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INVESTMENT SCREENING MECHANISMS AND THEIR POTENTIAL IMPACTS ON THE INTERNATIONAL REGIME OF TECHNOLOGY TRANSFER

MECANISMOS DE TRIAGEM DE INVESTIMENTOS E SEUS POTENCIAIS IMPACTOS SOBRE O REGIME INTERNACIONAL DE TRANSFERÊNCIA DE TECNOLOGIA

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ABSTRACT
This article analyses the proliferation of foreign investment screening mechanisms (ISMs) since 2016, with particular attention to their implications for international technology transfer. The study is based on a systematic review of literature, complemented by an examination of selected country cases, focusing on policies, strategies, and observed impacts. The methodological approach emphasises the identification of patterns and trends, employing comparative analysis to highlight differences across national contexts. Limitations arise from restricted data availability on the implementation and outcomes of ISMs in certain countries. The findings suggest that the spread of ISMs may mark a significant shift in the international framework of technology transfer. Predominantly introduced by developed economies, these mechanisms aim to protect advanced technologies, potentially constraining access for developing countries. The growing emphasis on national security as a justification reflects increasing concerns over safeguarding strategic technological advantages. The originality of this study lies in its comprehensive assessment of ISMs and their specific consequences for technology transfer. By mapping the driving forces behind their expansion, the article contributes to the understanding of current transformations in the global dynamics of innovation and technological security. It is suggested that future research include in-depth empirical analyses of the effects of ISMs on capital flows, examinations of the responses of developing countries, and assessments of the role of international cooperation in addressing common technological challenges.

KEYWORDS
Investment screening mechanisms. National security. Technology transfer.

RESUMO
Este artigo analisa a proliferação dos mecanismos de triagem de investimentos estrangeiros (ISMs, na sigla em inglês) desde 2016, com atenção particular às suas implicações para a transferência internacional de tecnologia. O estudo baseia-se em uma revisão sistemática de literatura, complementada pela análise de casos de países que implementaram ISMs, considerando suas políticas, estratégias e impactos observados. A abordagem metodológica privilegia a identificação de padrões e tendências, valendo-se de análise comparativa para evidenciar diferenças entre contextos nacionais. Reconhece-se a limitação decorrente da disponibilidade restrita de dados sobre a aplicação e os resultados dos ISMs em determinados países. Os achados sugerem que a difusão desses mecanismos pode representar uma mudança significativa no regime internacional de transferência de tecnologia. Predominantemente adotados por economias desenvolvidas, os ISMs visam proteger tecnologias avançadas, o que pode restringir o acesso de países em desenvolvimento. O fortalecimento da segurança nacional como justificativa revela a crescente preocupação em resguardar vantagens tecnológicas estratégicas. A originalidade deste estudo reside em sua avaliação abrangente dos ISMs e de suas consequências específicas para a transferência de tecnologia. Ao mapear as forças motrizes por trás de sua expansão, o artigo contribui para a compreensão das transformações atuais na dinâmica global da inovação e da segurança tecnológica. Sugere-se que pesquisas futuras incluam análises empíricas aprofundadas sobre os efeitos dos ISMs nos fluxos de capital, exame das reações dos países em desenvolvimento e avaliação do papel da cooperação internacional no enfrentamento de desafios tecnológicos comuns.

PALAVRAS-CHAVE
Mecanismos de triagem de investimentos. Segurança nacional. Transferência de tecnologia.

INTRODUCTION

Since 2016, governments have enhanced their foreign investment screening mechanisms (ISMs) or introduced new ones based on national security grounds (Bauerle Danzman and Meunier 2023; OECD 2018; OECD 2020; OECD 2021; OECD-UNCTAD 2022; Sanchez-Badin et al. 2021). Recent data from UNCTAD on the evolution of foreign direct investment (FDI) screening mechanisms shows that at least 37 countries introduced a regulatory framework for the screening of investments on national security grounds since 1995, most of which are developed economies (29 out of 37 countries).

ISMs can be divided into two main categories: inbound and outbound. Inbound ISMs refer to the measures taken by a country to assess and monitor foreign investments entering its territory. Outbound ISMs refer to the measures taken by a country to assess and monitor investments made by its companies in other countries. The proliferation of ISMs mainly refers to inbound instruments.

However, on 9 August 2023, US President Joe Biden issued an executive order to regulate certain types of US outbound investment in semiconductors and microelectronics, quantum information technologies and artificial intelligence sectors in 'countries of concern', where this investment may be a threat to US national security. While the EU has been following in U.S. footsteps, China, Japan, South Korea, and Taiwan already have comparable rules in place (Kanieck et al. 2023).

According to a recent study conducted by the OECD-UNCTAD (2022), foreign investment in advanced technology has been identified as one of the major national security concerns within the framework of ISMs. In this context, reforms in the US ISM since 2018 have been primarily motivated by the need to contain technology flows that could contribute to the development of foreign technology, particularly from China (Bauerle Danzman and Kilcrease 2022; Bauerle Danzman and Meunier 2021; Canes-Wrone et al. 2020). Similarly, the adoption of a European ISM was mainly supported by European countries with higher levels of technological development, namely France, Germany, and Italy (Chan and Meunier 2022).

Recent studies indicate that ISMs represent one of the main tools used by governments to compete in high-tech industries within the context of the technological race in the Fourth Industrial Revolution.[1] Wu (2018, 110) mentions that the Committee on Foreign Investment in the U.S.

[1] The Fourth Industrial Revolution is a term that refers to a period of significant changes in how people live, work, and relate to one another, driven by the convergence of digital, physical, and biological technologies. This revolution is characterized by the adoption of technologies such as artificial intelligence, robotics, nanotechnology, biotechnology, the Internet of Things, among others, which are transforming industries and society (Schwab 2016).

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(CFIUS)'s reform in the US has served to "expand the powers of the government's investment review to prevent the aggressive moves by Chinese and other foreign firms to purchase key technologies and acquire a greater stake of the value chain." Slawotsky (2021) highlights the repeated utilization of national security justifications by the US in the context of its ISM to safeguard its geopolitical and technological supremacy.

On one side, there is a movement towards the establishment of a new regulatory mechanism, primarily by developed countries, to address national security concerns and technological hegemony within the context of the Fourth Industrial Revolution. On the other side, developing countries (except for China) continue in general to depend on foreign technology and investment to deal with their own development processes. At the same time, they also face pressure to align their regulatory agenda with the trends of developed countries. If they have not yet implemented ISMs, some are studying the feasibility of introducing them.[2]

From the perspective of technology transfer regulation, there is concern that such mechanisms may be used to protect the technological hegemony of developed countries in technology markets, perpetuating the international domination of developing countries (Bian 2020) and the phenomenon of the middle-income trap.[3]

In this context, Toledo (2019, 43) emphasises that

> […] in Latin America, as in many African countries, a new neo-colonialism re-enacts previous modes of structuring relations in the international system and expands the exploitation of the periphery by central countries, replacing the interrupted processes of nation-building, both politically, economically, and technologically sovereign and independent, with new relations of dependency.

From the perspective of developing countries, restrictive inbound ISMs can, in theory, affect their ability to invest in developed countries in search of technology access. It is worth noting that one of the most recent aspects of globalization is the international expansion of multinationals from middle-income countries. Among the promising effects of this phenomenon is the potential positive

[2] Brazil, for example, does not currently have an ISM in effect, but there are efforts by the government to at least understand the suitability of its implementation. For instance, the Brazilian Institute of Applied Economic Research (Ipea) has issued a call for studies on ISMs in other countries and the potential operationalization of a Brazilian instrument (Baumann et al. 2020). Furthermore, in 2018, the former Secretariat of International Affairs of the Ministry of Planning (Seain/MP) developed a proposal for an ISM and the establishment of the Interministerial Commission for the Evaluation of Impacts on National Security of Large Foreign Direct Investment Projects (Sanchez-Badin et al. 2021).

[3] The "middle-income trap" describes the phenomenon in which certain countries reach a certain level of middle-income but struggle to sustain economic growth and end up stagnating. These countries face challenges in becoming high-income economies, mainly because they are unable to compete with other countries that already have production capabilities based on innovation and knowledge, while at the same time having significantly higher wages than low-income countries, making it difficult to compete based on cheap labour (CEPAL 2021; Tezanos et al. 2013).

impact on the development of these countries: through FDI in other countries, these multinationals can acquire new knowledge, which can contribute to the technological catch-up process in their home countries (Amighini et al. 2010).

To the extent that outbound ISMs adopted by developed countries could potentially reduce capital inflows to third countries, they could also affect the investments made by their companies in developing countries, in theory impacting potential technology transfer dynamics. Hence, it is important to understand how developed countries' ISMs are structured and the possible consequences for technology transfer specially to developing countries.

Furthermore, the proliferation of ISMs may create tension with the current predominant models and discourses regarding technology transfer and technology protection within the scope of international economic law. While the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS Agreement) carries a specific type of language at the international level that encourages the transfer and dissemination of technology between developed and less-developed countries (Franco 2010; Moura 2020), the ISM logic seems to restrict access to technology. Besides, while the safeguarding of technology by developed nations has traditionally relied on intellectual property (IP) norms, there seems to be now a shift towards the operationalization of this protection through ISMs (though IP of course maintain its relevance).

In view of the above, this article aims to examine the driving forces behind the proliferation of ISMs, providing insights into their geoeconomic, political and technological components. In addition, it explores the broadening scope of national security within the context of ISMs, addressing the potential risks associated with geoeconomic fragmentation[4] and their implications for developing countries. The paper also delves into the potential shifts in regulations pertaining to international technology transfer and technology protection, considering the emergence of ISMs, thus highlighting changing trends in this domain. Finally, it offers suggestions for future research exploring these topics in greater depth.

Methodologically, this paper combines a systematic review of scholarship and policy documents with a comparative legal-institutional analysis of investment screening mechanisms (ISMs) and related outbound measures over 2016–2024, with emphasis on critical/emerging technologies. The core comparison comprises the United States, the European Union/Member States

[4] Geoeconomic fragmentation is characterized by a policy-driven reversal of the decades of global economic integration the world has experienced specially before the global financial crisis in 2008-2010. It "encompasses reversals along any and all of the different channels whereby countries engage with each other economically, including through trade, capital flows, the movement of workers across national boundaries, international payments, and multilateral cooperation to provide global public goods." (Aiyar et al. 2023, 5)

(Germany, the United Kingdom, the Netherlands), and the Republic of Korea; for contrast, Mexico, India, Indonesia, and Vietnam are examined, mapping liberalization signals and/or the absence or alternative design of ISMs. Case selection follows three criteria: (*a*) technological salience and FDI weight; (*b*) regulatory density and data availability; and (*c*) relevance for technology-transfer effects toward developing countries.

1 DRIVERS OF ISMs AND THE ROLE OF TECHNOLOGICAL DOMINANCE

The proliferation of ISMs is directly linked to the broader phenomenon of geoeconomic fragmentation, with policymakers becoming more prone to raising barriers between countries, including in the areas of trade, capital, migration, and technology transfer.

Rising discontent with globalization in terms of its unequal distributional effects has fuelled political populism and trade tensions. Trade tensions between the US and China have further intensified global trade policy uncertainty, leading to a breakdown in multilateral trade dispute mechanisms. The COVID-19 pandemic and the war in Ukraine have exacerbated existing cracks in the global economic order. These events have revealed the vulnerabilities of production chains and financing networks that were previously considered reliable under stable global conditions.

The combination of the pandemic and geopolitical tensions has further highlighted the need for resilience and adaptability in the face of unforeseen challenges. Rising geopolitical tensions resulted in more protectionism and increasing use of cross-border restrictions on the national security grounds (Aiyar et al. 2023, 10). Therefore, a multitude of factors contribute to the phenomenon of geoeconomic fragmentation, and the related adoption of ISMs based on national security grounds.

According to the specialized literature, the intention to regulate foreign investment inflows was originally based on national security concerns of host countries. Initially, control was limited to defence sectors and military activities. However, in the last two decades, the concept of national security has significantly expanded, resulting in a gradual increase in the scope and content of ISMs (Bassan 2010; Bath 2015; Esplugues Mota 2018; OECD 2018; Sanchez-Badin et al. 2022).

A recent study by the OECD (2022) notes that foreign investment in advanced technology is at the forefront of national security concerns regarding these mechanisms. Some of the literature points to China as a determining factor in the growth of ISMs in the context of (*i*) the hegemonic dispute between China and the US and its Western allies, and (*ii*) China's investment strategy related to the acquisition of technology and critical infrastructure in various countries (Carrai 2020; Evennet 2021; Fukushima 2023; McCalman et al. 2023).

Not only the US, but other developed countries have condemned what they have termed as "forced technology transfer." In this regard, representatives from the US, Japan, and the European Union published a "Joint Statement on Trilateral Meeting of the Trade Ministers of the United States, Japan, and the European Union" in 2018, in which they condemned what they called "unfair" and "non-market-based" laws and policies related to technology transfer.

In particular, the document emphasises that

> Ministers further confirmed their shared view that no country should require or pressure technology transfer from foreign companies to domestic companies, including, for example, through the use of joint venture requirements, foreign equity limitations, administrative review and licensing processes, or other means. (United States, Japan, and European Union 2018)

Disputes have also been initiated not only by the US but also by the European Union within the WTO dispute settlement system against China's alleged policies of forced technology transfer (WTO 2018a, 2018b).

In April 2023, the G7 Ministers' made a statement, in which they emphasized

> […] the urgent need to take measures against illegitimate or forced state-led acquisition of critical technologies and intellectual property, especially when this constitutes a risk to the security of target countries. Critical and emerging technologies will have a transformative effect on the way societies function, and their unexpected, malicious, untrustworthy, or improper use has the potential to disrupt national and individual security. (G7 2023)

To illustrate the concerns, it is worth citing the US Executive Order of September 15, 2022, which provides formal guidance to the US agency responsible for investment screening analysis, the CFIUS, on the factors it should consider when conducting national security reviews. Among these criteria, the effect of the transaction on US technological leadership in specific industries is explicitly mentioned (Figueiredo 2025).

In addition to inbound ISMs, there are also control measures on outbound investments that potentially impact technology transfer among countries. For example, the CHIPS and Science Act, also enacted in the US, aims to foster investments in critical and emerging technologies in that country. According to this legislation, any semiconductor company receiving financial assistance from the US government is required to enter into an agreement with the Secretary of Commerce and "shall not engage in any significant transaction" involving the material expansion of semiconductor capacity in China or any other "foreign country of concern" for a period of 10 years (including the Islamic Republic of Iran, the Democratic People's Republic of Korea, and the Russian Federation).

Furthermore, behind the recent adoption of an US outbound ISM there are "concerns arising from China's indigenous development of technologies relevant to US national security." (Bauerle

Danzman and Kilcrease 2022, 4) In fact, technology flows that could enable the development of foreign technology were at the centre of the concerns that led to the 2018 reforms in the US for its investment screening and export control mechanisms (Bauerle Danzman and Kilcrease 2022, 6).

Additionally, a study on the reasons behind the European Union's adoption of regulations on ISMs, Chan and Meunier (2022, 514–15) concluded, based on various interviews with high-ranking officials involved in the negotiation process, that the most important variable explaining the countries' support for the regulations was their level of technological development. In other words, countries with higher technological levels were more supportive of the European legislation on ISM.

The main proponents of a European ISM—France, Germany, and Italy—already had their ISM at the domestic level when the European mechanism was proposed in 2017. These Member States also have some of the highest levels of technology in Europe. Their own experience in protecting high-tech sectors and controlling technology transfers abroad motivated them to propose a European-level ISM (Chan and Meunier 2022, 534–35). Furthermore, the operationalization of ISMs in European countries seems to have a significant focus on Chinese investments, similar to the situation in the US, as many decisions taken in Germany and the UK, for instance, restricted several Chinese investments (Berg et al. 2022).

A consequence of this geopolitical tension between US and allies, on one side, and China, on the other, is that firms and policymakers are increasingly exploring methods to relocate production processes to countries they trust and share aligned political preferences with, in order to reduce the susceptibility of supply chains to geopolitical tensions, which has been termed as "friend-shoring." In this sense, Ahn et al. (2023, 92) suggest that there may be a link between friend-shoring and ISMs when they state that "the importance of friend-shoring goes beyond just announcements and translates into investment-screening measures motivated by national security purposes."

The focus on Chinese investments in the operationalization of American and European ISMs is also connected to technological issues. In an endeavour to acquire cutting-edge technologies, Chinese companies, frequently with indirect or informal connections to the government, are actively acquiring Western assets. Chinese investment in both Europe and the United States reached unprecedented levels in 2016 (Wu 2018, 106). Consequently, ISMs in the US and Europe have served to hamper attempts by Chinese firms to acquire their domestic technologies.

Slawotsky (2021, 8) comments that the geo-political competition with China has had a profound effect on the U.S. conceptualization of national security. By demonstrating the interconnectedness between emerging technologies and hegemonic rivalry, the U.S. has asserted its national security concerns over China's military-civilian fusion strategy through

measures like tightening foreign investment restrictions and imposing export restrictions.

China's remarkable accomplishments in technological markets have led the US to perceive itself as potentially growing weaker in comparison. Chinese technological advancements have been notable, encompassing leadership in areas such as Artificial Intelligence, Quantum Computing, and even successfully reaching the Far Side of the moon.

The US expresses exceptional concern over China's dominance in 5G technology, exemplified by Huawei. 5G offers significantly faster speeds compared to current technology, and Huawei is globally recognized as the most advanced and cost-effective provider, with no apparent U.S. competitor of equal magnitude (Slawotsky 2021, 25). In this context, the adoption of ISMs by developed countries also seems to suggest a close relationship with maintaining technological dominance in a competition to lead the Fourth Industrial Revolution (González 2018; Slawotsky 2021; Wu 2018).

Roberts et al. (2022, 8) note that now the focus of government intervention in relation to foreign investment is increasingly also widening beyond China. In both 2020 and 2021, over 85 percent of the acquisitions reviewed by CFIUS involved investors from non-Chinese origins. This trend is evident in various countries, such as France, where the proposed acquisition of the French company Photonis by the US group Teledyne in 2020 led to the first publicly announced refusal of FDI authorization.

Similarly, in the United Kingdom (UK), a majority of interventions on national security grounds from 2019 to 2021, under the public interest merger control regime, involved acquirers from non-Chinese backgrounds. These included proposed acquisitions by investors from Canada (Connect BidCo/Inmarsat in 2019) and the US (Advent International/Cobham in 2019, Parker Hannifin Corporation/Meggit plc in 2022, Cobham Ultra Acquisitions Limited/Ultra Electronics Holdings Plc in 2022, and NVIDIA/Arm in 2022). In UK, this trend continues under the new standalone screening regime in effect since January 4, 2022. Transactions under review involve investors from countries like France (Altice/BT) and the United Arab Emirates (Tawazun/Reaction Engines).

As highlighted by González (2018), governments and companies worldwide are engaged in legitimate—and illegitimate—actions to establish themselves in a particular technology, for pioneering commercial application, and to gain traction in new markets. According to the author, while some disputes over technology transfer and intellectual property are longstanding, recent unilateral actions to address such tensions risk disrupting trade and investment flows and undermining the multilateral trading system.

The Fourth Industrial Revolution, as described by Schwab (2016), is driven by a

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convergence of emerging technologies—like AI, robotics, IoT, autonomous vehicles, and biotechnology—that are rapidly evolving and merging across physical, digital, and biological domains. These innovations are set to transform how society produces, consumes, works, communicates, and interacts globally. Countries that lead in setting standards and mastering these technologies will gain significant economic and geopolitical advantages, as technological expertise becomes a key source of power.

Therefore, countries are using ISMs based on national security grounds as tools of industrial policy to control and direct foreign investment flows into prioritized sectors and activities, in line with the country's development strategy and strategy of technological leadership.[5] They often involve protecting strategic and sensitive sectors of the economy from foreign investments that could harm the local industry and weaken the country's competitive position. Such instruments have implications for trade, technological innovation and economic growth (Góes and Bekkers 2022).

In this context, concerns arise that an overly broad interpretation of the concept of national security on which ISMs are based, an increasing number of sectors covered, and opaque decision-making processes may create new barriers to investment and distort investment flows worldwide (Mildner and Schmucker 2021; Wernicke 2021).

2 ENLARGEMENT OF THE CONCEPT OF NATIONAL SECURITY

As explained in the 2023 UNCTAD Investment Policy Monitor, the notion of screening foreign investment based on national security concerns is not a new concept. Security exceptions are present in many trade and investment agreements. Some countries have incorporated a general safeguard clause in their investment laws, which provides a legal basis to reject undesirable foreign investments on national security grounds. Others have implemented sector-specific restrictions, where foreign participation beyond certain limits is seen as detrimental to national security.

In recent years, there has been a noticeable shift towards adopting more sophisticated procedures dedicated to investment screening for national security reasons. This trend began in the late 2000s, with a significant increase in the number of countries employing investment screening for national security between 2006 and 2009, tripling from 3 to 9. The global economic crisis and the rise in outward foreign direct investment (FDI) from developing nations prompted more developed

[5] The countries' strategies in competing in technological sectors are not only operated through ISMs. Wu (2018) argues that the contours of competition between states in technology sectors involve a set of policy instruments which include: (*1*) export-oriented policies, (*2*) technology transfer policies, and (*3*) investment reviews. Each can be deployed on its own, but their use can also be coordinated as part of a larger national strategy.

countries to implement dedicated regimes for screening investments. By 2014, 17 countries had integrated elements of investment screening into their national policies. From 2016 onwards, there has been a substantial influx of amendments to existing investment screening regulations, mainly in 2020 and 2021, with 29 countries introducing changes to expand the scope of their screening regimes (UNCTAD 2023).

The peak of regulatory activity took place in 2020, coinciding with the global risks associated with the COVID-19 pandemic. While the number of countries implementing new screening regimes had been steadily increasing over the past decade, the pandemic did not alter this trajectory but rather expedited it (UNCTAD 2023, 3).

The concept of national security in trade and investment instruments has been traditionally linked to a narrower definition generally related to territorial integrity, state survivance and military issues (Slawotsky 2018, 5). In the context of trade, the security exception established in Article XXI of the GATT 1994 was analysed for the first time in 2019 in *Russia — Traffic in Transit* (WTO 2019).

The dispute concerned restrictions imposed by Russia that prevented Ukraine from using road or rail transit routes across the Ukraine-Russia border for all traffic in transit destined for Kazakhstan. In this case, the Panel confirmed that it had the power to review whether the requirements of the provision were met, rather than leaving it to the self-judgment of the invoking Member.

In particular, the Panel analysed Article XXI(b)(iii), which sets forth that "nothing in this agreement shall be construed to prevent any contracting party from taking any action which it considers necessary for the protection of its essential security interests taken in time of war or other emergency in international relations."

According to the Panel, war relates to armed conflict (WTO 2019, para. 7.72) while "emergency in international economic relations" involves

> […] a situation of armed conflict, or of latent armed conflict, or of heightened tension or crisis, or of general instability engulfing or surrounding a state. Such situations give rise to particular types of interests for the Member in question, i.e. defence or military interests, or maintenance of law and public order interests. (WTO 2019, para. 7.76)

The Panel made clear that "political or economic differences between Members are not sufficient, of themselves, to constitute an emergency in international relations." (WTO 2019, para. 7.75) It also introduced a requirement of good faith for WTO Members when resorting to such exception clause. In this sense, in determining whether the conditions of the chapeau of Article XXI(b) of the GATT 1994 were satisfied, the Panel point out that, although it is up to the Members to define their "essential security interests," they shall be constricted to the obligation of good faith

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so that they do not use such provision as an excuse to circumvent their multilateral obligations (WTO 2019, paras. 7.130–3).

In a 2020 WTO Panel interpreting the TRIPS security exception, it held that the essential security interests identified are ones that clearly "relat[e] to the quintessential functions of the state, namely, the protection of its territory and its population from external threats, and the maintenance of law and public order internally." (WTO 2020, para. 7.280)

In recent years, international investment agreements (IIAs)—including bilateral investment treaties (BITs) and preferential trade agreements (PTAs) with investment chapters—have increasingly incorporated security exceptions, often referencing or mirroring WTO provisions (Knight and Voon 2020, 108). According to UNCTAD's Investment Policy Hub, 388 out of 2,572 IIAs contain such clauses. The scope of "essential security interests" in these agreements varies significantly: while some, like the US-Argentina BIT, adopt broad and undefined language, others, such as the Canada Model FIPA, provide more narrowly defined exceptions (Yannaca-Small 2008, 103).

Investment tribunals have addressed security exceptions via treaty clauses or the customary international law defence of necessity under Article 25 of the ILC's 2001 Articles on State Responsibility (Dimitropoulos 2019). Notably, claims against Argentina following its 2002 crisis expanded the understanding of "essential security" to include economic emergencies (CMS 2005; Enron 2007; LG&E 2006; Yannaca-Small 2008, 103), with tribunals acknowledging that economic collapse could pose threats as serious as military conflict (LG&E 2006, para. 238).

However, tribunals differed on whether Argentina's crisis met the necessary threshold of severity (Yannaca-Small 2008, 104). More recently, in *CC/Devas v. India* (2016), the tribunal recognized that "national security issues relate to the existential core of a State" (para. 245) but distinguished between defence-related spectrum reservations and broader policy objectives (para. 354). Similarly, in *Deutsche Telekom v. India* (2017, paras. 265, 285–91), the tribunal found that India's actions went beyond essential security, as they were motivated by multiple concerns including societal needs.

Now, turning to the definition of national security in ISMs, it is important to stress that they do not provide an explicit concept. Rather, they exhibit different levels of guidance through legislation[6] or policy (Knight and Voon 2020, 108) and link them to different strategic sectors

[6] On 15 September 2022, U.S. President Biden issued an Executive Order—the first of its kind since CFIUS was created in 1975—providing formal guidance on key national security factors to consider when reviewing foreign investments.

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(Slawotsky 2021).

As relates to the relationship between national security and technology, Roberts et al. (2022, 2–3) mention that, "in many jurisdictions, FDI regulations now apply to transactions relating to critical infrastructure (including energy networks and ports), communications assets and advanced technology and data."

Nowadays, therefore, national security in the existing ISMs goes beyond traditional military and defence issues and includes transactions involving critical infrastructure, communication assets, advanced technology, data, and various other sectors (Dimitropoulos 2019).

Slawotsky (2021, 7) notes that two significant developments are leading to interconnected complexity in interpreting the exception. Firstly, the emergence of dual-use technology has expanded the scope of security threats beyond traditional notions of armed attacks or territorial integrity. These advancements have introduced new dimensions to security concerns.[7] Secondly, the United States, perceiving a potential threat to its dominant position, has broadly invoked national security in various trade and investment scenarios, offering justifications that extend beyond historical narratives of armed conflicts or physical defence.

Technology has played a significant role in shaping the notion of national security. If one selects the largest foreign investors in the world according to OECD database (OECD 2022) which are also top innovators according to the WIPO Innovation Index (WIPO 2022), their ISMs have specific concerns with technological areas, as shown in the following Table.

Table – Technological focus of ISMs from top investors and innovators

US	The Netherlands	UK	Germany	South Korea
Mandatory filing requirements apply only to covered transactions that involve "TID US businesses," which are certain US businesses involved	The Dutch ISM applies to investments in undertakings active in vital processes and sensitive technology and to	The British ISM cover all areas of the economy, some acquisitions of entities that carry out particularly sensitive work in 17 areas of the economy (such as in	Sensitive industries for Germany's production (e.g. semiconductors and other high-tech products) and investments in critical infrastructure are under particularly tight scrutiny. Sectors that trigger a mandatory cross-	The Act on Prevention of Divulgence and Protection of Industrial Technology (ITPA) governs the transfer of National Core Technologies

These include: (*1*) impacts on the resilience of critical U.S. supply chains, even beyond the defence sector; (*2*) effects on U.S. technological leadership in sensitive areas like AI, microelectronics, quantum computing, and food security; (*3*) industry investment trends that could pose risks, such as repeated acquisitions in a single sector; (*4*) cybersecurity threats; and (*5*) risks related to the misuse of sensitive personal data.

7 New areas of competition in the realm of dual-use technology encompass a wide range of fields including cloud technologies, semiconductor chips, hypersonic and new missile technologies, space-based applications, quantum and biotechnologies, autonomous and electric vehicles (AEVs), battery storage, and telecommunications. These technologies offer significant advantages to nations that incorporate them into their security and intelligence organizations, military establishments, and commercial industries. The impact of artificial intelligence (AI) alone is expected to reshape the nature of warfare, altering the speed and scale of military conflicts. (Araya and Mavinkurve 2022)

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US	The Netherlands	UK	Germany	South Korea
with critical technologies, critical infrastructure or sensitive personal data.	"high-tech campuses."	defence, civil nuclear, and quantum technologies) must be notified to the Secretary of State and receive approval before completion.	sectoral filing inter alia include: critical infrastructure; software for critical infrastructure; telecommunications monitoring; cloud computing; telematics infrastructure; media industry services for state communication infrastructures; medical/pharmaceutical industry; other critical industries (AI, robotics, semiconductors, nuclear, aviation and aerospace, quantum, satellite, additive manufacturing, IT etc.).	(NCT) to foreign companies as well as foreign acquisitions of domestic companies that hold National Core Technologies. MOTIE is the main government department responsible for administration of foreign acquisition of NCT.

Source: own authorship, from White & Case (2023).

Beyond the different transactions that have been restricted in technological sectors in the context of ISMs, "states are linking civilian technologies and consumer products to national security: Germany banned U.S.-made dolls; Russia banned LinkedIn; and India has blocked TikTok." (Slawotsky 2021, 12) Technologies became tools for disruption and insecurities in the hands of the state, which builds a narrative of threat towards them and makes it sound as if they have the power to re-establish control over them.

This is not to say that such technologies do not pose any legitimate concerns. After all, semiconductors, artificial intelligence, telecommunications equipment, additives, robotics, quantum computing, and other emerging technologies blur the boundaries between economic and military use. Technological advancements have created risks. The widespread use of mobile applications, the Internet of Things, and the constant flow of content have blurred the distinction between economy and security (Cohen 2020).

Personal data from seemingly unrelated activities to national security, such as dating apps and smart cars, could potentially be exploited by foreign investors as leverage against specific individuals, for information gathering purposes, or as tools for disinformation, which in turn could jeopardize national security. The connectivity enabled by technological change also allows malicious actors to gain control over critical infrastructure. The grey areas between commercial and military technological advancements thus pose a fundamental challenge in regulating ISMs (Bauerle Danzman and Meunier 2021).

However, the most appropriate ways to deal with these concerns should be better evaluated

before framing such a wide variety of technologies in the context of ISMs, creating a threat scenario that may be controversial to bar investment from foreign investors. Ultimately, the state alone cannot ensure the security of technologies and there are a broad range of necessary countermeasures that includes many elements that cannot be designed or implemented by the state alone (Cavelty and Egloff 2019). In this context, there may be alternative approaches to ISMs to mitigate the concerns mentioned above.

Hence, though linking national security to the traditional concept of physical integrity and military/defence factors may not be well-suited for current reality, the expansive notion that has been adopted in the context of ISMs should be analysed with caution. It is necessary to better understand what is covered and what is not in the concept of national security, what is reasonable, what legal standards apply. Otherwise, one risks leaving the concept entirely to the absolute discretion of the state, which can be very dangerous.

Especially when it comes to technologies, it is necessary to have more technical discussions on what exactly their dangers are and if these dangers actually pose systemic threats to the state to be considered a national security issue. Even in the context of uncertainties of the risks related to technologies, the legal system has principles and instruments (e.g. precautionary principle) which could be resorted to without the need to frame everything within a national security concern. It is necessary to separate what is really a security issue from what it is not.

While security was initially associated with the study of war, military strategy, and geopolitics, its definition started to evolve from the 1970s onwards. With the maturation of the nuclear relationship between superpowers during the Cold War, the original broad meaning of security began to resurface, prompting a push to expand the international security agenda beyond its military and political focus. Economic and environmental security gradually became recognized, albeit controversial, aspects of this agenda during the later stages of the Cold War. In the 1990s, societal (or identity) security, human security, food security, and other dimensions were added to the expanding concept of security (Buzan and Hansen 2009, 2).

Discursive approaches to security, which defend that it cannot be defined in objective terms, help to explain the expansion of the concept. Security is, according to the Copenhagen School, a speech act and "by saying 'security,' a state representative declares an emergency condition, thus claiming a right to use whatever means are necessary to block a threatening development." (Buzan et al. 1998, 21)

What is central to security analysis is thus "understanding the process through which particular 'threats' manifest themselves as security problems on the political agenda. 'Threats' in that

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sense are 'objective' when they are accepted by significant political actors, not because they have an inherent threatening status." What is considered a "security threat" will be influenced by different political, historical, geographical and economic factors surrounding a country.

Great power politics, the "continuous unfolding of new technologies and the need to assess their impact on the threats, vulnerabilities and the (in)stabilities of strategic relationships[8]" and key events also shape what states decide to define as security problems (Buzan and Hansen 2009, 52). Additionally, "for security speech acts to be successful, they also need to convince their relevant audiences." (Buzan and Hansen 2009, 33–4)

In other words, security threats are, for the Copenhagen School, a convincing narrative built by a state to pursue its interests and legitimize its actions. It is a political concept. A more dangerous aspect of security is that its logic is based on "drama, urgency and exception," i.e. "security is about making exceptional decisions." (Buzan and Hansen 2009, 31–2) In this context, states, using the rhetoric of threat and security, justify exceptional measures. States set the tone of the threat and of the drama. It does not necessarily reflect the reality, but the narrative is built to convince the audience, and the audience starts to believe in the discourse. The state can take advantage to take disproportional and abusive measures.

Investment screening mechanisms (ISMs) risk undermining the rule of law due to their lack of transparency, accountability, and clear procedural standards. As noted by Sanchez-Badin et al. (2022), both the discretionary nature of their implementation and the vague security-based evaluation criteria contribute to unpredictability and legal uncertainty, reinforcing the perception that ISMs are politically driven rather than rule-based.

The effective securitisation of a subject justifies the use of all available means, including those outside the normal political rules of the game (Cavelty and Egloff 2019, 43). Therefore, considering that many developed countries are adopting a focus on technological areas, it is important to better understand whether the current narrative of securitization of new technologies, presenting them as a great danger threatening the state or society, is reasonable.

There is a growing acknowledgment that Western countries are currently embracing industrial policies, and this carries significant implications for the rule of law (Stiglitz 2023). Various countries have been implementing industrial policies for a considerable time. However, it becomes

[8] Buzan and Hansen highlight the dual-use nature of technology, noting that many innovations—such as the Internet, nuclear energy, and communication systems—have both civilian and military applications. This overlap complicates the analysis of threats like nuclear proliferation. As the concept of security expands beyond the military sphere, the range of technologies influencing international security studies also broadens.

concerning when these policies become intertwined with the notion of "security" since it grants the country immeasurable powers to accomplish its objectives. Consequently, this may lead to a complete disregard for the rule of law.

According to Roberts et al. (2018), there is a growing convergence between economics and security that has the potential to reshape the fundamental aspects of the international economic law regime. They refer to this phenomenon as the "New Geoeconomic World Order." This convergence is evident in the efforts of economic superpowers to reformulate the rules and institutions governing international trade and investment, aiming to promote their own trade, investment, and security preferences. Consequently, the establishment of this New Geoeconomic World Order is expected to have a significant impact on the interpretation of the concept of national security (Dimitropoulos 2019).

However, it is important to note that the security rhetoric predominantly originates from developed countries with strong economic and technological capabilities. As observed in the case of ISMs, such measures are primarily implemented by these states. There are not enough studies about the new trends in investment policies or the recourse to national security measures in developing countries. Dimitropoulos (2019) suggests that ISMs and increased investment protectionism seem to be the order of the day for developed countries. Investment protectionism seems to be in a relative decline in the emerging economies of the East and South.

India, for instance, has loosened FDI requirements in recent years. Analysts comment that it will come as no surprise if the government were to further liberalize FDI requirements in India, and make it easier to invest into certain strategic sectors such as chemicals, healthcare and insurance (White & Case 2023); Indonesia has pursued a deregulatory agenda and does not have an ISM in place; Vietnam has recently implemented more favourable investment laws and incentives. In 2020, they introduced a revised Law on Investment, which clearly specifies the sectors that are off-limits for foreign investment and reduces the number of sectors considered "conditional" (White & Case 2023). In Latin America, only Mexico has an institutionalized ISM in place.

Recent geopolitical developments suggest a revival of non-alignment strategies among emerging economies in response to increasing global polarization. As Sahay (2022) notes, countries such as China, India, Brazil, and others have opted not to align fully with Western efforts to isolate Russia, instead seeking to preserve national interests. These states anticipate that their growing economic and demographic weight will enhance their bargaining power, enabling them to secure more favourable access to strategic technologies—ranging from defence systems to green technologies and advanced pharmaceuticals—which are seen as essential for their continued

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development and geopolitical relevance.

In this context, it is necessary to understand how these emerging economies will cope with potentially expanding notions of national security from developed countries, especially considering that they represent a political construct to advance the economic, technological and political agendas of the latter. Likewise, it is necessary to verify if these countries will simply replicate the logic of national security or express criticism of it. Ultimately, they still benefit from and need an integrated international economy for their development purposes and a new fragmented geoeconomic order may not be aligned with their interests.

3 ISMs AND TECHNOLOGICAL SHARING: CONSEQUENCES FOR DEVELOPING COUNTRIES

It is assumed that the transfer of technology is relevant for developing countries as a driving force to promote their economic development (Eaton and Kortum 1999; Freeman and Soete 1997; Furtado 1978; Keller 2002; Krugman 1990; Raslan 2021). For them, technological progress is still heavily influenced by their ability to access, adapt, and disseminate the technological knowledge that has already been created abroad (UNCTAD 2014, 1).

FDI can serve as a catalyst for developing countries to access and adopt technological advancements from more developed economies. Multinational corporations (MNCs) that invest in these countries can often transfer knowledge, skills, and technology through their investments. This transfer can occur through various channels such as training programs, joint ventures, licensing agreements, and the adoption of new production processes. MNCs may also conduct R&D in their home countries, and through FDI, they bring these research capabilities to the host countries.

FDI can also contribute to upgrading the technological capabilities of domestic industries in developing countries. By integrating into global value chains, domestic firms can learn from the best practices and technologies employed by MNCs. This spillover effect can lead to productivity improvements, enhanced competitiveness, and the development of new industries in the host country.

FDI can stimulate linkages between local firms and multinational companies, creating opportunities for knowledge spillovers. Local suppliers, subcontractors, and service providers may benefit from the transfer of technology and know-how through their interactions with foreign investors. This can lead to increased efficiency, improved product quality, and the development of a more competitive local business environment.

From the perspective of developing countries, understanding potential barriers to technology

transfer resulting from ISMs implemented by developed countries is of utmost importance for the analysis and design of policies that promote economic development (Cirera et al. 2022) and prevent the perpetuation of economic and technological dependence of developing countries.

As emphasized by Furtado (1978, 116), global domination has its primary source in the control of technological innovations. In this sense, it is stated that "technology dominance currently constitutes the cornerstone of the international power structure." Few developing countries rank among the leading countries in technology sectors, with China being the prominent representative in the field of innovation, with high investment rates in research and development and a significant number of patent applications each year. Other countries such as India, Thailand, Vietnam, the Philippines, Russia, Chile, Brazil, and South Africa also seek to achieve more prominent positions in this field and have shown performance above expectations, but they still lag far behind the level of technological development of developed countries such as the United States, Japan, and European countries (WIPO 2022).

Where outbound ISMs are implemented in addition to other measures that limit investments abroad, this may have an impact on the ability of developing countries to access technologies. The same can be said in relation to inbound ISMs where they restrict investments from developing countries.

As explained above, one of the factors influencing the adoption of ISMs by developed countries was the increasing number of developing-country MNCs. Over the past few decades, FDI from developing countries has emerged as a significant driver of economic globalization (Aiyar et al. 2023). This growth is exemplified by the rise of emerging multinational enterprises (EMNEs), which represent the visible expansion of outward foreign direct investment (OFDI) from developing countries.

Between 1995 and 2015, the share of OFDI stocks from developing countries has tripled from 4% to 12%, amounting to an equivalent of US$2.8 trillion. National security concerns have arisen in relation to these EMNEs particularly because state ownership is prominently widespread in many EMNEs, especially when compared to large multinational enterprises (MNEs) from developed countries (Bezuidenhout et al. 2021, 2–3).

Enterprises from China, Brazil, South Africa, India, Russia, and Turkey have made significant strides in penetrating markets of both developing and developed countries. This notable interest in investment by EMNEs is a result of economic liberalization in their home countries and fundamental changes in foreign trade and investment policies. These changes have not only attracted substantial levels of inward FDI but have also motivated enterprises from emerging markets to expand

their investments in foreign markets (Bezuidenhout et al. 2021, 5).

By investing in developed host countries, EMNEs can access their technology, which may empower them to upgrade their capabilities, improve competitiveness, and expand their market reach. It enables them to tap into the knowledge and resources available in these countries, driving their growth and success in the global economy.

Developed countries often possess cutting-edge technology, research and development capabilities, and innovative practices. EMNEs can leverage partnerships, collaborations, and acquisitions in the host country to gain access to these technologies. This allows them to enhance their own product offerings, improve production processes, and stay competitive in the global market.

Also, by operating in developed host countries, EMNEs can interact with local businesses, universities, and research institutions. This facilitates knowledge sharing, technology transfer, and learning from best practices. EMNEs can acquire valuable insights, expertise, and technical know-how from the developed country's technology ecosystem, which can be applied in their home country or other markets.

In addition, being present in a developed host country provides EMNEs with opportunities to build networks and collaborate with local firms, industry associations, and research clusters. These collaborations can lead to joint research and development projects, access to specialized resources, and knowledge exchange. Such partnerships can enhance the EMNE's technological capabilities and open doors to new market opportunities.

Further, by integrating advanced technologies from developed host countries into their operations, EMNEs can enhance their competitiveness in both domestic and international markets. Upgrading technological capabilities enables them to improve product quality, increase productivity, and develop innovative solutions that meet customer demands. This, in turn, helps them gain a competitive edge over their rivals.

A recent IMF study which has analysed the phenomenon of geopolitical fragmentation, of which the proliferation of ISMs is an integral part, concluded that several emerging market and developing economies are highly vulnerable to FDI relocation deriving from onshoring and friend-shoring strategies of advanced economies. This is explained by their reliance on FDI from geopolitically distant countries. Over the long term, the division of FDI due to the emergence of geopolitical blocs can result in significant declines in output. These declines can be particularly harsh for emerging market and developing economies that face increased limitations from advanced economies, which are their primary providers of FDI (Ahn et al. 2023).

The study also shows that if FDI continues to decrease and its distribution across countries

changes, it could have significant negative consequences for host countries. This could result in lower capital accumulation and limited technological advancements. Vertical FDI, which is more likely to be targeted by policies promoting investment in strategic sectors, contributes to economic growth due to its knowledge-intensive nature. The presence of multinational corporations also directly benefits local businesses. In advanced economies, competition from foreign firms encourages domestic firms to enhance productivity. In emerging market and developing economies, domestic suppliers benefit from technology transfers and increased demand for inputs from foreign firms in downstream sectors (Ahn et al. 2023, 94).

Aiyar et al. (2023), in turn, call attention to the fact that emerging markets and low-income countries are particularly vulnerable to trade and technology fragmentation. Due to their distance from the technological frontier, they suffer disproportionately when access to embodied technology and research and development (R&D) is limited.

Additionally, technological fragmentation and limited diffusion of technology could have a significant negative impact on innovation and productivity, especially for less developed countries. Barriers that restrict access to high-tech inputs and services can hinder the transfer of knowledge and impede income convergence between nations. Government intervention aimed at preventing technological advancements may result in costly barriers to technology diffusion. These efforts can discourage research and development due to restricted market access, hinder innovation (including for climate-friendly technologies and semiconductors), and create shortages in other industries, leading to higher prices and limited entry of new companies.

Recent data localization measures implemented by certain governments may lead to increased state control over data, data flows, and digital technologies, potentially hampering productivity and driving up prices. Efficiency losses resulting from technological and digital fragmentation can be particularly significant in areas where common platforms facilitate quick verification of tech protocols, such as in cross-border payments (Aiyar et al. 2023, 16).

In technological terms, it is important to recall that developing countries may face a challenge in the context of the Forth Industrial Revolution if it results in substantial re-shoring of global manufacturing to advanced economies, which is likely to happen if competitiveness of firms is no longer driven primarily by access to low-cost labour. Historically, developing countries have relied on their cost advantages to build strong manufacturing sectors that serve the global economy. This pathway has allowed them to accumulate capital, transfer technology, and raise incomes.

However, if this pathway becomes less viable, these countries will need to reconsider their industrialization models and strategies. One concern is that the Fourth Industrial Revolution may

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result in a winner-takes-all dynamic, both among countries and within them. This dynamic could exacerbate social tensions and conflicts, leading to a less cohesive and more volatile world. It is important to recognize and address this potential danger (Schwab 2016).

Considering the aforementioned factors, ISMs implemented by developed countries on national security grounds, as part of a broader strategy of geoeconomic fragmentation, could have a disproportionately severe impact on developing countries. These measures have the potential to impede the diffusion of technology and diminish the potential benefits derived from foreign direct investment (FDI). Consequently, this could further widen the technological gap between, in particular, developed and developing nations, if ISMs are to be employed as a "friend-shoring" tactic to redirect investments away from developing countries and impose limitations on investments from EMNEs.

These adverse effects should be considered by developing countries when deciding whether to emulate national security agendas of developed countries or to elaborate individual or joint strategies to contest them.

4 POTENTIAL CHANGING TRENDS IN THE REGULATION RELATING TO INTERNATIONAL TECHNOLOGY TRANSFER AND TECHNOLOGY PROTECTION IN VIEW OF THE RISE OF ISMs

The proliferation of ISMs along with friend-shoring mechanisms have the potential to bring about changing trends in the regulation relating to international technology transfer and technology protection. The increased use of ISMs can have implications for technology transfer, as it introduces an additional layer of scrutiny and regulation. It may lead to more stringent requirements and conditions imposed on foreign investors, particularly in sectors related to advanced technologies. Additionally, it represents a new form of technology protection, which has been historically made through intellectual property (IP) rules.

Traditionally, countries have protected their technology through national IP laws, in particular, patent laws. During the 18th and 19th centuries, lawmakers had nationalist concerns. In the US, patents were afforded to US citizens only. In France the individual introducing a foreign patent was treated on equal footing with the true inventor. The system was built to free ride on English inventions (WIPO 2017, 45).

With the intensification of trade among countries, the industrialists of the most technically developed countries launched the idea of international protection of patents. In 1883, with the signing of the Paris Convention for the Protection of Industrial Property, an internationalization phase in IP

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protection begun. However, with the advent of globalization, the Paris Convention was not enough to protect the technology of major industrialised countries as it did not oblige other countries to adopt a minimum standard of protection.

The decolonization and independence of many developing countries and the economic growth of these emerging economies, with their own technological capacity and newly acquired capacity to reverse engineer foreign inventions resulted in tensions and concerns from the industrialized world. The problem was "solved" with the signing of the TRIPS Agreement in 1995, which obliged Members to adopt minimum standards of protection set forth in the Agreement, which should also be extended to nationals and those assimilated to residents of other countries (WIPO 2017, 47).

Still, the presence, within the context of the TRIPS Agreement, of more open concepts and a greater concern for balancing the rights of IP rights holders and the interests of Member countries regarding technological development, health and nutrition protection, promotion of public interest in sectors relevant to socio-economic and technological development, resulted in some policy space for developing countries to implement national technology transfer strategies.

Consequently, several developing countries have incorporated performance requirements, control of restrictive clauses, and administrative review of technology transfer contracts into their national legislations to ensure greater effectiveness in the process of disseminating technology to the domestic market through foreign investments (Franco 2010; Raslan 2021, 353).

However, countries in the Global North, to maintain their dominance in technology markets and, above all, to hinder the technological advancement of certain countries in the Global South, have reacted to more assertive domestic policies of developing countries regarding technology transfer. In this regard, the literature notes a tendency, on the part of developed countries, to adopt trade and investment agreements with developing countries that restrict the possibility for the latter to implement rules on technology transfer to foreign companies (Abbott 2020).[9] Developed countries have also started proposing bilateral treaties with developing countries, which establish higher

[9] Abbott (2020, 260–61) highlights a trend among developed countries to incorporate provisions that restrict domestic rules for technology transfer in preferential trade and investment agreements. As an illustrative example, the United States has included clauses to this effect in agreements with developing countries since the conclusion of its bilateral trade agreement with Chile in 2004, which stated that the approval of investments would not be conditioned on a performance requirement "to transfer specific technology, a production process, or other proprietary knowledge to a person in its territory." (Article 10.5.1(f)) This type of provision has become a constant feature in U.S. negotiations of preferential agreements. Furthermore, it can be found in the text of the Trans-Pacific Partnership Agreement (TPP), preserved in the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP). The EU-Canada Comprehensive Economic and Trade Agreement (CETA) also includes a restriction on technology transfer requirements in essentially identical terms.

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protection standards than those set forth in the TRIPS Agreement, also known as TRIPS-Plus agreements (Basso 2005).

Furthermore, there is a narrative from developed countries, particularly the United States, members of the European Union, and Japan, condemning what they have labelled as "forced technology transfer" mechanisms by China (Raslan 2021; Yin 2022). In this sense, developed countries have demonstrated their willingness to adopt mechanisms that restrict the regulatory policy space of developing countries in order to curb national technology transfer policies and ultimately secure a leadership position in technology markets.

However, until recently, this movement by developed countries was carried out to some extent through consensus-based and negotiated mechanisms, as both the bargaining conducted within the framework of the TRIPS Agreement and the restrictions imposed under trade and investment agreements and TRIPS-Plus agreements presupposed negotiations and concessions between the two sides: the Global North and the Global South.

With the advent of ISMs, there seems to be a new dynamic in the regulation of international transfer of technology and technology protection.[10] Countries are, with their ISMs, adopting unilateral measures of extraterritorial scope and non-consensual nature to protect their indigenous technologies and keep them within the boundaries of the national territory or the territory of like-minded countries.

At the same time, they maintain the power to restrict the access of technologies to third countries either through limitations on, or prohibitions of, investments in their own country or through restricting the investments made by their companies abroad. Protection of technology is associated to a narrative of national security which allows countries to adopt extraordinary measures which may disregard the rule of law. The following Figure illustrates this changing dynamic.

[10] It is acknowledged that ISMs are not only used to protect technology but also advance other policy goals. Nonetheless, this article primarily concentrates on the dimension pertaining to the protection of technological sectors.

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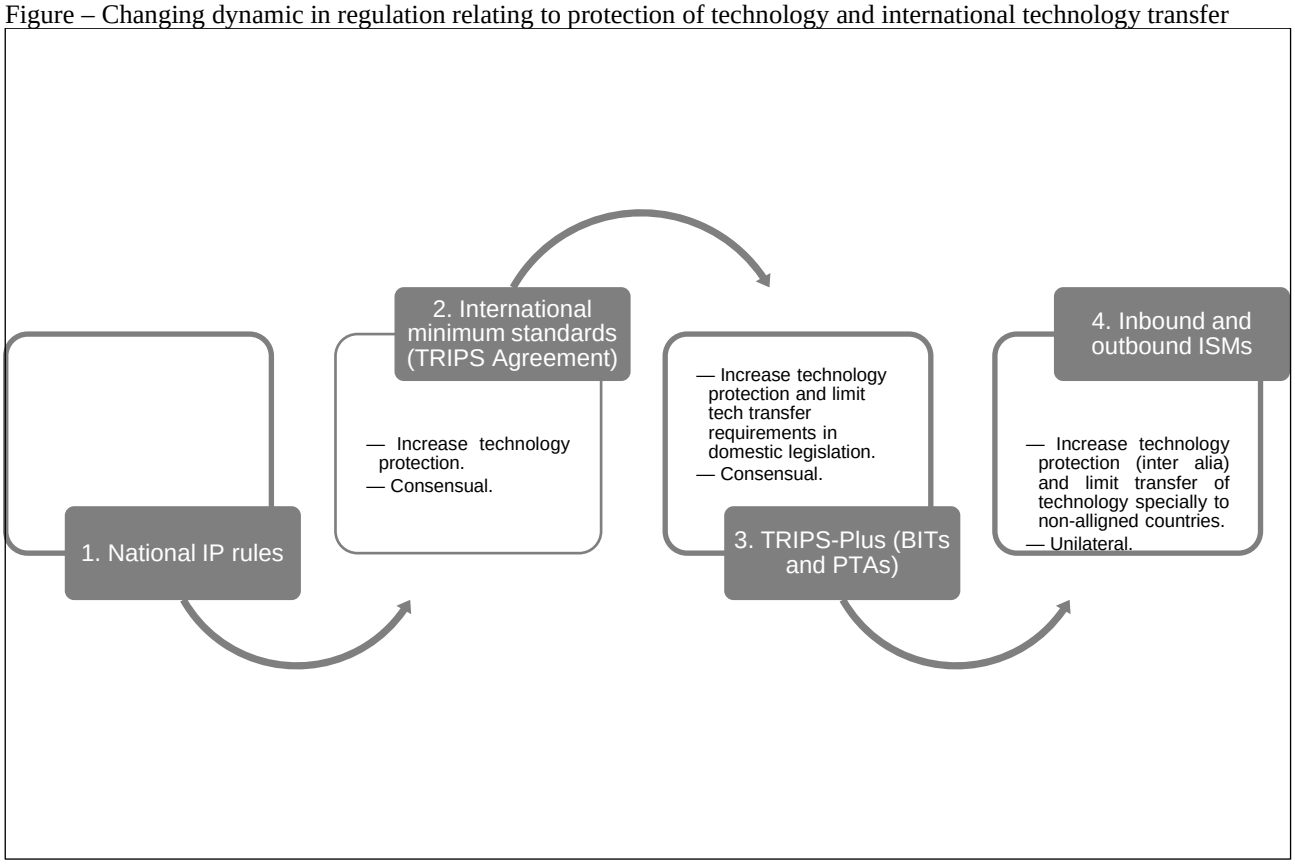
Figure – Changing dynamic in regulation relating to protection of technology and international technology transfer



Source: own authorship.

It is also interesting to note that the ISMs' logic of restricting investments based on national security considerations goes against the discourse constructed in the international arena regarding access to and dissemination of technology.[11]

5 CONCLUSIONS AND SUGGESTIONS FOR FUTURE RESEARCH

The proliferation of ISMs by developed countries and the resulting changing trends in technology protection and in international technology transfer regulation have the potential of significantly impacting developing countries. Developed countries, by resorting to a broad notion of national security, may adopt stricter measures to protect their technological advancements and strategic industries, which could limit the access of multinational companies from middle income countries to their cutting-edge technologies.

Due to friend-shoring trends, developing countries could also risk having fewer capital

[11] See the preamble and Articles 6, 7, and 66 of the TRIPS Agreement. See also item 17.6 of the 2030 Agenda for Sustainable Development. Other items also articulate this logic of global efforts to promote access and technology transfer to facilitate the development process, such as items 17.7, 17.8, 7.a, 8.1, 8.2, 9.4, 12.a, and 14.a.

inflows from developed countries which could also have adverse effects in terms of their economic and technological development. The questionable securitization of technology within the framework of ISMs without any discernible criteria not only paves the way for increased geoeconomic fragmentation but also exacerbates the growing technological divide between developed and developing nations.

Given this scenario, it is important that future research tests these hypotheses empirically by analysing the impact of decisions of investment screening authorities from developed countries on investments and capital flows from developed countries to developing countries. More broadly, it would be interesting to assess the impact of national security trade and investment measures from developed countries on developing ones.

In this analysis, it is necessary to isolate China from other developing countries due to its specific characteristics in terms of economic and technological capabilities and hegemonic power. It would also be worthwhile to create categories within the developing countries to better reflect their specific features in terms of economic, social and technological development. It would also be valuable to see if there are new clauses or obligations in new BITs and PTAs signed between developed and developing countries which could indicate new forms of restriction on technology transfer.

In addition, future studies could also analyse how developing countries are reacting to these trends. As mentioned, as many countries are adopting ISMs, they may feel under pressure to establish their own mechanisms. On the other side, there seems to be a liberalising trend in some countries as shown in the case of Vietnam. Also, there seems to be resurging a new strategy of non-alignment. In this context, it is important to assess the changes (if any) developing countries are doing in their investment laws.

At the same time, it is equally important to understand their moves in multilateral forums. As mentioned, one criticism to adopt ISMs on national grounds to address risks in technological markets lies on the fact that the state alone cannot solve problems that have a cross-border nature. Advanced technologies, such as artificial intelligence, biotechnology, and cybersecurity, often pose unique challenges that transcend national borders.

Issues like data protection, privacy, and cyber threats require collaborative efforts to develop common frameworks, information-sharing mechanisms, and coordinated responses. International cooperation allows for the pooling of resources and expertise to tackle these shared challenges effectively. Additionally, developing new means for governing emerging technologies requires a multi-stakeholder approach, engaging governments but also the private sector, civil society and other

experts (Roberts 2022). Furthermore, not all technologies may represent a security threat.

While the technology policy gap has continued to widen since 2018, international institutions have adapted and assumed new roles to foster global cooperation and tackle common digital and technological challenges. In parallel, a range of novel formats for international collaboration have emerged (Roberts 2022). In this context, it is important to analyse the extent to which developing countries can shift the forum of the technology debate to these international instances to avoid more protectionism from developed countries.

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