this paper briefly discusses the concept of digital ecosystems.

2. Digital Ecosystems

The coalescence of competitive forces around few major digital platforms has given rise to a new type of competitive environment, which is characterized by the co-existence and interdependence of multiple economic actors with a shared interest in value creation. These dynamics can be explained by some of the characteristic features of the platform economy, namely interconnectedness, modularity, and

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network effects[2].

These characteristics have given rise to the so-called "inverted firm" phenomenon: digital platforms choosing to innovate and achieve scale by bringing together large number of interdependent user groups, and using open external contracts in preference to closed vertical integration or subcontracts[3]. Instead of integrating functionalities inside the firm, these actors achieve growth by externalizing production to so-called "complementors", which fosters the creation of a rich ecosystem and yet allows them to maintain some control over it through technical standards and contractual rules. Their role as regulators of this ecosystem, or more specifically of orchestrators of value creation, is crucial to both enable growth and avoid negative externalities. At the same time, however, it provides them with opportunities for abuse in a way that may hinder competition, innovation, and the effectiveness of public policies.

Given the above dynamics, it is clear that a competitive strategy that can be put in place by orchestrators is to attract complementors into their ecosystem through open standards, facilitate their value creation up to the point in which the complementor has obtained a critical mass of users, and subsequently integrate into the complementors' market (once it is apparent that such market is profitable).

Given the variety of business activities that the orchestrator facilitates, there is obviously a certain degree of selectivity involved in picking the complementor market where this integration is pursued, and the orchestrator will need to carefully ponder the chances of disrupting each particular complementor's business through its own entry. It is precisely at this stage that the strategy may become anti-competitive: the orchestrator may introduce restrictions that penalize the complementor's product or service over the one developed by the orchestrator.

The range of such restrictions varies, including, for instance, charging high intermediation fees, reducing access to transactional data, and suddenly or repeatedly altering ranking criteria for surfacing the complementor's offering to consumers within the ecosystem, while refraining from applying these rules to the orchestrator or its affiliates. At their

[2] The first term refers to the way in which different species within an ecosystem relate to each other. The second is a system property which measures the degree to which densely connected compartments within a system can be decoupled into separate communities or clusters which interact more among themselves rather than other communities. Finally, network effects refer to the fact that a product or service derives more value the more people use it- and which can be either direct (if the value accrues to the same group of users) or indirect (if the value accrues to another group of users that is connected to the former through the platform: for instance, advertisers).

[3] Parker, Geoffrey, Van Alstyne, Marshall W., & Jiang, Xiaoyue. 'Platform ecosystems: How developers invert the firm'. 41 (1) MIS Quarterly (2017), 255-266.

core, all these practices have to do with limitations on the ability to effectively interoperate with the orchestrator's platform.

Accordingly, an effective remedy against such situation cannot remain limited to the notion of technical interoperability: regulators should prescribe what is referred to as "equitable interoperability", meaning that an entrant is not only able to join the platform, but can do so on qualitatively equal terms as others, including the platform operator (or ecosystem orchestrator) itself[4].

3. Interoperability: A Techno-legal Concept

Interoperability may be defined as "*the ability of two or more systems or applications to* ***exchange*** *information and to* ***mutually use*** *the information that has been exchanged*"[5] Fundamentally, interoperability is the ability to transfer and render useful data and other information across systems, applications, or components.

Importantly, interoperability considers different layers of the systems that it tackles: the technological, data, human, institutional. While the data and technological dimensions are essential for our study, the human and institutional aspects of interoperability must not be underestimated as they are often just as – and sometimes even more – important than the technological aspects.

This property is particularly relevant in the telecommunications area as network interoperability is essential to achieve end-to-end connectivity. Indeed, the main reason why anybody in the world using the old Public-switched Telephone Networks (PSTNs) was able to communicate with anyone else is interoperability.

In practical terms, to achieve interoperability, shared standards are needed. Standards are the regulatory tools that make possible the design of interoperable systems. A plethora of standard bodies exist for different sectors, and they may have public or private nature. As regards ICTS, some of the most prominent international standards are the International Telecommunication Union (ITU), one of the oldest intergovernmental organisations in the world, which became a United Nations agency, after the establishment of the UN,

[4] Crawford, Gregory S., Dinielli, David, Fletcher, Amelia, Heidhues, Paul, Schnitzer, Monika, Scott Morton, Fiona, Seim, Katja M.'Equitable Interoperability: the "Super Tool" of Digital Platform Governance', Tobin Centre Policy Discussion Paper No. 4 (July 13, 2021)

[5] See ITU. (2015). "Interoperability in the digital ecosystem". GSR Discussion Paper. http://www.itu.int/en/ITU-D/Conferences/GSR/Documents/GSR2015/Discussion_papers_and_Presentations/Discussionpaper_interoperability.pdf

and the Internet Engineering Task Force (IETF), an open standardisation body dedicated to Internet technologies and primarily made of engineers representing private sector entities and, to a lesser extent, academic and regulatory agencies. Such bodies play an essential role by elaborating technical standards, which are documents establishing engineering and technical requirements, to be employed in the design of systems, or system components, and to use services and exchange information effectively together.

The concept of interoperability is increasingly important as interconnected technologies, continuously receiving and transmitting data, are becoming the norm. Communication among devices, cars, engines, phones is only possible if they are interoperable and therefore, interoperability plays an instrumental role in furthering the sustainable evolution of the Internet, as a globally interconnected ecosystem.

In the sections below, we concisely analyse the concept of interoperability and its potential application to legal and regulatory systems rather than being merely confined to the technical systems.

3.1. How to Foster Interoperability

Interoperability is also one of the main purposes of the ITU's International Telecommunication Regulations, which "are established with a view to facilitating global interconnection and interoperability of telecommunication facilities and to promoting the harmonious development and efficient operation of technical facilities, as well as the efficiency, usefulness and availability to the public of international telecommunication services."[6]

Interoperability can be fostered through the actions of private as well as public actors. The actions of such actors can be taken on a unilateral basis or via joint efforts involving a plurality of stakeholders. Hence, it is important to note that there is a spectrum of possibilities for public-private collaboration aimed at developing tools that may advance interoperability.

Private actors can foster interoperability trough technical collaboration. Mobile payments are a frequently cited example to illustrate a broad level of cooperation between businesses, including retailers, manufacturers, payment processors and banks. Standards, including non-

[6] See art. 1.3, International Telecommunication Regulations (ITRs) https://www.itu.int/en/wcit-12/Pages/itrs.aspx

proprietary open standards, are also an important option through which private actors collaborate towards higher levels of interoperability. Although standards have a great potential for achieving high degrees of interoperability their effectiveness might be limited.

Regulatory decisions influencing interoperability might also range from more unilateral actions to more collaborative actions. Regulators might mandate the adoption of interoperable standards, which might be an effective approach. However, governments might have difficulties to adapt rules to new realities once the standards become outdated. Moreover, governments might lack sufficient expertise to choose the most efficient standards. Importantly, regulators can also mandate the disclosure of information that is essential to build interoperable systems, components, and applications.

Such mandatory disclosure might have different dimensions and that, in some cases, the regulator can require industry participants to disclose information, and leave it to the participants to resolve the details such as consideration or compensation. [7] Transparency rules and labelling requirements are also a regulatory approach, but it is harder to assess the effectiveness of such approach, as they contribute indirectly towards interoperability. It is also worth mentioning that Intellectual Property law also recognises explicit interoperability exceptions, e.g. in the EU Software Directive, as well as reverse engineering exception to trade secrets[8].

Lastly, interoperability might be fostered through competition law, an ex-post type of intervention. Nonetheless, the limitations of such intervention are easy to infer, due to its ex-post nature and procedural delays, which stand in contrast with the fast-evolving nature of technology and interconnection standards.

3.2. Legal Interoperability: Can Regulatory Systems Be Interoperable?

There are also legal aspects to promoting interoperability. Legal interoperability fosters compatibility of rules concerning the same topic within different jurisdictions or different administrative levels within a state. Like technical interoperability, legal interoperability stimulates the exchange of information within different systems. As such, interoperability of both

[7] *Idem.*

[8] Zingales, Nicolo. 'Of Coffee Pods, Videogames, and Missed Interoperability: Reflections for EU Governance of the Internet of Things' (December 1, 2015). TILEC Discussion Paper No. 2015-026, Available at SSRN: https://ssrn.com/abstract=2707570. See also Lianos, Ioannis, Zingales, Nicolo, McLean, Andrew, Raslan, Azza. 'The scope of competition law in the digital economy', *Pravovedenie, 63(4), 522-572.*

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technical and legal systems allows individuals - and, particularly, Internet users - to access and provide services in a cross-border fashion and to enjoy equal right-protection within different systems thanks to compatible (or, preferably, common) rules, principles and procedures.[9]

The "models and sets of rules" required to allow various juridical system to interoperate may be elaborated by players on an equal footing through harmonisation; may be unilaterally imposed by a player enjoying an asymmetric power relationship with the other players or may be fostered through transnational diffusion.[10] Harmonisation relies on the cooperative effort by a group of governmental actors to elaborate a suitable solution to a shared – and frequently transnational – problem. To this end, public actors may define common regulatory tools aimed at fostering the free flow of information or, more generally, the free movement of people, goods, services and capital. Harmonisation usually backs legal interoperability via intergovernmental processes taking place within bilateral, plurilateral or multilateral fora.

Transnational diffusion, differently from the two former cases, is grounded on a process of adoption and reproduction of rules and procedures deemed as reliable and efficient and, contrary to harmonisation and imposition may occur in the absence of any institutional agreements. To this extent, international fora and transnational NGOs may be the vehicle of transnational diffusion and, although such entities may lack institutional legitimacy, they may deploy relevant influence on policy development (Béland and Orenstein, 2009).

When considering the autonomous networks composing the Internet, it is spontaneous to remark that their technical interoperability is guaranteed by the use of shared standards that are voluntary adopted by operators and service providers by reason of their proven efficiency. Indeed, the day-to-day operation of the Internet is indeed based on the "voluntary adherence to open protocols and procedures defined by Internet Standard"[11] that enable end-to-

[9] See Belli, Luca and Foditsch, Nathalia. (2016). "Network Neutrality: An Empirical Approach to Legal Interoperability", in Belli, L. and P. De Filippi. (eds.) Net Neutrality Compendium: Human Rights, Free Competition and the Future of the Internet (Springer, 2016); Belli, Luca. ´Data Protection in the BRICS Countries: Enhanced Cooperation and Convergence towards Legal Interoperability´. In New Media Journal. Chinese Academy of Cyberspace Studies. (2021).

[10] See Jörgens Helge (2003). Governance by Diffusion – Implementing Global Norms Through Cross-National Imitation and Learning. Environmental Policy Research Centre of FFU-report 07-2003; Belli, Luca. De la gouvernance à la régulation de l'Internet. Berger-Levrault. (2016).

[11] See Bradner, S. The Internet Standards Process - Revision 3, Request for Comments: 2026. (1996).

end communication taking place via "a loosely-organized international collaboration of autonomous, interconnected networks."[12]

The concept of interoperability has been associated with different benefits affecting competition and innovation, increasing efficiency in the provision of services by Governments. Interoperability is also associated with reductions in the cost of technologies, as it promotes scalability. The benefits of technical interoperability tend to outweigh the possible challenges related to it and, for this reason, it seems important to enquire whether similar benefits may be achieved through the promotion of interoperability from a regulatory perspective rather than from an exclusively technical one. Shared rules and principles amongst various juridical systems have the potential to reduce transaction costs, deflating barriers to cross-border trade, and foster non-magnetisable benefits, such as the protection of fundamental rights.

4. Major developments in the BRICS

In the last couple of years, regulators' appreciation of the importance of open and interoperable ecosystems can be seen as a rapidly emerging trend across the BRICS. Below, we make reference to some notable initiatives in this sense, which can fruitfully be compared and built upon to trace the path of a common regulatory agenda.

China is perhaps the country where the principle of equitable interoperability has been most visibly made its way into the regulatory framework, in several parallel initiatives. The most significant development is arguably the adoption by nine Chinese ministries and commissions, on 19 January 2021, of the Opinions on Promoting Standardized, Healthy, and Sustainable Development of Platform Economy[13]. The Opinions are addressed to all local governments, urging them to improve the transparency, interpretability, and fairness of their algorithms of platform companies, and asking them to cut off "improper links" between their payment services and their financial products. Companies should not use picking-sides practice in the payment services or abuse the market dominance of non-bank payment services.

India is another jurisdiction that is demonstrating a keen interest and commitment for interoperable ecosystems. The Central Bank is a key player in this respect, having created a single interface for payments (Unified Payments Interface) as a public utility,

[12] Idem.

[13] Fa Gai Gao Ji [2021] No.1872

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facilitating the interaction with all accredited payment providers[14]. More peculiar to the Indian context is the government's effort to provide a common digital infrastructure layer for e-commerce (Open Network for Digital Commerce), allowing sellers to manage the distribution and sale of their products on multiple e-commerce platforms in a synchronized way[15]. The government is also trying to replicate a similar dynamic with regard to the sharing and re-use of non-personal data, having published a proposal for the creation of an open system of instructions to developers (India Stack) for the secure and standardized sharing of data[16].

A third major player in this scene is Russia, where the Central Bank has not only created a regulatory framework for open banking[17], but also put out for consultation a policy paper detailing possible regulatory approaches to digital ecosystems[18]. The competition authority has also placed an important focus on interoperability and non-discrimination conditions on the Google and Apple app store ecosystems to open the market to applications from domestic competitors, in particular in the *Google Android* (2016) and the *Apple/Kanspersky* case (2019), and more recently extended that treatment to local companies Headhunter.ru (2020) and *Yandex* (2022).

Brazil's experience is aligned with the trend described above. The most prominent example is the financial sector, where, after a streak of cases brought by the competition authority to ensure non-discrimination and interoperability of payment system[19], the central bank has recently fostered and started the creation of a common infrastructure with the regulation of open banking[20] and instant payments[21]. There are other initiatives emerging with the aim of creating an open and standardized infrastructure in other sectors, namely health[22] and food delivery[23]. Furthermore, Brazil offers a particularly

[14] https://www.npci.org.in/what-we-do/upi/product-overview

[15] https://www.business-standard.com/article/economy-policy/india-to-launch-open-e-commerce-network-to-take-on-amazon-walmart-122042801460_1.html

[16] https://www.medianama.com/2022/06/223-new-data-governance-policy-privacy/

[17] https://www.finextra.com/pressarticle/88494/russia-welcomes-first-open-banking-participants

[18] https://www.cbr.ru/eng/press/event/?id=9718

[19] https://cdn.cade.gov.br/Portal/Not%C3%ADcias/2019/Cade%20divulga%20estudo%20sobre%20mercado%20de%20instrumentos%20de%20pagamento__Cadernodeinstrumentosdepagamento_27nov2019.pdf

[20] https://www.bcb.gov.br/estabilidadefinanceira/openbanking

[21] https://www.bcb.gov.br/estabilidadefinanceira/pix

[22] https://www.openhealthbr.com

[23] See https://valor.globo.com/empresas/noticia/2022/06/07/open-delivery-tem-novas-adesoes.ghtml. In addition, on March 28, the city of Rio launched an "open" delivery application, in the sense of allowing delivery to be provided by the restaurants themselves: this application allows interoperability with delivery systems that are not from the application itself, and thus facilitates the transfer of a higher share of the value to delivery workers, as well as the practice of better working conditions. See https://prefeitura.rio/fazenda/prefeitura-lanca-aplicativo-de-delivery-que-preve-taxa-zero-para-restaurantes-e-o-dobro-da-remuneracao-para-entregadores/

promising framework for regulatory coordination: it gives the national data protection authority the prerogative to provide for interoperability standards[24], a power that can be used to promote good practices not only in the country, but also across the BRICS.

South Africa has not yet been proactive with regard to interoperability solutions, but the South African Competition Commission launched on 9 April 2021 an 18-month Sector Inquiry on Online Intermediation Platforms with the aim to study specifically the feature of these markets that may hinder competition amongst platforms and that give rise to discriminatory or exploitative treatment of business users, as well as those that may negatively impact on the participation of small-medium enterprises and firms operated by historically disadvantaged persons. This presents an excellent opportunity to examine and address some of the crucial interoperability issues affecting the openness of digital ecosystems.

5. Conclusions

This short contribution sought to provide context and direction for the development of open and contestable digital ecosystems. It has illustrated the relevance of BRICS cooperation as a driver of innovation and as a proponent of alternative models for global governance, particularly in cyberspace. Our aim was to illustrate a practical way in which this cooperation can provide an effective mechanism to address concerns of economic power (and possibly broader societal effects) arising from the concentration of crucial decisions into the hands of a few key gateways for digital commerce- what we call “digital ecosystems”.

The solution is to pursue interoperability in two senses: first of all, as a technical concept, interpreted broadly to refer not merely the interconnection but also the equal treatment of complementary products and services, as a tool to promote fairness, contestability and bottom-up innovation. Secondly, legal interoperability of the legal rules applicable to and by digital ecosystems across the BRICS would facilitate the affirmation of convergent normative frameworks in the BRICS vision, defining compatible principles and rules, while preserving both openness and sovereignty.

By promoting interoperability, more competition can be spurred, which in turn could lead to more start-ups and SMEs to enter the market to deliver solutions that are more user-centric, while incentivising incumbents to increase quality and/or

[24] Art 40 of the Brazilian General Data Protection Law, or LGPD.

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reduce price. However, to ensure interoperability policy discussions lead to an outcome that is equally beneficial for both "developed" and "developing" countries, the specificities of the latter must be analysed and represented in relevant discussions. Otherwise, the outcome of a discussion primarily led by European and North American countries, according to their needs and understandings, risks exacerbating existing divides and transforming a discussion on how to cooperate into a process creating further discrepancies.

The existing debates around interoperability are mainly concentrated in Western countries, thus failing to understand (or even consider) the perspectives, realities and needs of the Global South in general and of major players such as the BRICS countries. In this context, BRICS countries can act as digital locomotives not only by including interoperability in the list of relevant issues to be debated, but also by using such debates as a catalyst for the promotion of Global South discussions on interoperability – and digital policies in general – that may act as counterbalance to the traditionally Western-centric discussions on the issue.

提升互操作性，构建金砖国家开放数字生态系统

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摘要:本文旨在为开放且可竞争的数字生态系统提供发展背景与方向。本文简要讨论了数字生态系统，概述了互操作性的概念，并基于金砖国家发展现状，为如何制定互操作性提出了一些建议。同时，详述了遵守法律决议互操作性的各方面内容，以期在数字生态系统中打造开放的生态，鼓励互补者创造价值，防止现有参与者进行不公平的价值提取。

关键词：金砖国家；数字生态；互操作性

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一、引言：新型数字火车头

1990 年，印度前总理曼莫汉·辛格牵头起草了一份具有里程碑意义的南方委员会报告，正式提出“全球南方国家”这一概念，号召南南合作，推崇“南方火车头”理论。这份报告强调，全球南方国家不能寄希望于前殖民者和帝国主义力量来推动本国发展：“新的驱动力必须源自南方国家本身。”金砖国家人口占全球总人口的 41%，全球 GDP 占比 25%，全球贸易总量占比达 20%，因此其自身完全有能力成为自己的原动力。

“金砖国家”一词诞生二十年来，其根本目标从未改变：打造多极秩序，让全球南方国家领导下的全球治理和发展真正惠及发展中国家。要促使这一伟大目标的实现，金砖国家和非金砖国家都要明白，数字技术、数字治理和数字政策都扮演着极其关键的角色。

数字变革正以一种前所未有的速度重塑我们的生活。这种变革在带来绝佳机遇的同时，也带来了巨大挑战。因此，金砖国家不仅要成为“南方火车头”，更要成为数字技术和数字治理创新的驱动力。

不到十年时间，金砖国家已成为数字技术领域的地区乃至全球引领。例如，中国、印度和巴西在短短八年间，就从全世界联网人数最少的国家一跃成为线上支付的领导者。因此，金砖国家完全有潜力成为将来的全球南方国家的数字火车头。

自美国国家安全局外包技术员爱德华·斯诺登泄密事件曝出后，金砖国家也出台了诸多治理

倡议，旨在开展全球数字合作。斯诺登事件后，巴西于 2014 年在圣保罗召开了“关于互联网治理的未来——全球多利益相关方会议”（也称“全球互联网治理大会”），会上通过了《全球互联网多利益相关方圣保罗声明》。[25]不幸的是，时间告诉我们，光有雄心壮志还远远不足以支持发展，我们还必须要有足够的资源和稳定来取得富有重大意义的成果。

因此，中国为促进网络空间治理也做出了全球性努力，于 2014 年召开世界互联网大会（亦称乌镇峰会）。该会议由中国政府每年举办，旨在为利益相关方提供一个绝佳平台，围绕数字技术的相关问题商讨相应的解决方案。

印度于 2017 年举办了全球网络空间会议；俄罗斯自 2019 年起开始组织召开国际人工智能会议；南非也已成为互联网治理领域中最积极的非洲国家。更重要的是，2022 年 7 月，首届数字金砖论坛将在中国领导下召开，届时所有金砖国家都将有机会进一步讨论数字技术与治理的相关方法，找出共性，促进未来合作。

金砖国家领导的这些倡议充分展示了对数字技术与治理，以及规范性框架的高度关注。日益明显的是，金砖国家也充分理解了互操作数字技术的价值，主要是在全球范围内交换信息，享受、提供服务，同时也充分理解了互操作标准的价值，即在保护国家与数字主权的同时促进全球贸易。

保护主权、促进开放是应被视为互相兼容的目标，前提是二者都有合法的互操作框架作为支

[25] Maciel, Marilia and Zingales, Nicolo and Fink, Daniel, NoC Internet Governance Case Studies Series: The Global Multistakeholder Meeting on the Future of Internet Governance (NETmundial) (January 1, 2015). Available at SSRN: https://ssrn.com/abstract=2643883

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持。法律互操作性的实现可依赖诸多策略，如制定兼容标准、为用户提供相似等级的保护、为数字产品生产商和数字服务提供商提供相似的义务等。

这种法律互操作性应当成为金砖国家促进数字合作的基础，为全球南方国家驱动的数字治理提供了另一种模式，旨在实现开放和包容。重要的是，“网络金砖”项目表明，金砖国家的诸多数字政策与规范是高度兼容的。

要成为真正的数字火车头，金砖国家不仅要从技术和法律角度理解互操作性，更要真正去依赖互操作性。对此，笔者认为，大家对这一概念的理解，以及金砖国家讨论中体现的对互操作性政策的包容，都能带来更大的社会及经济益处，扩大并增强金砖国家数字生态系统的开放性。

为了促成这项具有挑战性的任务，本文在巴西热图利奥·瓦加斯基金会法学院技术与社会中心的“网络金砖”项目及金砖国家生态系统反垄断项目的基础上，概述了互操作性的概念，为如何制定互操作性提出了一些建议。在分析互操作性的各方面之前，本文还简要讨论了数字生态系统的概念。

二、数字生态系统

几大数字平台的竞争实力总和营造出了一种新兴的竞争环境。在这种环境中，多方经济行为者在价值创造的共有利益上共存且互相依赖。这些可以理解为平台经济的特点，即互联性、模块化和网络效应。[26]

[26] 第一个术语指同一生态系统中不同物种互相联系的方式。第二个术语则是一种系统属性，用于测算同一生态系统中紧密相连的部分各自分离为不同群体和集群的程度，他们更愿意与自己而非其他群体互动。最后，网络效应指的是产品或服务创造更大价值，有更多人愿意使用——可以是直接的

这些特点也导致了所谓的“倒立公司”现象：数字平台通过吸纳诸多互相依赖的用户群体，使用开放的外源合同而非封闭式垂直整合或子合同来创新和扩大规模。[27]相较于在公司内部进行功能融合，这些行为者外化生产，使其成为“互补者”来实现增长。这就促成了一个丰富的生态系统，通过技术标准与合同规则维持对生态系统的控制。他们作为这一生态系统的监管者，或者更具体地说，作为价值创造的支持者，对促进增长和避免负面外部效应来说至关重要。但与此同时，这也为滥用竞争、创新和公共政策的效力提供了机会。

鉴于上述情况，很明显，协调者可以实施的竞争战略，是通过开放标准吸引互补者进入他们的生态系统，促进他们的价值创造直到互补者获得大量用户，并随后融入互补市场（一旦该市场明显有利可图）。

考虑到协调者促成的各类商业活动，在选择追求整合的互补者市场时有一定的可选择性，协调者应仔细考虑干扰某一互补者商业活动的可能性。眼下，这种策略可能是反竞争的：协调者可能会引入限制，以限制补充者而非协调者开发的产品或服务。

这些限制的种类很多，例如收取高昂中介费，减少交易数据的获取，突然或反复修改评级标准，用以限制生态系统中互补者为消费者提供的服务，同时避免将这些规则应用于协调者或其关联方。究其核心，这些必要限制措施都与协调者平台有效的互操

（若价值来源于同一组用户），也可以是间接的（若价值来源于另一组用户，这两组用户通过广告商等平台互相连接）。

[27] Geoffrey Parker、Marshall Van Alstyne, M. W.、Xiaoyue Jiang，平台生态系统：开发商如何倒置公司，41（1）《管理信息系统季刊》（2017），255-266

作性能力相关。

相应地，针对这种情况的有效补救方案也不能被技术互操作性的概念限制：监管者应当规定好什么是“公平的互操作性”。这意味着新加入者不仅可以进驻平台，也可以跟其他人一样应用平等的条款，包括平台经营者（或生态系统支持者）自身。[28]

三、互操作性：涵盖技术与法律两个层面的概念

互操作性的定义是指“两个或多个系统或应用**交换**信息和**相互利用**交换得来的信息的能力”。[29]从根本上而言，互操作性是一种通过系统、应用或组件传输、使用有用数据和其他信息的能力。

重要的是，互操作性要考虑它负责处理的系统的不同层面：技术、数据、人文和制度。虽然数据和技术层面对研究至关重要，但互操作性的人文和制度层面也不能被低估，它们通常或者说很多时候甚至要比技术层面更重要。这一属性在电信方面尤为明显，因为网络互操作性是实现端到端连接的关键要素。全球使用老式公共交换电话网络的人能与他人联系的最主要原因就是互操作性。

在实际情况中，要实现互操作性，就需要有一套可共享的标准。标准是互操作系统设计的监管工具，各个领域都有自己的监管机构，或公或私。例如信息与通信技术，其中最著名的国际标准要数全球历史最悠久的政府间组织之一——国际电信联盟。在联合国成立后，国际电信联盟也

[28] Gregory S. Crawford, David Dinielli, Amelia Fletcher, Paul Heidhues, Monika Schnitzer, Fiona M. Scott Morton, Katja Seim, ‘Equitable Interoperability: the “Super Tool” of Digital Platform Governance’, Tobin Centre Policy Discussion Paper No. 4 (July 13, 2021)

[29] See ITU. (2015). “Interoperability in the digital ecosystem”. GSR Discussion Paper. http://www.itu.int/en/ITU-D/Conferences/GSR/Documents/GSR2015/Discussion_papers_and_Presentations/Discussionpaper_interoperability.pdf

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成为了联合国下属机构。此外，还有互联网工程任务组，这是一个专注互联网技术开放标准的机构，由代表私营实体的工程师、一小部分学者及监管机构组成。这类机构制定技术标准，发挥着至关重要的作用，这些标准也是提出工程和技术需求的参考文件，适用于系统或系统组件设计，可以帮助服务和交换信息得以更有效的使用。

持续接受和传输数据的互联技术正逐步成为标准，互操作性的概念也日益重要，设备、汽车、引擎和手机间的交流只有在互操作的基础上才能实现。因此，在全球互联的生态系统中，互操作性为进一步推动互联网的可持续发展发挥了重要作用。在下一部分，我们将简要分析互操作性的概念，同时探索其应用于法律和监管系统，而非仅仅局限于技术系统的潜力。

(一) 如何助力互操作性实现

互操作性是国际电信联盟出台的《国际电信规则》的主要目的之一，其中写道：“(本规则)的制定旨在促进全球互联互通和电信设施互操作性的实现，促进技术设施的和谐发展和高效运行，同时也确保国际电信服务的效率、有效性和可用性。”[30]互操作性可以经公私行为者推动。行为者的行为可以是单方面的，也可以是多方利益相关方的集体行为。因此，要注意的是，公私部门有极大的共同协作空间，可以共同开发促进互操作性的工具。

私营行为者可以通过技术协作促进互操作性。在描述包含零

[30] See art. 1.3, International Telecommunication Regulations (ITRs) https://www.itu.int/en/wcit-12/Pages/itrs.aspx

售商、制造商、支付处理商和银行等商务领域的广泛合作时，移动支付是一个被频繁提及的例子。标准（包含非专有开放标准）也是非常重要的选择。私营行为者可以此协作实现更高水平的互操作性。即便标准在实现高度互操作性方面有着极大潜力，但其有效性也是有限的。

影响互操作性的监管决策包括过于频繁的单边行为和协作行为。监管者可能强制采用互操作性标准，这是一个有效方法。然而，一旦标准过时，政府很难在新形势下应用这些规则，同时也缺乏足够的经验选择更高效的标准。重要的是，监管者也会强制披露围绕搭建互操作系统、组件和应用至关重要的信息。

这类强制披露可以从不同层面进行解读，在有些情况下，监管者可以要求行业参与者披露信息，让参与者自行解决对价或赔偿等细节。[31]透明性规则和贴标需求也是一种监管方法，但就更难评估这种方法的有效性，因为他们对互操作性的贡献是间接的。此外，还值得提及的是知识产权法，该法也认同明确的互操作性免责条款(例如欧盟的软件指令)，以及将工程特例转换为商业机密的免责。[32]

最后，互操作性可通过竞争法这种事后干预措施来进一步推动。然而，这类干预措施因其事后性质和程序性延误，局限也显而易见，无法紧追技术和互联互通标准的快速变化。

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[31] *Idem.*

[32] Nicolo Zingales, 'Of Coffee Pods, Videogames, and Missed Interoperability: Reflections for EU Governance of the Internet of Things' (December 1, 2015). TILEC Discussion Paper No. 2015-026, Available at SSRN: https://ssrn.com/abstract=2707570. See also Ioannis Lianos, Nicolo Zingales, Andrew McLean, Azza Raslan, 'The scope of competition law in the digital economy', *Pravovedenie, 63(4), 522-572.*

（二）法律互操作性：监管体系能否实现互操作?

我们还可以从法律层面促进互操作性。法律互操作性可以让一个国家内部不同管辖或行政层面有关同一话题的规则互相兼容。正如技术互操作性一样，法律互操作性也促进了不同系统间信息的交换。同样，技术和法律系统的互操作性也让个人，尤其是互联网用户，可以跨境获取或提供服务，能够在不同系统中享受平等的权利保护，这一切都要归功于相互兼容的（或是共有的）规则、原则和程序。[33]

让不同司法体系可以互操作的“模型与规则组”可以让参与者在平等的基础上通过协调的方式进行制定；也可由具备不对称实力的一方单方面强加于另一方，或通过跨国扩散进行。协调依赖于众多政府行为者的共同努力，为共同面对的问题（通常为跨国问题）制定一个妥当的解决方案。为此，公共部门行为者应当制定共有的监管工具，旨在促进信息的自由流动，通常是人员、货物、服务和资本的自由流动。协调通常会通过双边、诸边或多边论坛中的政府间流程来支持法律互操作性。[34]

与前两种情况不同，跨国扩散以可依靠高效的规则和程序采用、程序复制，与在没有制度协议的情况下进行的协调和实施有所不同。就此而言，国际论坛和

[33] See Belli, Luca and Foditsch, Nathalia. (2016). “Network Neutrality: An Empirical Approach to Legal Interoperability”, in Belli, L. and P. De Filippi. eds. 2016. Net Neutrality Compendium: Human Rights, Free Competition and the Future of the Internet. Springer.; Luca Belli. Data Protection in the BRICS Countries: Enhanced Cooperation and Convergence towards Legal Interoperability. In New Media Journal. Chinese Academy of Cyberspace Studies. (2021).

[34] See Jörgens H. (2003) Governance by Diffusion – Implementing Global Norms Through Cross-National Imitation and Learning. Environmental Policy Research Centre of FFU-report 07-2003; Belli, L. De la gouvernance à la régulation de l’Internet. Berger-Levrault. (2016).

跨国非政府组织就是跨国扩散的媒介，即便这些实体缺乏制度合法性，它们也会对政策发展施加相关影响（Béland、Orenstein 2009）。

在考虑组成互联网的自治网络时，自然会注意到其技术互操作性是通过使用共享标准来保证的，运营商和服务提供商由于已证实的效率考虑而自愿采用这些标准。事实上，互联网的日常运营确是基于“自愿遵守互联网标准的开放协议和程序”[35]，通过“组织松散的自治国际协作”实现端到端通信[36]。

互操作性概念一直以来与促进竞争和创新、提升政府服务条款效率等各种好处息息相关。它还与技术成本降低相关，因为其极大促进了技术的可扩展性。技术互操作性的好处要远远大于随之而来的挑战。因此，重要的是，要明白是否可以从监管层面，而非单单技术层面，通过促进互操作性来实现类似的益处。不同司法体系的共有规则和原则有可能降低交易成本，减少跨国贸易壁垒，提高不可磁化利益，比如保护基本权利。

四、金砖国家的主要发展现状

过去几年间，监管者对于开放且具有互操作性的生态系统的理解，在金砖国家内部形成了一种新兴趋势。下面，我们将援引一些著名的倡议计划，通过对比找出一条共同监管议程的道路。

在多个平行倡议中，中国也许是在将公平互操作性原则融入监管框架方面做得最好的国家。最重要的进展是中国九部委在

[35] See Bradner, S. The Internet Standards Process - Revision 3, Request for Comments: 2026. (1996).

[36] Idem.

2021 年 1 月 19 日联合发布的《关于推动平台经济规范健康持续发展的若干意见》[37]。《意见》面向所有当地政府，督促平台企业提升算法透明度与可解释性，促进算法公平；断开支付工具与其他金融产品的不当连接。企业不得在支付过程中要求“二选一”，或滥用非银行支付服务相关市场支配地位。

印度对互操作生态系统也表现出了极大的兴趣，也做出了相应承诺。中央银行再次扮演了关键角色，将支付接口（统一支付接口）打造为公共事业，促进所有官方支付服务提供商的互动。[38]印度有一点不同的是，政府为电商提供的共同数字基础设施（数字电商开放网络）让卖家可以在多个电商平台同步管理产品的分销。[39]政府也正试图复制相似的经验，共享非个人数据或对其进行再利用，此外还发布了为开发者（India Stack）建立开放指令系统的提案，以便以安全标准的方式共享数据[40]。

第三位主要参与者是俄罗斯，其央行不仅为开放银行业制定了监管框架，[41]还制定了有关数字生态系统中潜在监管方案的政策文件。[42]竞争部门也重点关注了谷歌和苹果应用商城生态系统中的互操作性和非歧视条款，以便为国内竞争者应用开放市场，尤其是 *Google Android*（2016）和 *Apple/Kanspersky*（2019）案例，最近该关注也延伸到了当地公司 Headhunter.ru（2020）和 *Yandex*

[37] Fa Gai Gao Ji [2021] No.1872

[38] https://www.npci.org.in/what-we-do/upi/product-overview

[39] https://www.business-standard.com/article/economy-policy/india-to-launch-open-e-commerce-network-to-take-on-amazon-walmart-122042801460_1.html

[40] https://www.medianama.com/2022/06/223-new-data-governance-policy-privacy/

[41] https://www.finextra.com/pressarticle/88494/russia-welcomes-first-open-banking-participants

[42] https://www.cbr.ru/eng/press/event/?id=9718

(2022)。

巴西的经验与上述趋势一致。最突出的例子就是其金融行业，竞争部门确保支付系统[43]的非歧视和互操作性后，央行监管开放银行业[44]和即时支付，以此着手搭建了共同基础设施。[45]还有以在其他领域建设开放和标准化基础设施为目标的倡议，如医疗健康[46]和餐食外卖[47]。此外，巴西也为监管协调提供了前瞻性框架：赋权国家数据保护部门提供互操作标准。[48]这种权力可以在本国，甚至所有金砖国家推广为良好实践。

南非尚未主动提出互操作性的解决方案，但南非竞争委员会于 2021 年 4 月 9 日发布了为期 18 个月的线上中介平台调查项目，旨在专门研究这些市场的特点，观察哪类市场有可能阻碍平台竞争，哪类市场有可能歧视或剥削商业用户，或是有可能对历史上处于不利地位的人经营的中小企业和公司造成负面影响。这也就有了绝佳时机来检验和解决影响数字生态系统开放性的关键互操作性问题。

五、结语

本文旨在为开放且可竞争的数字生态系统提供发展背景与方向。本文阐述了金砖国家合作的双重身份之间的相关性，一是其作为创新推动者，二是其作为全

[43] https://cdn.cade.gov.br/Portal/Not%C3%ADcias/2019/Cade%20divulga%20estudo%20sobre%20mercado%20de%20instrumentos%20de%20pagamento__Cadernodeinstrumentosdepagamento_27nov2019.pdf

[44] https://www.bcb.gov.br/estabilidadefinanceira/openbanking

[45] https://www.bcb.gov.br/estabilidadefinanceira/pix

[46] https://www.openhealthbr.com

[47] 详见 https://valor.globo.com/empresas/noticia/2022/06/07/open-delivery-tem-novas-adesoes.ghtml。此外，3 月 28 日，里约热内卢发布了“开放”外卖应用，餐厅可以自行负责外卖服务：这一应用实现了外卖系统的互操作性，这一系统不来自应用本身，因此促进了外卖员价值共享，以及更优良的工作环境。详见 https://prefeitura.rio/fazenda/prefeitura-lanca-aplicativo-de-delivery-que-preve-taxa-zero-para-restaurantes-e-o-dobro-da-remuneracao-para-entregadores/

[48] Art 40 of the Brazilian General Data Protection Law, or LGPD.

NON-FINAL version of BELLI, Luca and ZINGALES, Nicolo. (2023). "Interoperability to foster open digital ecosystems in the BRICS countries" (提升互操作性，构建金砖国家开放数字生态系统). in Chinese Academy of Cyberspace Studies, Xinhua Institute, China Institute of International Studies (中国网络空间研究院，新华社研究院，中国国际问题研究院). Shared Vision for the Digital World: Insights from Global Think Tanks on Jointly Building a Community with a Shared Future in Cyberspace (数字世界的共同愿景：全球智库论携手构建网络空间命运共同体). The Commercial Press (商务印书馆).

球治理，尤其是全球网络空间治理替代模式的支持者。我们的目标是找出一条实践之路，让这种合作可以为解决经济实力问题（或者更广义的社会效应）提供有效机制。这些问题来源于数字商务中的重要决策由部分关键门户集中掌控，这些门户也就是我们所说的“数字生态系统”。

这个解决方案意在从两个方面实现互操作性：首先是技术层面，这里指的不仅仅是互联互通，也指互补产品和服务的平等对待，应将其视作一个促进公平、可竞争性和由下至上创新的工具。第二，金砖国家数字生态系统法律规则的互操作性将促进金砖国家愿景规范框架的落实，在保证开放和主权的同时，界定兼容原则及规则。

促进互操作性可以激发更多竞争，反过来也能让更多初创企业和中小企业进驻市场，产出更多以用户为中心的解决方案，同时也会激励现有参与者提升质量，降低价格。不过，要想确保互操作性政策的讨论能平等地惠及“发达”和“发展中”国家，应当在相关讨论中进一步分析发展中国家的特殊性。之前由欧洲和北美国家领导的讨论结果是根据其自身需要和理解所达成的，有可能会拉大现有差距，将合作变为分歧。

围绕互操作性的现有讨论主要集中在西方国家，因此无法理解（甚至无法考虑）全球南方国家，如金砖国家等主要参与者的角度、现实和需求。在这此情况下，金砖国家要成为“数字火车头”，通过将互操作性纳入议题清单，促进全球南方国家关于互操

NON-FINAL version of BELLI, Luca and ZINGALES, Nicolo. (2023). "Interoperability to foster open digital ecosystems in the BRICS countries" (提升互操作性，构建金砖国家开放数字生态系统). in Chinese Academy of Cyberspace Studies, Xinhua Institute, China Institute of International Studies (中国网络空间研究院，新华社研究院，中国国际问题研究院). Shared Vision for the Digital World: Insights from Global Think Tanks on Jointly Building a Community with a Shared Future in Cyberspace (数字世界的共同愿景：全球智库论携手构建网络空间命运共同体). The Commercial Press (商务印书馆).

作性和数字政策的讨论——此

举或能对传统意义上以西方为中

心的观点起到制衡作用。