

# ARTICLES

## The Role of Regulatory Frameworks in Balancing Between National Security and Competition in LEO Satellite Market

Matin Pedram\* & Eugenia Georgiades\*\*

### ABSTRACT

*The low Earth orbit (LEO) satellite market is booming, and the expectations for an efficient regulatory system are rising. Governments seek to keep regulatory improvements at the same pace as innovations. However, their divergent priorities and interests result in different frameworks and relatively costly solutions. Moreover, LEO satellites are operated in space, where states' security interests exist. This clash of interests substantially influences the concepts of national security and competition. Consequently, a regulatory framework shifts from a simple licensing system to a gatekeeper to entail that just competition cannot drive the market without considering national security concerns. In this respect, entities and customers are exposed to various incentives and transaction costs, prompting them to alter their strategies and contractual arrangements. In some cases, these choices operate like barriers to entry which in turn might distort market competitiveness. This paper considers the regulatory frameworks in Australia, Bangladesh, Indonesia, Japan, and Vietnam to explore the shape of a robust regulatory framework. Given that the United States is a pioneer in the expanding notion of national security and the LEO satellite market, the Federal Communications Commission's recent changes are also examined. This paper employs transaction costs and rent-seeking approaches to identify root causes of possible anticompetitive behaviors and proposes viable solutions to advance a robust regulatory framework consistent with LEO satellite internet.*

I. INTRODUCTION.....	181
II. INTERNET FROM SPACE: SPECIFICATIONS AND LICENSING.....	185
A. <i>Satellite internet</i> .....	185

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1.	Segments of satellite connectivity . . . . .	185
a.	<i>Ground-based assets</i> . . . . .	186
b.	<i>Space-based assets</i> . . . . .	186
c.	<i>Links</i> . . . . .	186
d.	<i>Connection points</i> . . . . .	187
2.	Low Earth Orbit (LEO) vs Geostationary Orbit (GEO) . . .	187
B.	<i>Licensing Satellite Internet</i> . . . . .	189
1.	Australia . . . . .	189
a.	<i>Regulatory body</i> . . . . .	189
b.	<i>Required licenses</i> . . . . .	189
2.	Bangladesh . . . . .	190
a.	<i>Regulatory body</i> . . . . .	190
b.	<i>Required licenses</i> . . . . .	190
3.	Indonesia . . . . .	191
a.	<i>Regulatory body</i> . . . . .	191
b.	<i>Required licenses</i> . . . . .	191
4.	Japan . . . . .	191
a.	<i>Regulatory body</i> . . . . .	191
b.	<i>Required licenses</i> . . . . .	192
5.	Malaysia . . . . .	192
a.	<i>Regulatory body</i> . . . . .	192
b.	<i>Required licenses</i> . . . . .	193
6.	Vietnam . . . . .	193
a.	<i>Regulatory body</i> . . . . .	193
b.	<i>Required licenses</i> . . . . .	194
III.	REGULATORY FRAMEWORKS TAKE THE REINS OF SATELLITE INTERNET . . .	194
A.	<i>Preserving national security or protecting local businesses</i> . . .	194
1.	Expanding national security . . . . .	195
a.	<i>Regulatory frameworks with national security test</i> . . .	196
i.	Australia . . . . .	196
ii.	Japan . . . . .	197
b.	<i>Regulatory framework without national security test</i> . . .	198
i.	Bangladesh . . . . .	198
ii.	Indonesia . . . . .	199
iii.	Malaysia . . . . .	201
iv.	Vietnam . . . . .	201
B.	<i>Protecting Competition</i> . . . . .	203
1.	Transaction costs in LEO satellite constellations. . . . .	203
a.	<i>LEO satellite launch projects</i> . . . . .	203
b.	<i>Regulatory framework possible response</i> . . . . .	206
2.	Restraints on rent-seeking activities. . . . .	208
a.	<i>First-mover advantages and spectrum management</i> . . .	208
i.	Spectrum auctions. . . . .	208
ii.	Sunsetting protection . . . . .	209

IV. CONCLUSION .....	211
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### I. INTRODUCTION

On the 18<sup>th</sup> of December 1958, the United States put the first communications satellite, Signal Communication by Orbiting Relay (SCORE) into low Earth orbit (LEO). The satellite broadcast former U.S. President Eisenhower's taped Christmas message and remained operational for 35 days.<sup>1</sup> This remarkable achievement demonstrated the possibility of communication through satellites and became the basis for future communication satellites.<sup>2</sup> In addition, it revealed new potential abilities in space that states can now exploit.<sup>3</sup>

LEO satellites are close to Earth's surface.<sup>4</sup> This feature enables them to be operated for a diverse array of activities such as capturing high-resolution pictures and internet connection.<sup>5</sup> LEO satellites can also equip governments with multiple capabilities to enhance communications and remote sensing with lower costs. LEO constellations are thus capable of diffusing the effectiveness of any anti-satellite plans conducted by hostile states, which raises government resilience. In this vein, it is ineffective to destroy small and inexpensive satellites, especially when the number of LEO satellites can rapidly multiply.<sup>6</sup>

However, the LEO satellite industry is capital-intensive and requires cutting-edge technologies.<sup>7</sup> Moreover, there is not an unlimited capacity for satellites in LEO. This means that the more LEO satellites there are, the higher the probability is of their collision.<sup>8</sup> MacDonald et al. acknowledge that collisions will rise by ten times if two or three LEO satellite mega-constellation projects are enacted.<sup>9</sup> This is already becoming an issue. For instance, in 2021, China complained about two close encounters of SpaceX's LEO satellites with the China Space Station.<sup>10</sup>

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1. RECONFIGURABLE CIRCUITS AND TECHNOLOGIES FOR SMART MILLIMETER-WAVE SYSTEMS 415 (Phillipe Ferrari et al. eds., 2022).

2. *Communications Satellite, SCORE*, NATIONAL AIR AND SPACE MUSEUM, <https://perma.cc/GY5Q-GZMK>.

3. *This Month in NASA History: The U.S. SCORE'd in the Race to Space*, NASA APPEL KNOWLEDGE SERVICES, <https://perma.cc/8GQF-M4QZ>.

4. Andrew May, *Low Earth Orbit: Definition, Theory and Facts*, SPACE.COM (May 30, 2022), <https://perma.cc/FP6L-GZVB>.

5. *Low Earth Orbit*, EUROPEAN SPACE AGENCY, <https://perma.cc/F3NF-S53D>.

6. NICHOLAS EFTIMIADES, ATL. COUNCIL, SMALL SATELLITES: THE IMPLICATIONS FOR NATIONAL SECURITY 10 (May 2022). In a similar vein, SpaceX designs another variant of Starlink, Starshield, to provide more secure services for missions with national security implications. See Sandra Erwin, With Starshield, SpaceX Readies for Battle, SPACENEWS (Jan. 19, 2023), <https://perma.cc/F3SP-E36K>.

7. MAKENA YOUNG & AKHIL THADANI, CTR. FOR STRATEGIC & INT'L STUD., LOW ORBIT, HIGH STAKES ALL-IN ON THE LEO BROADBAND COMPETITION 24-25 (2022).

8. *Why China Fears Starlink*, ECONOMIST (May 18, 2023).

9. Bruce W. MacDonald, Carla P. Freeman, & Alison McFarland, *China and Strategic Instability in Space: Pathways to Peace in an Era of US-China Strategic Competition*, 515 U.S. INST. OF PEACE 16 (2023).

10. U.N., Comm. on the Peaceful Uses of Outer Space, Note verbale dated 3 Dec. 2021 from the Permanent Mission of China to the United Nations (Vienna) addressed to the Secretary-General, U.N. Doc. A/AC.105/1262 (Dec. 6, 2021).

Despite this growing problem, there is a lack of a global legal system to centralize, manage, and validate information about small satellites, posing a challenge to national security. Additionally, small satellites used for communications are susceptible to cyberattacks.<sup>11</sup> These challenges prompt governments to tighten regulations on the deployment of small satellites,<sup>12</sup> allocate resources to favored projects, and interfere in the market.<sup>13</sup>

Licensing requirements are part of a mechanism to implement the state's international obligations<sup>14</sup> regarding governmental and nongovernmental space activities.<sup>15</sup> In the case of LEO satellite internet, licensing has been gradually transformed into a mechanism to control the local market and maintain national security. Indeed, states use a regulatory framework to preserve their sovereignty,<sup>16</sup> and control data and market competitiveness.<sup>17</sup> In 2023, in the United States, the Federal Communications Commission (FCC) also established the Space Bureau to specialize policies and procedures associated with satellite systems.<sup>18</sup> One of the FCC's competencies is promoting competition, innovation, and investment in broadband services.<sup>19</sup>

In 1979, Kenneth Arrow postulated that individual actions are the property of society because these actions require the joint participation of other individuals.<sup>20</sup> This implies that social institutions play significant part in regulating individual

11. EFTIMIADIS, *supra* note 6, at 10.

12. YOUNG & THADANI, *supra* note 7, at 1.

13. *Launching into the State of the Satellite Marketplace: Hearing Before the H. Energy & Com. Subcomm. on Comm'n & Tech.*, 118th Cong. (2023) (statement of Kari A. Bingen, Dir., Aerospace Sec. Project & Senior Fellow, Int'l Sec. Program, Ctr. for Strategic & Int'l Stud.); Ryan Bukardt, Jesse Klempler & Brooke Stokes, *R&D for Space: Who Is Actually Funding It?*, MCKINSEY & CO. (Dec. 10, 2021), <https://perma.cc/6GFM-A29J>.

14. The five main treaties that make up the backbone of international space responsibilities are the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, *opened for signature* Dec. 18, 1979, 610 U.N.T.S. 205 (entered into force July 11, 1984) [hereinafter *Outer Space Treaty*]; Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects, *opened for signature* Apr. 22, 1968, 672 U.N.T.S. 119 (entered into force Dec. 3, 1968); Convention on International Liability for Damage Caused by Space Objects, *opened for signature* Mar. 29, 1972, 961 U.N.T.S. 187 (entered into force Sept. 1, 1972); Convention on Registration of Objects Launched into Outer Space, *opened for signature* Sept. 15, 1976, 1023 U.N.T.S. 15; and Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, *opened for signature* Dec. 18, 1979, 1363 U.N.T.S. 3 (entered into force July 11, 1984).

15. OECD, *THE SPACE ECONOMY AT A GLANCE 2014* 44 (OECD Publishing 2014) <https://perma.cc/NT6K-AK2Z>.

16. Frans G. von der Dunk, *Sovereignty Versus Space – Public Law and Private Launch in the Asian Context*, 5 SING. J. INT'L & COMP. L. 22, 46 (2001).

17. Jack Wright Nelson, *NewSpace, Old Problems: Asset-Based Satellite Financing in the Asia-Pacific*, 2 SING. J. INT'L & COMP. L. 354, 361-62 (2021).

18. Establishment of the Space Bureau and the Office of International Affairs and Reorganization of the Consumer and Governmental Affairs Bureau and the Office of the Managing Director, 88 Fed. Reg. 21424 (Apr. 10, 2023) (to be codified at 47 C.F.R.).

19. *What We Do*, FED. COMM'N COMM'N, <https://perma.cc/4W7F-FMWW>.

20. KENNETH J. ARROW, *Values and Collective Decision-Making*, in *PHILOSOPHY AND ECONOMIC THEORY* 110, 114 (Frank Hahn & Martin Hollis eds., 1979).

transactions.<sup>21</sup> Arrow's argument is still sound in the age of space activities and mass deployment of satellites and urges a duty to discipline individual activities in outer space. Although these constraints are set and exercised by institutions (mainly governmental) due to the nature of space activities, they might also be reflected in international norms and treaties. While this industry is at its beginning stages of flourishing, a robust regulatory framework should take into account competition and guarantee that the market will remain open for new entrants and that consumers benefit from fair prices and services. The International Monetary Fund (IMF) underlines that the lack of access to the Internet can exacerbate income inequality between countries.<sup>22</sup> The digital gap is a phenomenon in both industrialized and less developed communities.<sup>23</sup> In 2023, 2.6 billion people (approximately thirty-three per cent of the world's population) had no access to the Internet;<sup>24</sup> therefore, the existence of an effective regulatory framework together with the LEO satellite market becomes more crucial to overcome geographical and technological obstacles.

In the market, regulations are employed to curb the concentration of power and monopolistic behaviors rooted in property rights. Further, satellite internet depends largely on space, where the locus of government power is likely to exist in the future.<sup>25</sup> Such circumstances might give rise to national security interests that overtake competition in a state's priorities. In fact, governments consider regulating commercial space activities as part of their sovereignty and require satellite internet to comply with their domestic rules. In international law, it is acknowledged that governments have the right to regulate the use of the information and communications technology (ICT) infrastructure within their territories.<sup>26</sup> However, mixed priorities lead to enforcing regulations with substantial adverse effects on the private sector. As an illustration, in 2021, the FCC administered the Supply Chain Reimbursement Program with \$1.9 billion value to compensate communications services for the replacement of equipment and services produced or provided by Huawei and ZTE.<sup>27</sup> Moreover, the Secure and Trusted

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21. *Id.*

22. Mercedes Garcia-Escribano, *Low Internet Access Driving Inequality*, IMF BLOG (June 29, 2020), <https://perma.cc/XZS5-SJK3>.

23. Matthew Pajares-Yngson, *Bangladesh Hopes To Lead To A "Zero Digital Divide" World*, FORBES (Aug. 9, 2023). For instance, forty-three percent of U.S. citizens whose incomes are lower than \$30,000 have no internet access at home. Keith Hamm, *To Close Digital Divide, Lawmakers Succeed When Focused on Education and Transparency*, CURRENT (Aug. 11, 2023), <https://perma.cc/6XX6-92H9>.

24. *Statistics*, INT'L TELECOMM. UNION, <https://perma.cc/47XL-489L>.

25. KARI A. BINGEN, KAITLYN JOHNSON, & MAKENA YOUNG, CTR. FOR STRATEGIC & INT'L STUD., *SPACE THREAT ASSESSMENT 2023* 3 (Apr. 2023) ("Space is an increasingly important enabler of economic and military power").

26. DAN SVANTESSON, REBECCA AZZOPARDI, WENDY E. BONYTHON, JONATHAN CROWE, STEVEN FREELAND, SAMULI HAATAJA, DANIELLE IRELAND-PIPER, & NATHAN MARK, *THE DEVELOPING CONCEPT OF SOVEREIGNTY: CONSIDERATIONS FOR DEFENCE OPERATIONS IN CYBERSPACE AND OUTER SPACE* 27–30 (June 2021).

27. *Protecting Against National Security Threats to the Communications Supply Chain Through FCC Programs*, FED. COMM'N COMM'N, <https://perma.cc/WXM8-MUZ5>.

Communications Networks Act of 2019 restricts providers' choice of business partners and allocates a part of public revenue to reimburse opportunity costs.<sup>28</sup> Anne Krueger posits that state intervention is an inevitable consequence of being suspicious about the market mechanism, and rent-seeking is an unintended consequence of that intervention.<sup>29</sup> Indeed, rulemaking frequently provides interest groups with opportunities for rent-seeking<sup>30</sup> behaviors.<sup>31</sup> Analogously, although satellite internet involves innovative technologies, it might bring about a contest between enterprises to secure their current share or create a monopoly. Hence, a robust regulatory framework can play a pivotal role in halting rent-seeking activities or directing them to increase the national product.

The article begins by unfolding the segments of satellite internet in Part II. This entails a reflection on the difference between LEO and geosynchronous equatorial orbit (GEO) satellites. Part II also studies the current regulatory frameworks in Australia, Bangladesh, Indonesia, Japan, Malaysia, and Vietnam to clarify whether the current approaches to licensing, foreign investment, and competition can cope with technological changes. After considering various regulatory frameworks, Part III is allocated to the implications of an effective regulatory framework. The aim is to find a reconciliation between the free market and national security interests. At this point, by employing national security measures, the countries are divided into two groups with and without a national security test. The national security test represents a mechanism in which foreign investments in sensitive businesses like the telecommunications industry should be examined by authorities. Regulations often grants a discretionary power to authorised agents to refuse investments that are deemed to be contra national

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28. Secure and Trusted Communications Networks Act, 47 U.S.C. § 2 (2019) (providing “[t]he Commission shall place on the list published under subsection (a) any communications equipment or service, if and only if such equipment or service—(1) is produced or provided by any entity, if, based exclusively on the determinations described in paragraphs (1) through (4) of subsection (c), such equipment or service produced or provided by such entity poses an unacceptable risk to the national security of the United States or the security and safety of United States persons. . .”).

29. Anne O. Krueger, *The Political Economy of the Rent-Seeking Society*, 64 AM. ECON. REV. 291, 302 (1974); Matin Pedram, *Reliability of Regulating Artificial Intelligence to Restrain Cartelization: A Libertarian Approach*, 12 ASIAN J. L. & ECON. 149, 149–150 (2021) (explaining that “it is not feasible to find a real free market which relies solely on its own forces and resources. Governments are present to interfere in the free market by means of various laws and regulations”).

30. In an economic analysis, a monopoly is inefficient because it sells less at higher prices which makes consumers worse off. A monopoly also prompts others to spend their resources on achieving a monopolistic position in the market. This is called rent-seeking behavior. DAVID D FRIEDMAN, *LAW'S ORDER: WHAT ECONOMICS HAS TO DO WITH LAW AND WHY IT MATTERS* 246 (2001). Rent-seeking directs resources to counterproductive activities which in turn lower the national product. 5 GORDON TULLOCK, *THE RENT-SEEKING SOCIETY* 185 (Charles K. Rowley ed., 2005). These activities can be shaped as lobbying, campaign contributions, bribery, etc., that a firm employs. Joseph M. Jadow, *Monopoly Rent Seeking Under Conditions of Uncertainty*, 45 PUB. CHOICE 73, 74 (1985). A firm may engage in these activities to gain external support such as a tariff, preferred licensing system, and subsidy from the government to hinder competition and preserve its monopolistic position in the market.

31. Robert D. Cairns, *Rent Seeking, Deregulation and Regulatory Reform*, 11 CANADIAN PUB. POL'Y 591, 595 (1985).



interest or security. As an illustration, in Australia, national security and competition are among the main factors of the national interest test. In this respect, the policy identifies carriers or a nominated carriage service provider as sensitive, tying them to national security.<sup>32</sup> This article also considers the approach to national security and competition taken by the United States, one of the pioneers in LEO satellite constellation. It appears that arbitrary accounts of national security can reduce consumer welfare and disrupt the allocation of resources in the market which in turn contributes to anticompetitive behaviors. As a remedy, it is incumbent on a robust regulatory framework to put into practice more transparent and market-friendly mechanisms to crack down on rent-seeking opportunities.<sup>33</sup>

## II. INTERNET FROM SPACE: SPECIFICATIONS AND LICENSING

GEO and LEO satellites can be launched for various missions. GEO satellites are centrally used for communications, while LEO satellites are increasingly operated to facilitate internet services.

### A. Satellite internet

Not only can LEO satellites connect remote areas to the internet, but they also are capable of supporting 5G networks.<sup>34</sup> Thus, it is possible to integrate LEO satellites with 5G networks to improve the quality of services and extend them to air, sea, and other remote areas.<sup>35</sup>

#### 1. Segments of satellite connectivity

Satellite internet requires four segments to be operated in a given area. Any satellite system requires ground-based assets, space-based assets, links between elements, and connection points to users.<sup>36</sup>

32. "(2) A business is a sensitive business if: (a) the business is carried on wholly or partly in any of the following sectors (including such a business relating to infrastructure for those sectors): (i) media; (ii) telecommunications; (iii) transport. . ." Foreign Acquisitions and Takeovers Regulation 2015 (Law No. 217/2015) § 22(2) (Austl.). Despite this, the Act does not provide transparent definition of national security. DEP'T OF THE TREASURY, AUSTRALIA'S FOREIGN INVESTMENT POLICY 1 (June 20, 2023).

33. In order to have a clear insight into the efficiency of the regulatory frameworks in these countries, this article relies on the 2023 Index of Economic Freedom (the Index) published by the Heritage Foundation. Regulatory efficiency is one of the categories measured by its formula. HERITAGE FOUND., 2023 INDEX OF ECONOMIC FREEDOM 403-10 (2023). In this regard, bureaucratic procedures for obtaining required licenses and complicated regulations count against business freedom and productivity. *Id.* at 14-15. Further, to make a concrete statement, it is required to separate the rocket launch market and the market for internet provision via satellites. While this study considers the status quo in which SpaceX has a dominant position in launching satellites Micah Maidenberg, *Elon Musk's SpaceX Now Has a "De Facto" Monopoly on Rocket Launches*, WALL ST. J. (July 7, 2023, 12:35 AM), <https://perma.cc/SF5Y-K2BP>. the core argument remains general to explain similar monopolies in satellite internet services.

34. *The Role of Satellites in the Future of 5G*, ACCELERCOMM (May 2023), <https://perma.cc/8N9G-M4JL>.

35. *5G from Space – The Role of Satellites in 5G*, NOKIA, <https://perma.cc/HYD7-863G>.

36. MELISSA K. GRIFFITH & CHRISTOPHER M. HOCKING, WILSON CTR., SEIZING OPPORTUNITIES: FOUR NATIONAL SECURITY QUESTIONS TO ASK ABOUT THE USE OF SATELLITES IN 5G NETWORKS 9 (Sept. 2021).

*a. Ground-based assets*

The ground segment refers to all the ground-based elements that collect and spread information from the satellite to the user.<sup>37</sup> This segment includes ground stations and launch facilities. Ground stations act as command-and-control systems for satellites and are the first line that realizes a satellite is marred in space. Launch facilities make it possible for a satellite holder to put satellites into space. Only some satellite owners can launch satellites and need more infrastructure to conduct them.<sup>38</sup>

*b. Space-based assets*

Space-based assets represent infrastructure such as satellites that significantly support civilian and military activities.<sup>39</sup> Thus, they consist of satellites contributing to navigating, positioning, and communicating.<sup>40</sup> Space-based assets become more salient where they are tied to national security. The U.S. National Space Policy emphasizes that an integrated operational command and control should be established to defend space-based assets.<sup>41</sup> Similarly, in 2021, the Joint Standing Committee on Foreign Affairs, Defence and Trade of Australia equated space control with air control, insisting that the protection of assets in space and space-based capabilities is of utmost importance and should be enhanced.<sup>42</sup>

*c. Links*

A satellite network requires communication systems, such as radio frequency or free space optical (FSO or laser communications), to transmit information and convey commands. These systems facilitate the transfer of data to the Earth (downlink) and send commands from the Earth (uplink).<sup>43</sup> Radio frequency systems utilize electromagnetic waves to transmit data. Accordingly, “[i]nformation is modulated onto radio frequency electromagnetic waves and sent over channel, through the atmosphere or space.”<sup>44</sup>

Commercial satellite services use a range of frequency bands: C (between 4 GHz and 8 GHz), Ku (between 12 GHz and 18 GHz), Ka (between 26 GHz and 40 GHz), L (between 1 GHz and 2 GHz), and V.<sup>45</sup> But Ka is the preferred band for LEO satellite communications.<sup>46</sup> Although it covers a smaller range than the Ku-band, the Ka-band can surprisingly lower the cost of bandwidth and, at the

37. SMALL SPACECRAFT SYS. VIRTUAL INST., NAT’L AERONAUTICS & SPACE ADMIN., STATE-OF-THE-ART SMALL SPACECRAFT TECHNOLOGY 266 (2023).

38. GRIFFITH & HOCKING, *supra* note 36.

39. LUCY SMYTHE & LYDIA HARRIS, PARLIAMENTARY OFF. OF SCI. & TECH., DEFENCE OF SPACE-BASED ASSETS 2 (2021).

40. GRIFFITH & HOCKING, *supra* note 36.

41. The National Space Policy, 85 Fed. Reg. 81755 (Dec. 16, 2020).

42. JOINT STANDING COMM. ON FOREIGN AFFS., DEF. & TRADE, PARLIAMENT OF THE COMMONWEALTH OF AUSTRALIA, INQUIRY INTO THE DEPARTMENT OF DEFENCE ANNUAL REPORT 2019-20 8 (2021).

43. SMALL SPACECRAFT SYS. VIRTUAL INST., *supra* note 37, at 227.

44. *Id.*

45. *Satellite Basics*, INTELSAT, <https://perma.cc/LJ27-G4WV>.

46. VINCENT BONNEAU, BASILE CARLE, BERTRAND PEDERSEN, & LAURENT PROBST, LOW-EARTH ORBIT SATELLITES: SPECTRUM ACCESS 5 (Digital Transformation Monitor Report 2017).



same time, enhance download and upload speeds.<sup>47</sup> In addition, the Ka-band requires “small, lightweight, and high-efficiency antennas.”<sup>48</sup>

Although radio frequencies are more cost-effective than FSO, they are prone to jamming and eavesdropping. Moreover, FSO promises a higher speed of data transfers (apparently 100 gigabits per second). Hence, endeavors are being made to use laser beams for transmissions that are unlikely to intercept or jam.<sup>49</sup>

Radio frequency is a finite resource for multiple uses.<sup>50</sup> The scarcity of radio frequency, which is one of the main components of LEO satellite broadband, increases the race between entities.<sup>51</sup> Moreover, this natural resource is owned and controlled by a state with sovereignty over the territory.<sup>52</sup> Hence, not only do LEO satellite operators deal with scarcity, but they also confront various regulatory frameworks.

#### d. Connection points

Depending on the functionality of a satellite, connection points might be other networks or devices.<sup>53</sup> In the case of satellite internet provision, end-users or customers are the connection points. In this case, information is transferred via user terminals to satellites; therefore, customers are the ultimate beneficiaries of promising internet services.<sup>54</sup>

## 2. Low Earth Orbit (LEO) vs Geostationary Orbit (GEO)

GEO satellites are placed at an altitude of 35,786 kilometers, making it possible to cover a broader range of areas. These satellites are mainly used for communications. LEO satellites are positioned at an altitude between 160 and 2,000 kilometers.<sup>55</sup> They are primarily operated to provide internet service. For this, a network of LEO satellites is required, and their closer distance to the Earth is an advantage for establishing high-speed internet.<sup>56</sup>

47. *Ka vs Ku Band: Which Is the Best for Satellite Broadband?*, AID & INT’L DEV. F. (Sept. 24, 2019), <https://perma.cc/ZU2V-7UYB>.

48. Enrique G. Cuevas & Vijitha Weerackody, *Technical Characteristics and Regulatory Challenges of Communications Satellite Earth Stations on Moving Platforms*, 33 JOHNS HOPKINS APL TECH. DIG. 37, 39 (2015).

49. *DARPA, Lasers and an Internet in Orbit*, ECONOMIST (describing how the Defense Advanced Research Projects Agency (DARPA) has commenced a project, Space-BACN, to create optical communications terminal and enable seamless communication between the government and commercial satellite constellations); *DARPA Kicks Off Program to Develop Low-Earth Orbit Satellite ‘Translator’*, DEF. ADVANCED RSCH. PROJECTS AGENCY (Aug. 10, 2022), <https://perma.cc/9WQN-TQGT>.

50. Christiana Herter, *The Electromagnetic Spectrum: A Critical Natural Resource*, in TRANSBOUNDARY RESOURCES LAW 89, 655 (Albert E. Utton & Ludwik A. Teclaff eds., 2019).

51. YOUNG & THADANI, *supra* note 7, at 7.

52. Herter, *supra* note 50, at 655.

53. GRIFFITH & HOCKING, *supra* note 36, at 10.

54. JOHN GARRITY & ARNDT HUSAR, ASIAN DEV. BANK, DIGITAL CONNECTIVITY AND LOW EARTH ORBIT SATELLITE: CONSTELLATIONS OPPORTUNITIES FOR ASIA AND THE PACIFIC 29 (2021); *Satellite Internet: Connected from Space*, INMARSAT, <https://perma.cc/N6LR-M7JR>.

55. GARRITY & HUSAR, *supra* note 54, at 8.

56. *Id.*; GRIFFITH & HOCKING, *supra* note 36, at 11 (MEO satellites, placed between LEO and GEO satellites, are also available whose primary functions are navigation and timing).

In between, there are medium Earth orbit (MEO) satellites. As LEO satellites are closer to the Earth, they can push away a more extended period of latency.<sup>57</sup> This advantage prompts companies and states to consider enormous projects in LEO.

Starlink, backed by SpaceX; Kuiper, designed by Amazon; and OneWeb, owned by the UK government, are the salient projects in the LEO constellations industry. As Elon Musk said in 2015, the Starlink project seeks to “rebuild the internet in space.”<sup>58</sup> Currently, Starlink benefits from approximately 4,500 LEO satellites, which account for fifty percent of active satellites, and aims to operate 42,000 satellites in orbit.<sup>59</sup> Project Kuiper consists of 3,236 satellites that will be gradually placed into LEO by 2026 to provide remote areas with affordable broadband.<sup>60</sup> The OneWeb satellite network comprises 648 LEO satellites alongside twelve synchronised orbital planes. OneWeb will complete its first launch program in 2023.<sup>61</sup>

China has planned to conduct its home-grown LEO satellite deployment. In this respect, in 2020, China informed the International Telecommunication Union (ITU) about the deployment of 13,000 satellites at altitudes from 500 to 1,145 kilometers.<sup>62</sup> China Aerospace Science and Industry Corp (CASIC) is a state-owned enterprise that administers the project.<sup>63</sup> The Chinese Communist Party supports this project and loosens regulatory requirements to accelerate it.<sup>64</sup> Regardless of LEO satellites, ViaSat plans to launch five GEO satellites<sup>65</sup> alongside a network of ground stations to provide an internet connection.<sup>66</sup>

57. YOUNG & THADANI, *supra* note 7, at 3.

58. Peter B. de Selding, *SpaceX To Build 4,000 Broadband Satellites in Seattle*, SPACENEWS (Jan. 21, 2015), <https://perma.cc/9U5X-GR8B>.

59. Adam Satariano, Scott Reinhard, Cade Metz, Sheera Frenkel, & Malika Khurana, *Elon Musk's Unmatched Power in the Stars*, N.Y. TIMES (July 28, 2023).

60. Thomas Kohnstamm *Everything You Need to Know about Project Kuiper, Amazon's Satellite Broadband Network*, AMAZON (Mar. 14, 2023), <https://perma.cc/YF9H-6Y5S>; Order on Application for Authority to Deploy and Operate a Ka-band Non-Geostationary Satellite Orbit System, Doc. No. FCC 20-102 (July 29, 2020).

61. *Our Network*, EUTELSAT ONEWEB, <https://perma.cc/2AZH-SH5T>.

62. *Vast Satellite Constellations Are Alarming Astronomers*, ECONOMIST (Nov. 25, 2021).

63. *China Gears up to Compete with SpaceX's Starlink This Year*, REUTERS (Mar. 2, 2023, 5:29 AM), <https://perma.cc/3HBP-VSME>.

64. 118<sup>th</sup> Cong., *supra* note 15.

65. See Peter Christiansen, *What Happened to ViaSat's New Satellite?*, HIGH SPEED INTERNET (Aug. 22, 2023), <https://perma.cc/SAN5-AYS4>, for more information about the project and how it works.

66. ECONOMIST, *Why China Fears Starlink*, *supra* note 17. In May 2023, ViaSat took over Inmarsat whose scheme was to deliver the Internet via LEO satellites. See *ViaSat Completes Acquisition of Inmarsat*, INMARSAT (May 31, 2023), <https://perma.cc/WC5Y-2AFV>. In a project dubbed Orchestra, Inmarsat sought to create a hybrid network to provide a stronger connectivity. See Jason Rainbow, *Inmarsat Unveils Multi-Orbit Orchestra Constellation*, SPACENEWS (July 29, 2021), <https://perma.cc/84SQ-S5MT>. Despite this, it is unclear whether ViaSat aims to continue this project particularly after requesting the FCC on V-Band withdrawal. See Dan Swinhoe, *ViaSat Withdraws V-Band Application for Inmarsat's Orchestra Satellite Constellation*, DATA CTR. DYNAMICS (July 26, 2023), <https://perma.cc/5GWG-WGZV>.

### *B. Licensing Satellite Internet*

As mentioned earlier, satellite internet is in force to provide end-users with a promising internet connection. This technology is only available in some areas mainly because of its costs. One of the components of these costs is ascribed to licensing procedures, which vary in each jurisdiction. These procedures can be adapted to hamper the market or foster competition.

#### 1. Australia

##### *a. Regulatory body*

The Australian Communications and Media Authority (ACMA) is the main regulatory body supervising broadcasting, radiocommunications, and telecommunications services.<sup>67</sup> Based on Section 28 of the Space Act 2018, the Minister of Industry, Science, and Resources must permit any satellite launch beforehand. In addition, under Section 6A of the Competition and Consumer Act 2010 (the Act), the Australian Competition and Consumer Commission (ACCC)<sup>68</sup> enforces the Act to promote competition and fair trading. In 2016, ACMA and ACCC signed a memorandum of understanding (MOU), acknowledging that their responsibilities might intersect on issues such as competition in communications and related sectors, radio frequency spectrum, etc.; therefore, the MOU highlighted the importance of collaboration.<sup>69</sup> For instance, in the radio frequency spectrum, one of the substantial components of satellite internet, ACCC seeks to promote a competitive market.<sup>70</sup>

##### *b. Required licenses*

Based on Section 28 of the Telecommunications Act 1997, “[i]f a designated radiocommunications facility is used, or is for use, to supply a carriage service between a point in Australia and one or more other points in Australia, the facility is a network unit.” A Telecommunications Carrier Licence is required if a network unit wishes to provide internet services to the public. Alternatively, the provider can initiate an arrangement with a licensed telecommunications carrier.<sup>71</sup>

In Australia, the satellite internet provider should obtain Radio Communications Licences. Radio Communications Licences comprise Class, Spectrum, and Apparatus licenses. Spectrum licenses represent the use of radiocommunications

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67. *Compliance and Enforcement Policy*, AUSTRALIAN COMM’NS & MEDIA AUTH. (ACMA), <https://perma.cc/XD39-4Q69>.

68. *About the ACCC*, AUSTRALIAN COMPETITION & CONSUMER COMM’N (ACCC), <https://perma.cc/3H69-D2SG> (last visited Apr. 2, 2023).

69. *Memorandum of Understanding between the Australian Competition and Consumer Commission and the Australian Communications and Media Authority*, ACMA § 2 (Dec. 16, 2016), <https://perma.cc/6QXD-ZJRV>.

70. ACCC, *COMPETITION LIMITS ADVICE FOR 1800 MHZ SPECTRUM IN REGIONAL AREAS 1* (May 2015).

71. *Apply for a Telecommunications Carrier Licence*, ACMA, <https://perma.cc/8F7N-KC9N>.

devices in a specific frequency band.<sup>72</sup> In Australia, uplink and downlink should be licensed. For a downlink, an Earth licence is necessary. According to Radiocommunications (Interpretation) Determination 2015, an earth licence is an apparatus license that authorizes the holder to operate an earth station. In addition, for an uplink, a space licence should be obtained.<sup>73</sup> Regarding satellite launch from Australian jurisdiction, the operator should obtain a Minister's permit.<sup>74</sup>

## 2. Bangladesh

### *a. Regulatory body*

The Bangladesh Telecommunication Regulatory Commission (BTRC) was established to regulate telecommunication systems and enhance telecom services efficiently.<sup>75</sup> While the Bangladesh Competition Commission was created by the Competition Act 2012,<sup>76</sup> one of the BTRC's objectives is to sustain a competitive and market-oriented system.<sup>77</sup> It is also reflected in Section 30 of the Bangladesh Telecommunication Act 2001.<sup>78</sup> In 2018, BTRC issued Significant Market Power Regulations,<sup>79</sup> restricting anti-market behaviors in the telecommunications industry. Based on Sections 7 and 10 of the Regulations, BTRC is authorized to investigate and determine whether an operator maintains market power.

### *b. Required licenses*

Suppose a satellite internet provider aims to bring internet access. In that case, an Internet Service Provider (ISP) license (according to Section 14 of the Regulatory and Licensing Guidelines for Internet Service Provider 2020 with a five-year validity) alongside a Satellite Operator License (according to the Regulatory and Licensing Guidelines for Satellite Operators 2022 with a fifteen-year validity) is required. Section 7.2 of the Regulatory and Licensing Guidelines for Internet Service Provider 2020 limits foreign direct investment to nationwide ISP licenses.

72. *Spectrum Licences*, ACMA, <https://perma.cc/DME6-P3SK>.

73. *Space Licence*, ACMA, <https://perma.cc/P9QB-MWGE>.

74. Space (Launches and Returns) Act 2018 (Act No. 123/1998) § 46U (Austl.).

75. Telecommunication Act, 2001 (Act No. 18/2001) (Bangl.).

76. "This Act shall apply to all enterprises involved in purchase-sale, production, supply, distribution or storage, as the case may be, of goods or services for commercial purposes." Competition Act, 2012 (Act No. 23/2012) § 3 (Bangl.). Despite this, BTRC believes that the promotion of competition in telecommunications market falls into its authority. See U.N. Conference on Trade and Development, *Voluntary Peer Review of Competition Law and Policy: Bangladesh* 27 (July 2022).

77. *Vision & History*, BANGL. TELECOMM. REGUL. COMM'N, <https://perma.cc/6BNY-CYS4>.

78. "The functions and duties of the Commission shall be ... to maintain and promote competition among the service providers in order to ensure high-quality telecommunication services." Telecommunication Act § 30.

79. Bangladesh Telecommunication Regulatory Commission (Significant Market Power) Regulations, 2018 (S.R.O. No. 315-Law/2018) art. 6 (Bangl.).

### 3. Indonesia

#### *a. Regulatory body*

The Ministry of Communications and Informatics (MCI) is tasked with executing national and technical policies and supervising telecommunications and internet services.<sup>80</sup> Despite this, Article 4 of the Law on Telecommunications 1999 emphasizes that MCI can delegate its supervisory role to a regulatory body. The Indonesian Telecommunications Regulatory Body (BRTI) was established in this respect. Based on Article 2 of the Regulation on Indonesian Telecommunications Regulatory Body 2018, BRTI should ensure that “the principles of transparency, independence, accountability, and fairness in performing regulatory, supervisory, and control functions in the field of information and communication technology. . .” which also includes broadcasting infrastructure and internet, as well as digital economy’ are met.

With respect to competition, the Commission for the Supervision of Business Competition (KPPU) was founded to enforce the Law Concerning the Prohibition of Monopolistic Practices and Unfair Business Competition 1999.<sup>81</sup>

#### *b. Required licenses*

To carry out satellite internet services in Indonesia, the applicant must obtain a Telecommunications Operations Licence,<sup>82</sup> Telecommunications Service Operations Licence,<sup>83</sup> and Radio Frequency Spectrum Licence.<sup>84</sup> Regarding satellite launches, the Indonesian government must manage and supervise space activities within its territory.<sup>85</sup> Thus, in the case of launch from the jurisdiction of Indonesia, satellites should be registered with the Space Agency.<sup>86</sup>

### 4. Japan

#### *a. Regulatory body*

The Ministry of Internal Affairs and Communications (MIC) oversees telecommunications and broadcasting services in Japan.<sup>87</sup> Article 9 of the Telecommunications

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80. Novin Kelvianto Nurakbar, *The Indonesian Ministry of Communication and Informatics (MCI) Content Moderation Regulation Policy Since 2020: Impacts on Good Governance and Freedom of Expression*, 7 (Nov. 2022) (B.A. thesis, Flinders University).

81. Law Concerning the Prohibition of Monopolistic Practices and Unfair Business Competition, 1999 (Law No. 5/1999) art. 30 (Indon.).

82. Regulation on Electronically Integrated Business Licensing Service in the Field of Communication and Informatics, 2018 (Reg. No. 7/2018) art. 15 (Indon.).

83. *Id.*, art. 16.

84. “(1) Radio Frequency Spectrum usage must first obtain a license to use a Radio Frequency Spectrum from the Minister. (2) The Radio Frequency Spectrum license as referred to in paragraph (1) shall comprise: a. Bandwidth License; b. Apparatus License; and c. Class License. (3) The Minister shall stipulate a license to use a Radio Frequency Spectrum based on the results of technical analysis.” *See Regulation on Post, Telecommunications, and Broadcasting*, 2021 (Reg. No. 46/2021) art. 45 (Indon.).

85. Law on Space Activities, 2013 (Act No. 21/2013) art. 41 (Indon.).

86. Space Agency is a governmental body “whose duty is to implement government affairs in the field of research and development of aerospace and its utilization and the Space Activities.” *Id.*, art. 1.

87. *Index*, MINISTRY OF INTERNAL AFFS. & COMMC’NS (MIC), <https://perma.cc/8SBR-52XP>.

Business Law 1984 states that a person who aims to operate a telecommunications business must be registered with MIC. In relation to fair trade and market competitiveness, the Japan Fair Trade Commission (JFTC) was established as an independent administrative commission to implement the Antimonopoly Act 1947 and the Subcontract Act 1956. Accordingly, JFTC seeks to preserve competition and preclude anticompetitive conduct in the market.<sup>88</sup>

### *b. Required licenses*

In order to conduct satellite internet services, one must register its entity as a Telecommunications Service Provider and obtain registration from MIC.<sup>89</sup> To provide internet services, the entity requires earth stations.<sup>90</sup> These stations are operated in the Ku or Ka band and must conform to Article 54.3 of the Ordinance Regulating Radio Equipment 1950.<sup>91</sup> The entity is required to obtain a radio station license based on Article 6 of the Radio Act.<sup>92</sup> According to Article 4.1 of the Space Activities Act, the Prime Minister's permission is required once the satellite operator aims to put a satellite into orbit from Japanese territory.<sup>93</sup>

## 5. Malaysia

### *a. Regulatory body*

The Malaysian Communications and Multimedia Commission (MCMC) is empowered by the Communications and Multimedia Act 1998 to establish a competitive and efficient communications and multimedia industry.<sup>94</sup> MCMC is directed by the Ministry of Communications and Digital (Section 9). Per MCMC's recommendations, the Minister is the authorized person who grants the licenses.<sup>95</sup> In addition, the Malaysia Competition Commission (MyCC) exercises the Competition Act 2010 and deals with anticompetitive behaviors in the

88. *For Fair and Free Market Competition*, JAPAN FAIR TRADE COMM'N, <https://perma.cc/KW63-99FV>.

89. Telecommunications Business Act, 1984 (Act No. 86/1984) art. 9 (Japan).

90. *Frequently Asked Questions*, MIC, <https://perma.cc/5Z9J-SEVY>.

91. Ordinance Regulating Radio Equipment, 1950 (Reg. No. 18/1950) art. 54.3 (Japan).

92. "Any person who wishes to obtain a radio station license must submit an application to the Minister of Internal Affairs and Communications along with a document, on which the following information are entered:

- (i) purpose. . .
- (ii) necessity for establishing the radio station
- (iii) persons with which radio communications are conducted and communication information. . .
- (iv) (iv) location of radio equipment (referring to, for radio stations for artificial satellites (herein-after referred to as 'artificial satellite stations'), the orbit or the position. . .
- (v) type of radio waves, and desirable frequency range and antenna power. . ."

Radio Act, 1950 (Law No. 131/1950) art. 6(1)(i)-(v) (Japan).

93. Act on Launching Spacecraft, etc. and Control of Spacecraft, 2016 (Act No. 76/2016) art 4.1 (Japan).

94. *Vision and Mission*. MALAYSIAN COMM'NS & MULTIMEDIA COMM'N (MCMC).

95. Communications and Multimedia Act 1998 (Act 588) § 30 (Malay.).



market.<sup>96</sup> Nonetheless, MyCC has no authority to regulate activities reflected in the Communications and Multimedia Act 1998.<sup>97</sup> In August 2023, MyCC and MCMC signed a MOU to collaborate and foster competition in these areas.<sup>98</sup>

### *b. Required licenses*

Based on Standard License Conditions,<sup>99</sup> foreign companies are unlikely to receive an Individual or Class Licence. Despite this, the Minister is authorized to grant class licenses on the grounds of public interest and promotion of industry growth.<sup>100</sup> The Minister can exempt a foreign investor from holding a partnership or registering a company. For instance, in July 2023, SpaceX was licensed to activate satellite internet with 100 percent foreign ownership.<sup>101</sup> Licenses categorize applicants as Network Facilities and Network Service Providers. A network facilities provider that aims to use its network satellites should obtain either an individual or class license. In cases of foreign companies, they can be designated as class licensees. A class license is granted to an applicant to conduct a particular activity.<sup>102</sup> Satellite internet providers should also submit their requests for spectrum assignment<sup>103</sup> to MCMC.<sup>104</sup> Further, in cases where the satellite operator seeks to launch a satellite from the jurisdiction of Malaysia, an application should be submitted to the Malaysian Space Board.<sup>105</sup>

## 6. Vietnam

### *a. Regulatory body*

The Vietnam Telecommunications Authority (VNTA) is the regulatory body with respect to the telecommunications industry.<sup>106</sup> Based on the Prime Minister's Decision No 35,<sup>107</sup> VNTA's central duties include licensing telecommunication and

96. Competition Commission Act 2010 (Act 713) § 3 (Malay.).

97. "This Act shall not apply to any commercial activity regulated under the legislation specified in the First Schedule. . ." Competition Act 2010 (Act 712) § 3(3) (Malay.).

98. *MyCC and MCMC Strengthen Collaboration with MoU Signing*, MALAY. COMPETITION COMM'N (Aug. 3, 2023), <https://perma.cc/JA4R-EP33>.

99. See Communications and Multimedia Act 1998 Schedule.

100. MCMC, LICENSING GUIDEBOOK 1, 7 (Apr. 1, 2023).

101. Angelin Yeoh, *Musk's Starlink Lands in Malaysia*, STAR (July 26, 2023), <https://perma.cc/L8QH-D443>.

102. Communications and Multimedia Act 1998 § 44. A Class License is valid for one calendar year. Upon expiration, the licensee should apply for a renewal. See *Types of Licenses and Application Procedures*, MCMC.

103. The spectrum assignment will be valid for twenty years. See Communications and Multimedia (Spectrum) Regulations 2000 (P.U.(A) 128/2000) Reg. 17 (Malay.).

104. "The Commission may issue a spectrum assignment which confers rights on a person to use one or more specified frequency bands for any purpose consistent with the assignment conditions." Communications and Multimedia Act 1998 § 159(1).

105. Malaysian Space Board Act, 2022 (Act 834) § 17 (Malay.).

106. *About Us*, VIETNAMESE TELECOMM. AUTH.

107. *Decision on Functions, Tasks, Powers and Structure of the Telecommunications Bureau Directly under the Ministry of Information and Communication*, GLOBAL REGULATION, <https://perma.cc/T77D-39EJ> (translating the Socialist Republic of Vietnam Decision 35/2011 via Microsoft software).

network services as well as controlling and exercising regulations on competition. In this sense, Article 19 of the Law on Telecommunications 2009 states that telecommunications enterprises should avoid anticompetitive and unfair conduct specified in the Competition Law 2018.<sup>108</sup> VNTA is also authorized to inspect and handle competition-related issues in this case.

### *b. Required licenses*

If an applicant seeks to establish telecommunications networks alongside the provision of telecommunications services, a License for the Commercial Provision with fifteen years of validity should be obtained (Article 34 of the Law on Telecommunications 2009). To use radio frequencies, satellite internet providers should acquire satellite orbit and frequency licenses (Article 16 of the Law on Radio Frequency).<sup>109</sup>

## III. REGULATORY FRAMEWORKS TAKE THE REINS OF SATELLITE INTERNET

Regulatory frameworks represent different attitudes toward national security, the flow of investments, and market competitiveness arising from prioritized interests, rent-seeking, and transaction costs.<sup>110</sup> Countries develop licensing mechanisms to retain checks and controls over the telecommunications sector. They seek to clarify procedures and reduce costs so long as the system complies with international obligations and national interests. A robust regulatory framework contrasts with an inefficient one in that the former can balance national security and market forces.

### *A. Preserving national security or protecting local businesses*

Although countries might be interested in fostering national security via regulatory frameworks, they diverge in terms of applicable methods and contextualization of national security. For instance, some countries limit investments from a designated territory or ban them from entering particular sectors.<sup>111</sup> Regardless of the divergence, these measures should be transparent, non-discriminatory,

108. Competition Law, 2018 (Law No. 23/2018) (Viet.).

109. Law on Radio Frequencies, 2009 (Law No. 42/2009) art. 16 § 1 (Viet.).

110. Ronald Coase posits that entities emerge in repose to the cost of the price mechanism. Indeed, an entity is established to manage market costs and deal with uncertainty. *See* R.H. Coase, *The Nature of the Firm*, 4 *ECONOMICA* 386, 390–92 (1937). Coase explains that regulatory mechanisms such as price control and quota programs can also highlight advantages of a bigger entity than the market exchange. *Id.* at 393. In Coase's analysis, if the cost of the price mechanism was high, economic agents would prefer to use alternatives (non-price mechanisms) to allocate resources. *See* Alex Robson, *The Legacy of Ronald Coase: Commercial Implications and Policy Consequences*, 30 *POLICY* 23, 24 (2014). This approach maintains that the relative efficiency of each mode determines which one is likely to be chosen by market participants. *See* Oliver E. Williamson, *The Economics of Antitrust: Transaction Cost Considerations*, 122 *UNIV. PA. L. REV.* 1439, 1442 (1974).

111. OECD, *NATIONAL TREATMENT OF FOREIGN-CONTROLLED ENTERPRISES* (2017), <https://perma.cc/5ZCB-RMBV>.

proportionate, and predictable.<sup>112</sup> Further, it is tempting to use national security interests to increase protectionism within the free market.<sup>113</sup>

### 1. Expanding national security

Of the six countries, Australia and Japan passed laws to strictly discipline foreign investment and ownership in the telecommunications industry. Accordingly, the regulatory framework is equipped with a national security test to prevent foreign investments that might pose security risks.

Analogously, in 2018, the United States enacted the Foreign Investment Risk Review Modernisation Act (FIRRMA) to extend the authority of the Committee on Foreign Investment in the United States (CFIUS) to block foreign investments that are not aligned with national security interests.<sup>114</sup> Section 1702 (b) (6) of FIRRMA stipulates that concerning national security risks, the President should assist allies and partners of the United States with employing similar procedures to supervise foreign investments.<sup>115</sup>

It seems the expanding scope of national security interests is being implicitly legitimized to protect local businesses from international competition. Indeed, foreign investments have a secondary importance. Similarly, in the *DISCO II Order*, the FCC employed a public interest analysis to evaluate whether a foreign telecommunications company could enter the U.S. market. National security, competition, spectrum availability, and eligibility requirements constitute the public interest formula.<sup>116</sup>

Further, in Section 1 of Executive Order 14083 (2022), the President underlines that although foreign investment brings prosperity and competitiveness, some can present risks to national security; therefore, foreign investment should be bound to the national security of the United States.<sup>117</sup> National security is tied to the broad concepts of critical infrastructure and technologies, enabling CFIUS to bar any foreign investment.<sup>118</sup> For instance, in the case of Oneweb's market access, the FCC insisted that the national security issue occurs in rare

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112. INV. DIV., OECD, GUIDELINES FOR RECIPIENT COUNTRY INVESTMENT POLICIES RELATING TO NATIONAL SECURITY 2 (2009) (recommending governments implement policies guided by the principles mentioned above).

113. Scott Lincicome & Inu Manak, *Protectionism or National Security? The Use and Abuse of Section 232*, 912 CATO INST. POL'Y ANALYSIS 6 (2021) (positing the Trump administration's use of national security legislation was for protectionist purposes rather than legitimate national security concerns); Pat Toomey, "No Trade Is Free" Review: A "Common Good" That Isn't, WALL ST. J. (Sept. 20, 2023, 5:54 PM).

114. J. Russell Blakey, *The Foreign Investment Risk Review Modernization Act: The Double-Edged Sword of U.S. Foreign Investment Regulations*, 53 LOY. L.A. L. REV. 981, 981–82 (2020).

115. Foreign Investment Risk Review Modernization Act, Pub. L. No. 115-232, Subtitle A, § 1702 (b)(6), 132 Stat. 1636, 2176 (2018).

116. See Fed. Comm'n's Comm'n, Amendment of the Commission's Regulatory Policies to Allow Non-U.S. Licensed Space Stations to Provide Domestic and International Satellite Service in the United States, First Order on Reconsideration, IB Docket No. 96-111, Doc. No. FCC 99-325 (Oct. 29, 1999).

117. Exec. Order No. 14083, 87 Fed. Reg. 57369 (Sept. 15, 2022).

118. *Id.*

circumstances, but it is still a matter of identification.<sup>119</sup> The FCC also develops a broader framework, public interest, to contextualise national security, competition, foreign policy, etc.<sup>120</sup>

*a. Regulatory frameworks with national security test*

In the same direction, Australia and Japan put into practice a national security test in the telecommunications industry.

*i. Australia*

Australia ranks number thirteen in the Index of Economic Freedom 2023 (hereinafter the Index). Its regulatory framework is transparent and effective, and the government's procedures rarely interfere with the market.<sup>121</sup> It seems that Australia's government favors competition in the satellite internet market because it increases consumer welfare and national interest. At the same time, the government is enthusiastic about foreign investments that can get past the national security test. This can also be seen in Part 1.2 of the Radiocommunications Act 1992, which maintains that spectrum management should comply with commercial, defence, and national security purposes.

Nevertheless, Australia brings into play multiple measures to protect the telecommunications industry. Foreign investments are predominantly disciplined by the Foreign Acquisitions and Takeovers Act 1975 (FATA) and the Foreign Acquisitions and Takeovers Fees Impositions Act 2015. Based on Section 81 of the FATA, the foreign investor must notify the Treasurer of a potential investment in certain businesses. In June 2023, the Treasurer released Australia's Foreign Investment Policy. In this policy, it is underlined that investments should not be contrary to the national interest, and the government reviews each foreign investment proposal to guarantee that the national interest is well secured.<sup>122</sup> For instance, in 2018, the Australian federal government decided to ban Huawei and ZTE from participating in 5G technology because there was a concern about their possible collaboration with the Chinese government and required security safeguards.<sup>123</sup> In such circumstances, a national security test is employed.<sup>124</sup> Thus, foreign persons who intend to invest or acquire more than ten percent of shares or

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119. See Fed. Commc'ns Comm'n, Petition for Declaratory Ruling to Modify the U.S. Market Access Grant for the OneWeb Ku-band and Ka-Band NGSO FSS System, Order and Declaratory Ruling, IBFS File Nos.: SAT-MPL-20200526-00062 and SAT-APL-20210112-00007, Doc. No. DA 22-970 (Sept. 16, 2022).

120. Laura B. Sherman, *A Fundamental Misunderstanding: FCC Implementation of U.S. WTO Commitments*, 61 FED. COMM'NS L. J. 395, 404 (2009).

121. HERITAGE FOUND., *supra* note 33, at 40–41.

122. DEP'T OF THE TREASURY, AUSTRALIA'S FOREIGN INVESTMENT POLICY 1 (June 20, 2023).

123. Tim Biggs & Jennifer Duke, *China's Huawei, ZTE Banned from 5G Network*, SYDNEY MORNING HERALD (Aug. 23, 2018, 11:16 AM) <https://perma.cc/TV8W-DR82>.

124. DEP'T OF THE TREASURY, *supra* note 122, at 7.

interests in the current satellite internet providers or establish satellite internet services should obtain the Treasurer's approval.<sup>125</sup>

In the case of competition, the government examines foreign investment proposals to ensure they will not bring about a dominant position in local or global markets.<sup>126</sup> Here, ACCC might get involved and independently study proposals to ensure they are consistent with Australia's competition policy.<sup>127</sup> In the Communications and Market Report 2021-22, the positive role of satellite services was accentuated by ACCC.<sup>128</sup> A government business enterprise, NBN Co., is a broadband access network,<sup>129</sup> in addition to Starlink<sup>130</sup> in the Australian satellite market. NBN Co. operates Sky Muster satellite to bring internet services to remote areas.<sup>131</sup> In 2021, SpaceX sent an official letter to ACCC, emphasizing that this technology does not threaten market competitiveness because its end users are dispersed across the country.<sup>132</sup> Despite this, Starlink has overtaken NBN Co. in the quality of services and forced the company to reconsider new approaches to business continuity.<sup>133</sup> The government is still keen on supporting and pouring money into NBN Co.<sup>134</sup> which allegedly demonstrates a protectionist policy in Australia.

## ii. Japan

Japan's economic freedom is ranked thirty-first on the Index, making this country moderately free. The regulatory framework is less bureaucratic.<sup>135</sup> However, some restrictive measures hamper foreign investments, particularly in the telecommunications industry. For example, given the frequency allocation, Japanese entities are prioritized.<sup>136</sup> In addition, in 2019, the Japanese parliament amended the Foreign Exchange and Foreign Trade Act (FEFTA), tightening

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125. *Id.* at 3.

126. *Australia's Foreign Investment Framework*, DEP'T OF THE TREASURY, <https://perma.cc/MQ53-ZLS8>.

127. *Compliance and Enforcement Policy and Priorities*, ACCC, <https://perma.cc/VX2B-SXL3> ("The ACCC exercises its enforcement powers independently, in the public interest, and with integrity and professionalism.").

128. ACCC, COMMUNICATIONS MARKET REPORT 2021-22 15 (Dec. 2022).

129. *Sky Muster Satellite Service Explained*, NBN CO., <https://perma.cc/8XHW-V5UZ>.

130. The limited number of providers does not prevent them from taking anticompetitive behaviors. *See, e.g.*, Tegan Jones, *ACMA Fires Warning Shot at Starlink for Breaching Advertising Rules*, SMARTCOMPANY (Sept. 20, 2023), <https://perma.cc/6D6A-YGFP> (reporting that in June 2023, it was revealed that SpaceX offered a huge discount (seventy-five percent) on hardware in rural areas of Australia); *see also* ACMA, INVESTIGATION REPORT FILE NO. ACMA2022/333 (Aug. 10, 2023). Although SpaceX was fined by ACMA on the grounds of noncompliance with advertisement rules, it demonstrates that Starlink seeks opportunities to outcompete its potential rivals.

131. S'HOLDER MINISTERS, STATEMENT OF EXPECTATIONS FOR NBN CO LIMITED (Dec. 19, 2022).

132. Email from R. Edward Price, Sr. Couns., SpaceX, to Steve Williams, Ass't. Dir. Trans. & Facilities, Access Infra. Div., ACCC (Nov. 19, 2021).

133. Nick Bonyhady & Lucas Baird, *NBN aims to match Elon Musk's Starlink but may have to write off \$620m*, AUSTRALIAN FIN REV. (July 6, 2023, 9:00 AM), <https://perma.cc/ULK8-KSSA>.

134. *Albanese Government Supports Rural and Regional Areas with Sky Muster Broadband Access*, SKY NEWS (June 21, 2023, 4:11 PM).

135. HERITAGE FOUND., *supra* note 33, at 192-93.

136. *When a License Will Not Be Granted*, MIC, <https://perma.cc/6L3N-VSDM>.

inward direct investment.<sup>137</sup> Based on Article 27 of the FEFTA, a foreign investor seeking to take over more than one percent of shares in designated industries must notify the Minister of Finance and the competent minister for the business about the business purpose, amount, timing, and other necessary information. In 2021, the Ministry of Finance published a list of companies to elaborate on the categories of businesses that require prior notification. Accordingly, businesses are divided into three categories.<sup>138</sup> Category three includes core businesses tied to national security,<sup>139</sup> and potential foreign investors must issue prior notice and can own up to one percent of the shares of these companies. In this respect, KDDI, the business partner of SpaceX in Japan,<sup>140</sup> falls into category three.<sup>141</sup>

*b. Regulatory framework without national security test*

Unlike Australia and Japan, Bangladesh, Indonesia, Malaysia, and Vietnam lack a transparent and explicit national security test to hinder foreign investments in businesses associated with the telecommunications industry. Despite this, these regulatory frameworks have the power to use the ambiguity of laws to prevent or terminate any investments or deals that might not be consistent with national security.<sup>142</sup>

*i. Bangladesh*

Bangladesh's world rank on the Index is 123 in economic freedom, indicating that the economy is mostly unfree. The lack of reliable infrastructure and multiple regulatory obstacles make this country one of the most inefficient systems in the world.<sup>143</sup> Given the telecommunications sector, BTRC is working on a new International Long-Distance Telecommunications Services (IDLTS), dubbed National Telecom Policy, to ease foreign investment and remove investment caps in the telecom industry. It is supposed that the transition period will be commenced in 2028.<sup>144</sup>

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137. *Japan Revises Rules on Foreign Investment*, U.N. CONF. ON TRADE & DEV. INV. POL'Y HUB (May 7, 2020), <https://perma.cc/46RX-UC8Q>.

138. *List of classifications of listed companies*, MINISTRY OF FIN. (2021), <https://perma.cc/UBX9-BAMB>.

139. *Update of the List of Classifications of Listed Companies Regarding the Prior-Notification Requirements on Inward Direct Investment*, MINISTRY OF FIN. (Nov. 2, 2021).

140. *KDDI to Offer SpaceX's Starlink to Enterprise and Civil Government Customers*, KDDI (Oct. 12, 2022), <https://perma.cc/8AKM-ERMP>; Email from Matt Botwin, Dir., Global Satellite Gov. Affs., SpaceX, to Koichi Katagiri, Div. Dir., Fixed & Satellite Radio Commc'n, MIC (Dec. 6, 2019) (explaining it is required to establish a Japanese company, register it as a telecommunications service provider, and then apply for relevant licenses).

141. See MINISTRY OF FIN., *List of Classifications of Listed Companies*, *supra* note 138.

142. MATTHEW P. GOODMAN, MATTHEW REYNOLDS, & JULIANNE FITTIPALDI, CTR. FOR STRATEGIC & INT'L STUD., *ECONOMIC SECURITY IN EMERGING MARKETS: A LOOK AT INDIA, VIETNAM, AND INDONESIA* 5 (May 17, 2022).

143. HERITAGE FOUND., *supra* note 33, at 50–51.

144. Anaet Shawon, *ILDTS Policy to See Drastic Changes*, DAILY SUN (Feb. 9, 2022, 3:54 AM), <https://perma.cc/A8EX-TXZJ>.



In 2018, BTRC put a GEO satellite, Bangabandhu-1, into orbit.<sup>145</sup> The government has considered launching a LEO satellite in the near future.<sup>146</sup> Bangabandhu-1 has multiple functions, including broadband service primarily in remote areas.<sup>147</sup> The engagement of a regulatory body in developing and launching satellites demonstrates the state's desire to dominate the market, which might be in contrast with competition.

Notwithstanding this, BTRC issued the Regulatory and Licensing Guidelines for Satellite Operators 2022, in which, in addition to domestic investors, foreign entities are authorized to conduct satellite broadband services in Bangladesh (Section 6). It is specified that BTRC has a right to revoke any radio frequency assignment by virtue of national security or interest (Section 7.12).

Regarding competition, Section 13 of the Guidelines stipulates that unfair conduct that distorts the status quo in the national telecommunications industry, such as increasing competitors' business, operational, or technical costs, is prohibited. This involves BTRC controlling pricing structures. For example, not only does BTRC examine technical aspects of Starlink's satellite internet, but it also aims to fix the prices with the company.<sup>148</sup>

Section 6 of BTRC Significant Market Power Regulations stipulates that certain acts must be permitted by the Commission. Accordingly, an activity that is likely to result in the reduction of competition in the telecommunications market must be brought to the Commission for examination and permission.<sup>149</sup> The Commission might allow the activity on grounds of the national interest and "the specific welfare of the consumers, or specific economic and social welfare," provided that such a permission does not weaken other operators' rights and is consistent with governmental policies and procedures.<sup>150</sup>

## ii. Indonesia

With a world rank of sixty on the Index, Indonesia benefits from a moderately free economic system. The licensing system is relatively simple.<sup>151</sup> In Indonesia,

145. Deyana Goh, *Bangabandhu-1 Successfully Launched via SpaceX's Falcon 9*, SPACETECHASIA (May 13, 2018), <https://perma.cc/2NP4-PNTW>. Bangladesh Satellite Company Limited (BSCL), formerly known as Bangladesh Communications Satellite Company Limited (BCSCL), is a state-owned enterprise specialising in the satellite operation. *About Us*, BSCL, <https://perma.cc/3RHC-8MCD>; BSCL, SKYBROKERS, <https://perma.cc/7JHZ-GT4R>.

146. Ali Asif Shawon, *Bangabandhu-2: How Will the Second Satellite Benefit Bangladesh?*, DHAKA TRIBUNE (Mar. 5, 2022, 10:30 PM), <https://perma.cc/JUD8-6CCE>.

147. *See Remote Islands to Get High-Speed Internet via Bangabandhu Satellite*, FIN. EXPRESS (Aug. 8, 2020), <https://perma.cc/H5QK-HAT3>.

148. *See Elon Musk's Starlink to Launch Satellite Internet Service in Bangladesh*, DHAKA TRIBUNE (July 26, 2023), <https://perma.cc/69N7-S24T>. The CEO of the second-largest mobile operator, Mahtab Uddin Ahmed, says that to avoid severe competition, Starlink should only provide satellite internet in uncovered areas. Mahmudul Hasan, *SpaceX Wants to Launch Satellite Internet Service in Bangladesh*, DAILY STAR (July 27, 2023, 3:17 PM), <https://perma.cc/NG9B-66RK>.

149. Bangladesh Telecommunication Regulatory Commission (Significant Market Power) Regulations, 2018 (S.R.O. No. 315-Law/2018) art. 6 (Bangl.).

150. *Id.*

151. HERITAGE FOUND, *supra* note 33, at 178–79.

a foreign entity is unlikely to provide customers with direct internet services. Subsequently, the foreign entity should commence a partnership or collaboration with local entities to sell its services. Indonesia used to cap foreign investment at sixty-seven percent.<sup>152</sup> However, in 2021, the government liberated the telecommunications market, and foreign investors can own any percentage of shares. Nevertheless, there are exceptions to this.<sup>153</sup> According to Presidential Regulation No 10 Year 2021,<sup>154</sup> a positive list of businesses was issued. This list elaborates on business sectors that are restricted or conditioned for foreign investors.<sup>155</sup> Business fields open to foreign investors have no ownership cap and a foreign entity can establish its business with 100 percent ownership. It seems that the telecommunications sector falls into this category.<sup>156</sup> While a foreign telecommunications company can own its subsidiaries in Indonesia, its business is addressed by another restriction which is a local partner.<sup>157</sup> Consequently, foreign investments in the telecommunications sector are subject to having a mandatory local partnership such as joint venture, operational cooperation, profit sharing, subcontracting, or distribution with a domestic telecom operator and obtaining required licenses.<sup>158</sup>

Indonesia has tended to execute protectionist policies, but since 2014, the government has loosened restrictions and opened various sectors to foreign investments.<sup>159</sup> Indonesia is less likely to hamper an investment or partnership due to national security concerns.<sup>160</sup> For instance, despite Western countries' hesitance to work with Huawei, Indonesia indulges in multiple agreements with this company.<sup>161</sup> Indonesia seeks to develop its capacity for satellite constellation as well as benefit from satellite internet supplied by foreign entities.<sup>162</sup>

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152. *Foreign Investment in Indonesia's Consumer Sector: Many Distribution, Retail and Logistics Businesses Liberalised*, HERBERT SMITH FREEHILLS (March 18, 2021), <https://perma.cc/XS5T-MLJM>.

153. Ayman Falak Medina, *Indonesia's Positive Investment List: Sectors Open to Foreign Businesses*, ASEAN BRIEFING (Apr. 25, 2023), <https://perma.cc/UG78-BPUK>.

154. MINISTRY OF INVESTMENT & INDONESIA INVESTMENT COORDINATING BOARD, INDONESIA INVESTMENT GUIDEBOOK, 69 (2022), <https://perma.cc/T2SE-QH5F>. Accordingly, sectors are primarily divided into closed (such as gambling and manufacturing of chemical weapons) and open to foreign investments. The latter consists of prioritised businesses, business fields with specific requirements, and sectors that are open to foreign investment but the investor must have a local partner, and businesses with no limitations. *Id.* at 69-72; Medina, *supra* note 153.

155. See DELOITTE, 2023 INVESTMENT WINDOW INTO INDONESIA (IWI) 54 (2022).

156. Medina, *supra* note 153.

157. Gabriel Budi Sutrisno, *Starlink Must Work with Local Partner to Enter Indonesia*, Ministry Says, TECH IN ASIA (Aug. 28, 2023).

158. See *Indonesia Releasing "Positive List" of Investment*, UNCTAD INV. POL'Y HUB (Mar. 4, 2021), <https://perma.cc/45N7-52YT>.

159. Herdaru Purnomo & Novrida Manurung, *Jokowi to Ease Foreign-Ownership Ban on Indonesia Apartments*, BLOOMBERG (July 4, 2014, 12:40 AM); Shannon Hayden, *With a Dozen Economic Reform Packages under His Belt, Indonesia's Jokowi Settles In*, CTR. FOR STRATEGIC & INT'L STUD. (May 26, 2016), <https://perma.cc/U5RF-V8BG>.

160. GOODMAN ET. AL., *supra* note 142, at 6-7.

161. John McBeth, *Why Indonesia Isn't Scared of Huawei*, ASIA TIMES (Aug. 1, 2022), <https://perma.cc/KY2M-R479>.

162. For example, in June 2023, SpaceX put an Indonesian satellite, SATTRIA-1, into orbit. Mike Wall, *SpaceX Launches SATTRIA-1 Communications Satellite for Indonesia, Lands Rocket at Sea*, SPACE.COM (June 19, 2023), <https://perma.cc/5NE6-2HYA>.

Given the market competitiveness in internet services, Article 4 of the Regulation on Indonesian Telecommunications Regulatory Body 2018 states that BRTI has a supervisory role in “operational performance and business competition of telecommunications network and service operations. . .”<sup>163</sup> Nonetheless, KPPU is legitimized to investigate and combat unfair and monopolistic behaviors in the market.<sup>164</sup> Hence, it seems that KPPU has an ex-post function and gets involved after anticompetitive conduct was committed by an ISP.

### *iii. Malaysia*

Malaysia’s economic freedom is ranked forty-second in the world. The country has shortened the time for getting required licenses and made the system more transparent and efficient.<sup>165</sup> Malaysia has no specific law on foreign investment.<sup>166</sup> Thus, reviewing other relevant regulations impacting foreign investment in the telecom industry is necessary. Malaysia is less prone to weaponize national security against foreign companies, preventing them from doing business in its territory.<sup>167</sup> For example, in the case of Huawei’s 5G technology deployment, Malaysia’s Communications Minister stated that this country benefits from a free market, and local companies can opt for their business partners.<sup>168</sup>

### *iv. Vietnam*

Vietnam has a moderately free economy; its world rank is seventy-two. However, the cost of establishing a business is relatively high.<sup>169</sup> Moreover, the regulatory framework seeks to favor local companies in the telecommunication industry. The Vietnamese government gives enormous weight to the ICT industry in increasing socio-economic growth.<sup>170</sup>

Clause 1 of Article 6 of the Law on Investment 2014<sup>171</sup> stipulates that “[c]onditional business lines are the business lines in which the investment must satisfy certain conditions for reasons of national defence and security, social order and

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163. Regulation on Indonesian Telecommunications Regulatory Body, 2018 (Reg. No. 15/2018) art. 4 (Indon.).

164. Law Concerning the Prohibition of Monopolistic Practices and Unfair Business Competition, art 36.

165. HERITAGE FOUND., *supra* note 33, at 234–35.

166. 2023 Investment Climate Statements: Malaysia, U.S. DEP’T OF STATE (2023), <https://perma.cc/L85N-N37S>.

167. *GT Voice: US Has No Jurisdiction over Malaysia’s Economic Security*, GLOBAL TIMES (May 3, 2023, 11:41 PM), <https://perma.cc/LEL2-UWTX>.

168. Anisah Shukry, *Malaysia Stays Open to Chinese Firms in 5G Network Rollout*, BLOOMBERG (June 2, 2023, 12:07 AM).

169. HERITAGE FOUND., *supra* note 33, at 388–89.

170. In 2022, the share of three major network operators—VNPT-Vinaphone, Viettel, and Mobifone—accounted for ninety-five percent. *Vietnam – Information and Communication Technologies*, INT’L TRADE ADMIN. (Dec. 15, 2022), <https://perma.cc/CW8B-K6CJ>.

171. Law on Investment, 2014 (Law No. 67/2014) (Viet.).

security, social ethics, or public health.” Based on Article 17 of Decree 2021,<sup>172</sup> foreign investments are conditioned in some businesses, meaning foreign investors should conform to specified requirements. Appendix 1 of the Law includes a list of companies with restricted market access in which postal and telecommunications services are mentioned. According to Clause 3 of Article 9 of Law on Investment 2014 and Article 17 of Decree 2021, restricted businesses are subject to extra conditions, such as an investment cap determined by other applicable laws and regulations.<sup>173</sup>

In the case of telecommunication-related investment, the scope of this industry should be elaborated. Based on Article 3-1 of the Law on Telecommunications 2009,<sup>174</sup> telecommunications are “the sending, transmission, reception and processing of signs, signals, data, writings, images, sounds or information of any other nature by cable, radio, optical and other electromagnetic devices.”

Article 3-14 also defines the Internet “as the global information system using the Internet protocol and resources to provide different services and applications to telecommunications service users.” In 2001, Vietnam eased the private sector’s involvement in internet services.<sup>175</sup> However, foreign companies such as SpaceX are subject to additional measures on market access.<sup>176</sup>

According to clause 2 of Article 4 of Decree 2011,<sup>177</sup> foreign investors who aim to provide telecommunication services without network infrastructure should conduct a joint venture or a contractual cooperation with Vietnamese companies. Foreign investors are also required to establish a joint venture or contractual cooperation with Vietnamese telecom enterprises if they wish to provide these services with their own network infrastructure.

Irrespective of countries’ economic freedom ranks, all the regulatory frameworks seek to control foreign investments and instrumentalize national security. Given the fact that each country has a degree of national security concern, it seems that the more transparent national security is, the more economic freedom can be assured. In this sense, if the national security test is clear and certain, the investor could consider it *ex-ante*. Otherwise, an ambiguous notion of national security can strengthen anticompetitive behaviors and increase rent-seeking activities in the market.

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172. Decree on Elaboration of Some Articles of the Law on Investment, 2021 (Decree No. 31/2021) (Viet.).

173. Lê Trung Quốc Đạt, *Regulations on Business Lines with Prohibited and Restricted Market Access in Vietnam*, LAWNET (May 27, 2023, 6:07 PM), <https://perma.cc/RHF3-V9UM>.

174. Law on Telecommunications, 2009 (Law No. 41/2009) (Viet.).

175. Roy Chun Lee, *Telecommunications in Vietnam*, in *THE IMPACTS AND BENEFITS OF STRUCTURAL REFORMS IN TRANSPORT, ENERGY AND TELECOMMUNICATIONS SECTORS IN APEC ECONOMICS* 415, 416–17 (Christopher Findlay ed., 2011).

176. Decree of the Government on the Management, Provision, and Use of Internet Services, 2001 (Decree No. 55/2001) (Viet.).

177. *Decree of Detailing and Guiding the Implementation of a Number of Articles of the Law on Telecommunications*, 2011 (Decree No. 25/2011) (Viet.).

### *B. Protecting Competition*

Preserving competition in the telecommunications market is another responsibility of a robust regulatory framework. Any opportunity to monopolize the industry at any stage might bedevil rent-seeking, which can cause adverse effects on international trade and increase transaction costs.<sup>178</sup> A first step could be the simplification of the licensing system to reduce economic activities allocated to rent-seeking and curb welfare costs subsequently.<sup>179</sup> The regulatory framework also should be responsive and agile to face dynamism in the market and new challenges.

#### 1. Transaction costs in LEO satellite constellations

Not all countries can launch satellites, nor can they pour an enormous amount of money into this industry.<sup>180</sup> However, as the Center for Strategic and International Studies (CSIS) underlines, each country's regulatory framework can influence pioneer companies' market share and satellite internet coverage worldwide.<sup>181</sup> Similarly, in an official letter to ACCC, SpaceX maintained that it is technically impossible to activate satellite internet in all jurisdictions at once; therefore, providers are compelled to prioritize territories and countries with fewer regulatory burdens.<sup>182</sup> The regulatory framework can also affect a satellite internet provider's decision on vertical integration to manage the cost of separate transactions. Although this decision is reasonable, the satellite internet market might be exposed to more barriers to entry and limited choices.

##### *a. LEO satellite launch projects*

In the rocket-launch market, uncertainty is considerable; therefore, economic agents might tend to create a vertical business in which constellations and launches become integrated. Integrating the launch phase with reusable rockets and satellite constellations into one entity empowers the owner to take advantage of economies of scale.<sup>183</sup> The reusability of the spacecraft can decrease the cost of multiple launches. Nonetheless, such a combination or vertical conduct might strengthen market power which in turn raises the entry price and reduces competition in concentrated markets like LEO satellite constellations and launch. To restrict the hypothesis, it is considered that LEO satellite internet is the only option and satellite operators aim to provide the internet globally. In this case, the market can be split into two stages. Stage One is a satellite launch, and Stage Two is a satellite constellation. Here, the salient plans of the LEO satellite

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178. Krueger, *supra* note 29, at 290.

179. *Id.* at 301–02.

180. See Warren Buffet, *Space: Who's in the Airlock without a Spacesuit?*, 10 LONDON ECONS. SPACE IN FOCUS 1, 3-4 (2023).

181. YOUNG & THADANI, *supra* note 7, at 16.

182. Email from Price, *supra* note 132.

183. Enrique Dans, *With Starlink, Elon Musk Is Once Again Showing How to Make Economies of Scale Work*, FORBES (Apr. 6, 2021, 4:54 AM).

launch (Stage One) are explained to determine which company might have a superior position.

- i. ArianeGroup: Ariane 6 is a vehicle developed by ArianeGroup to undertake LEO satellite launches.<sup>184</sup> This rocket is set to be operated in 2024.<sup>185</sup> Ariane 6 is capable of carrying up to 20,000 kilograms into LEO. Despite this, Ariane 6 is supposed to be something other than a reusable rocket.<sup>186</sup> Project Kuiper inked an agreement with Arianespace for up to eighty-three launches in five years.<sup>187</sup>
- ii. Blue Origin: in 2022, was chosen by Project Kuiper to put its satellites into orbit. Parties agreed on twelve launches with an option for three additional launches. Blue Origin manufactured a reusable rocket, New Glenn, with the ability to provide twenty-five launch missions at the first stage.<sup>188</sup> This rocket has yet to be operated.<sup>189</sup>
- iii. Roscosmos: is a Russian state corporation that works on various strands of the Soyuz rocket for launch operations into LEO. However, following the invasion of Ukraine, major satellite internet companies are less inclined to collaborate with Roscosmos.<sup>190</sup> For instance, in 2022, OneWeb pulled out of a launch agreement.<sup>191</sup>
- iv. New Space India Limited: is a state-owned enterprise established by the Indian government to administer various services associated with space.<sup>192</sup> With a range of rockets, this company intends to expand its business and lower the cost of satellite launches for commercial use.<sup>193</sup> In March 2023, the company successfully put thirty-six satellites of OneWeb into LEO.<sup>194</sup>

184. *Ariane 6*, ARIANESPACE, <https://perma.cc/U7AL-5Z4X>.

185. Colleen E. Anderson, *Goodbye to Ariane 5*, NAT'L AIR & SPACE MUSEUM (July 11, 2023), <https://perma.cc/3QH6-RU2H>.

186. Andrew Jones, *Europe Won't Have Reusable Rockets for Another Decade: Report*, SPACE.COM (May 4, 2023), <https://perma.cc/MVW9-YR7S>.

187. *Amazon Secures up to 83 Launches from Arianespace, Blue Origin, and United Launch Alliance for Project Kuiper*, AMAZON (Apr. 5, 2022), <https://perma.cc/5MFS-3L4R>.

188. *Amazon Selects Blue Origin's New Glenn for up to 27 Project Kuiper Constellation Launches*, BLUE ORIGIN (Apr. 5, 2022), <https://perma.cc/5HTS-3AZH>.

189. Micah Maidenberg, *Jeff Bezos' Blue Origin Plots Launch of Its Mega Rocket. Next Year. Maybe.*, WALL ST. J. (Aug. 9, 2023, 5:30 AM). The estimated price of each launch via New Glenn would be \$68 million. Michael Sheetz, *Amazon Signs Massive Rocket Deal with 3 Firms, Including Bezos' Blue Origin, to Launch Internet Satellites*, CNBC (Apr. 5, 2022, 7:00 AM), <https://perma.cc/U5G2-TF56>.

190. FLORIAN VIDAL, FRENCH INST. OF INT'L RELS., *RUSSIA'S SPACE POLICY: THE PATH OF DECLINE?* 32 (Jan. 2021).

191. Jason Rainbow, *OneWeb Leaves Baikonur Cosmodrome after Roscosmos Ultimatum*, SPACENEWS (Mar. 2, 2022), <https://perma.cc/SNG6-2FQR>.

192. *About Us*, NEWSPACE LTD.

193. *Launch Services (SSLV, PSLV, GSLV and GSLV MK-III)*, NEWSPACE LTD.

194. Mike Wall, *Indian Rocket Launches Final 36 Satellites for OneWeb's Broadband Constellation*, SPACE.COM (Mar. 25, 2023), <https://perma.cc/N3KM-RW5U>.



- v. Rocket Lab: designed a mega constellation deployment rocket, Neutron, capable of carrying out 13,000 kilograms to LEO. This reusable rocket is planned to fly by 2024.<sup>195</sup> The company considers the lower price for each launch to rival Falcon 9.<sup>196</sup>
- vi. SpaceX: SpaceX is equipped with a reusable vehicle, Falcon 9,<sup>197</sup> that enables the company to use its facilities to launch satellites.<sup>198</sup> Falcon 9 can carry 22,800 kilograms per launch into LEO.<sup>199</sup> In response to the rise of new rivals, SpaceX reduced the cost of satellite launches, making it harder for other companies to compete.<sup>200</sup> In addition, SpaceX endeavors to push the boundaries and reach 100 orbital flights, compared with the sixty-one missions in 2022.<sup>201</sup>

SpaceX is the only option that converges the launch facility with satellite internet. Although this advantage enables an entity to deploy mega satellite constellations and retain a significant portion of the global market, different regulatory and licensing systems might slow down its pace. However, the lack of consistency between various regulatory frameworks incentivises the market power to deprioritize sophisticated jurisdictions. In other words, if the regulatory framework can abet the market power in keeping the rivals out of the market at a lower cost, the value of obtaining a monopoly position will rise,<sup>202</sup> and this jurisdiction will be prioritized. Hence, this might exacerbate the internet access gap and encourage investments to retain market power. Indeed, market power might also lead to discriminatory conduct at Stage One, increasing rivals' costs.<sup>203</sup> This action is in line with maintaining the position in the market with an inelastic price of demand.

Stage Two has yet to be monopolized, meaning that other satellite operators can compete with market power in various territories. In this case, demands would be price elastic due to multiple substitutions. However, potential entrants into Stage Two would be discouraged if the number of firms for negotiations at

195. Joey Roulette, *Rocket Lab to Fire up First Tests of New Engine next Year – CEO*, REUTERS (Sept. 30, 2022, 12:08 PM).

196. Michael Sheetz, *Rocket Lab Targets \$50 Million Launch Price for Neutron Rocket to Challenge SpaceX's Falcon 9*, CNBC (Mar. 24, 2023, 3:57 PM), <https://perma.cc/2TD8-RKEC>.

197. "Reusability allows SpaceX to refly the most expensive parts of the rocket, which in turn drives down the cost of space access." *Falcon 9*, SPACEX, <https://perma.cc/PK28-7DTJ>.

198. Maidenberg, *Elon Musk's SpaceX Now Has a "De Facto" Monopoly on Rocket Launches*, *supra* note 33.

199. SPACEX, *supra* note 197.

200. Alex Travelli, *The Surprising Striver in the World's Space Business*, N.Y. TIMES (July 4, 2023).

201. Micah Maidenberg, *SpaceX Aims to Increase Launches as Rivals Prep New Rockets*, WALL ST. J. (Jan. 8, 2023, 7:00 AM).

202. Richard A. Posner, *The Social Costs of Monopoly and Regulation*, 83 J. POL. ECON. 807, 824 (1975).

203. Timothy J. Brennan, *Vertical Mergers, the Coase Theorem, and the Burden of Proof*, 16 J. COMPETITION L. & ECON. 488, 503 (2020).

Stage One was limited.<sup>204</sup> This limitation tends to increase transaction costs and enable the vertical firm to prevail at Stage Two without denying other firms' entrance option.<sup>205</sup> The availability of Stage Two, even arguably, can be a strong position to legitimize the integration, but monopolistic consequences which eventually influence customers in areas with no reliable internet sources cannot be neglected. Hence, it seems that severing Stages One and Two fosters competition.<sup>206</sup>

As Oliver Williamson contended, decisions to integrate predominantly flow from transaction costs rather than technological determinism.<sup>207</sup> Although vertical integration might result in lower transaction costs for the merged firm<sup>208</sup> and create social benefits more prominent than the costs of monopolization,<sup>209</sup> the possibility of monopolistic side effects such as barriers to entry, gaps in internet access, etc. should not be ruled out.<sup>210</sup> The regulatory framework should include measures to increase uncertainty and the cost of retaining the monopoly.<sup>211</sup> Subsequently, social costs arising from rent-seeking activities would tend to decline.<sup>212</sup>

### *b. Regulatory framework possible response*

Given that in LEO satellite constellations, transaction costs are not restricted to jurisdiction and can influence other territories, it is worth examining whether international space treaties address competition in commercial space activities.<sup>213</sup> Article VI of the Outer Space Treaty stipulates that "States Parties to the Treaty shall bear international responsibility for national activities in outer space. . . and for assuring that national activities are carried out in conformity with the provisions set forth in the present Treaty." Broadly speaking, national activities include the commercial use of space by the private sector within the state's territorial jurisdiction.<sup>214</sup>

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204. Williamson, *supra* note 110, at 1462.

205. Richard A. Posner, *The Chicago School of Antitrust Analysis*, 127 UNIV. PA. L. REV. 925, 936–37 (1979).

206. *But see* Matthew M. Liskowycz, *SpaceX: Breaking the Barrier to the Space Launch Vehicle Industry* 62–63 (Dec. 22, 2016) (M.A. Thesis, Air Force Institute of Technology).

207. OLIVER E. WILLIAMSON, *THE ECONOMIC INSTITUTIONS OF CAPITALISM* 87 (1985).

208. For instance, the cost of launching satellites was, at one point, approximately \$200 million. *Space: Investing in the Final Frontier*, MORGAN STANLEY (July 24, 2020), <https://perma.cc/CDM4-JBYG>. SpaceX's launch project (launching satellites through a reusable rocket, Falcon 9) decreased the cost to \$67 million in 2022. Maidenberg, *supra* note 33.

209. Posner, *supra* note 202, at 811.

210. *Id.* at 937.

211. Jadow, *supra* note 30, at 84.

212. *Id.* at 83.

213. Here, the Outer Space Treaty is considered because it was either ratified or signed by all the countries in this study. *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies*, U.S. DEP'T OF STATE (Jan. 20, 2017), <https://perma.cc/4MVD-EXTY>.

214. Tara Brown, *Ukraine Symposium – The Risk of Commercial Actors in Outer Space Drawing States into Armed Conflict*, U.S. MIL. ACAD. LIEBER INST. (July 8, 2022), <https://perma.cc/F2S3-ENY4>.

International responsibility is associated with the state duty of authorization and constant supervision of the private sector's space activities.<sup>215</sup> In response, a regulatory framework is authorized to undertake supervising and licensing of LEO satellite constellations.<sup>216</sup> Subsequently, subject to Article VI, while the market competitiveness and monopolization fall into the state's discretion, the private entity's anticompetitive behavior is unlikely attributable to a state.<sup>217</sup> Regardless of other states' approaches, a state is eligible to determine what activities bear responsibility, which require licenses, and which should be controlled.<sup>218</sup>

Based on ITU's recommendations, member states increasingly take into account market power in international telecommunication services.<sup>219</sup> ITU reiterates that minimum intervention and proportionality principles should be applied in dealing with market dominance.<sup>220</sup> Barriers to entry, economies of scale, and vertical integration are among the ITU's components in identifying market power.<sup>221</sup> As already indicated, among the countries in this study, Australia, Indonesia, Japan, and Malaysia enacted laws addressing satellite launches. While the laws do not identify market competitiveness in LEO satellite launches, the concepts of national security and interest are broadly used and can include competition and state responsibility.

In this case, these terms can be employed to impose high costs on satellite launch operators that aim to restrict Stage One or monopolize Stage Two of the LEO market. For instance, Article 10 of the Law on Space Activities points out that space activities, including satellite launches, should be aligned with the national interests of Indonesia.<sup>222</sup> In Malaysia, the launch license might be revoked by the Space Board on the grounds of national security or public interest.<sup>223</sup> Similarly, in Australia, the Minister is authorized to set the rules that keep the satellite launch in line with national interest.<sup>224</sup>

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215. SERGIO MARCHISIO, NATIONAL JURISDICTION FOR REGULATING SPACE ACTIVITIES OF GOVERNMENTAL AND NON-GOVERNMENTAL ENTITIES 4 (Nov. 16, 2010).

216. Brown, *supra* note 214.

217. "States have developed and implemented their national laws in a variety of ways based on their policy considerations." James Gutzman, *State Responsibility for Non-State Actors in Times of War: Article VI of the Outer Space Treaty and the Law of Neutrality* 44 (2017) (M.A. Thesis, McGill University).

218. Frans G. von Der Dunk, *The Origins of Authorisation: Article VI of the Outer Space Treaty and International Space Law*, in NATIONAL SPACE LEGISLATION IN EUROPE: ISSUES OF AUTHORISATION OF PRIVATE SPACE ACTIVITIES IN THE LIGHT OF DEVELOPMENTS IN EUROPEAN SPACE COOPERATION 3, 23 (Frans G. von der Dunk ed., 2011).

219. ITU, Recommendation D.261, *Principles for Market Definition and Identification of Operators with Significant Market Power*, at iv (2016).

220. *Id.*

221. *Id.* at 2. Nonetheless, ITU's recommendations are built on substitutability in the market. *Id.* at 1. In this respect, the satellite internet provider's decision to integrate vertically can be exempted from further examination, when other types of internet sources are available.

222. Law on Space Activities, art. 10.

223. Malaysian Space Board Act, § 31.

224. Space (Launches and Returns) Act 2018, § 46U.

It can be seen that the Outer Space Treaty fails to bring a comprehensive framework for commercial and non-commercial activities in space. Indeed, general principles extracted from international space law can hardly be stretched to cope with technological changes like LEO satellite constellations.<sup>225</sup> Despite this, due to the upcoming proliferation of LEO satellite constellations, it is reasonable to change the conventional framework of national space laws and incorporate competition. A robust regulatory framework would also constrain anticompetitive behaviors in the launch phase. By that time, a robust regulatory framework should be apt to raise the expected cost of monopolization, at least at Stage Two.

## 2. Restraints on rent-seeking activities

Rent-seeking does not solely emerge in developing economies, but a market-oriented system might experience a distinct level of rent-seeking. In such a system, people enter a contest for the rent.<sup>226</sup> Those systems that benefit a few and hurt the masses are the central examples of rent-seeking provocation.<sup>227</sup>

### *a. First-mover advantages and spectrum management*

It is revealed that the LEO constellation market requires a high amount of capital and is composed of a limited number of players that compete for limited spectrum resources.<sup>228</sup> In this sense, the first move appears essential. This contest entails a robust regulatory system in which licensing should be fast and efficient. Due to limited resources, entities might be incentivized to build systems to chase more spectrum, irrespective of the efficiency of their systems. Thus, a robust regulatory framework should employ an efficient solution to assign radio frequencies to the most productive operators.

### *i. Spectrum auctions*

As elaborated earlier, regulatory bodies require the satellite internet provider to obtain relevant licenses in the spectrum assignment. If the licenses are supposed to be allocated by government officials, rent-seeking appears in the form of administrative costs and the entity's expected values.<sup>229</sup>

Auctions can curb rent-seeking costs and substantially allocate radio frequencies to the most productive entities.<sup>230</sup> Posner favors the auction, contending that "[t]he auction would substitute a transfer payment for a real cost, the expenditures

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225. SVANTESSON ET AL., *supra* note 26, at 49–50.

226. Gordon Tullock postulates that "[t]he most desirable rent-seeking outcome is that in which rent-seeking costs are zero and in which rent-seeking results in wealth transfers rather than dissipation of wealth." TULLOCK, *supra* note 30, at 66.

227. *Id.* at 28–29.

228. Zhuochen Xie, Lu Ma, & Xuwen Liang, *Unlicensed Spectrum Sharing Game Between LEO Satellites and Terrestrial Cognitive Radio Networks*, 25 CHINESE J. AERONAUTICS 605, 605 (2012).

229. Krueger, *supra* note 29, at 291–92.

230. Thomas W. Hazlett, Roberto E. Muñoz, & Diego B. Avanzini, *What Really Matters in Spectrum Allocation Design*, 10 NW. J. TECH. & INTELL. PROP. 93, 93 (2012).

on the hearing process by competing applicants.<sup>231</sup> An auction, however, cannot be the sole method to assign spectrum.<sup>232</sup> Hence, it is more reasonable to authorize the regulatory body to decide which bands should be auctioned.<sup>233</sup> In this respect, rent-seeking activities might appear as endeavors to exclude bands from an auction. Thus, the regulatory framework should take precaution measures to restrict other options to transparent and pre-determined circumstances, and courts should have the right to invalidate any corrupted assignment.

Among the countries in this study, in Australia, Section 39 of the Radiocommunications Act 1992 permits ACMA to assign spectrum through an auction.<sup>234</sup> Japan considers auctions as an efficient instrument to assign frequencies.<sup>235</sup> In Malaysia, MCMC has the merit of setting procedures for spectrum assignment. In this respect, it can be prescribed that radio frequencies should be allocated via an auction.<sup>236</sup> Based on the Prime Minister's Decision No. 16, Vietnam considers auctions a viable mechanism to allocate radio frequencies.<sup>237</sup>

### *ii. Sunsetting protection*

In response to new challenges, in June 2023, the United States amended Section 25.261 of the Commission's Rules to foster competition and weaken the first-mover position.

Ten years after the first authorization or grant of market access in a processing round, the systems approved in that processing round will no longer be required to protect earlier-rounds systems, and instead will be required to share spectrum with earlier-round systems under paragraph (c) of this section.<sup>238</sup>

231. Posner, *supra* note 202, at 824–25.

232. Parag Kar, *Satellite Spectrum – Auction or Not, and Why?*, MEDIUM (June 14, 2022), <https://perma.cc/NS6G-AD82>.

233. Minsoo Park, Sang-Woo Lee, & Yong-Jae Choi, *Does Spectrum Auctioning Harm Consumers? Lessons from 3G Licensing*, 23 INFO. ECON. & POL'Y 118, 125 (2011).

234. “In indicating the procedures to be followed for issuing spectrum licences, the plan may, for example, indicate whether the licences are to be allocated:

- (a) by auction; or
- (b) by tender; or
- (c) by allocation for a predetermined price or a negotiated price; or
- (d) by direct allocation; or
- (e) by a combination of any or all of the following:
  - (i) auction;
  - (ii) tender;
  - (iii) allocation for a predetermined price or a negotiated price;
  - (iv) direct allocation.”

Radiocommunications Act 1992 (Act No. 174/1992) § 39 (Austl.).

235. Juan Pedro Tomás, *Japan Plans 5G Spectrum Auction for Early 2026: Report*, RCR WIRELESS NEWS (Feb. 1, 2023), <https://perma.cc/88RB-WB8P>.

236. MCMC, SPECTRUM PLAN 2022 191 (2022).

237. Decision on Stipulating the Auction and Transfer of the Right to Use Radio Frequency, 2012 (Reg. No. 16/2012) (Viet).

238. 47 C.F.R. § 25.261 (2023).

The FCC revised the Section to sustain opportunities for new LEO satellite constellations to benefit from spectrum resources. In this case, the FCC seeks to consider a sunset clause for spectrum allocation so that the first mover cannot hold them for longer periods.<sup>239</sup> The FCC also proposes rules to activate spectrum sharing between satellite operators.<sup>240</sup>

To a lesser degree, Article 7.12 of the Regulatory and Licensing Guidelines for Satellite Operators 2022 reserves a right for BTRC to revoke the assignment of a frequency on the grounds of national security or national interest. This authority can be construed as saying that BTRC can shorten the duration of an assignment to preserve market competitiveness. Although it is a far cry from a sunset clause, BTRC is eligible to establish this procedure.

In Australia, ACMA can determine which frequency should be exempted from renewal. ACMA has the right to assign a radio frequency for up to twenty years. Thus, ACMA can activate medium-term licensing in cases of many users or the risk of hoarding.<sup>241</sup> Further, Section 74 of the Radiocommunications Act 1992 puts forward that noncompliance with the conditions of the license can result in suspension or cancellation of the spectrum license.

In Indonesia, the Minister is empowered to terminate a radio frequency license for a greater public interest.<sup>242</sup> In Japan, the MCI can revoke a radio station license (Article 76 of the Radio Law). However, the prerequisite of an assignment is being a Japanese entity; therefore, foreign entities are barred from applying.<sup>243</sup>

Based on Regulation 12 of the Communications and Multimedia Spectrum Regulations 2000, in Malaysia, MCMC can suspend or cancel an assignment when it is in favor of the public interest. Thus, it seems that the Malaysian regulatory framework lacks a sunset clause option.

In Vietnam, using a radio frequency against national security, social order, and safety might result in cancellation (Article 23 of the Law on Radio Frequencies).<sup>244</sup> Here, it is unlikely that a sunset clause can be generated.

A sunset clause is an efficient mechanism to decrease barriers to entry while the first mover is still able to take advantage of its investment for a reasonable period. In a broad interpretation, it might be possible to use the implications of the public interest or the authority of the regulatory body not to renew a spectrum once renewal bedevils competition in the satellite internet market. However, the lack of a precise sunset clause can risk arbitrary or bipartisan decisions. It is worth noting that in a rent-seeking economy, rent-seekers consume their resources to retain rents as well as protect themselves from other rent-seekers and

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239. Revising Spectrum Sharing Rules for NonGeostationary Orbit, Fixed-Satellite Service Systems, 88 Fed. Reg. 39783 (June 20, 2023) (to be codified at 47 C.F.R. § 25).

240. Revising Spectrum Sharing Rules for NonGeostationary Orbit, Fixed-Satellite Service Systems, 87 Fed. Reg. 3481 (Jan. 24, 2022).

241. ACMA, OUR APPROACH TO RADIOCOMMUNICATIONS LICENSING AND ALLOCATION 14-15 (Mar. 2021).

242. Regulation on Post, Telecommunications, and Broadcasting, art. 64.

243. MIC, *supra* note 136.

244. Law on Radio Frequencies, art. 23.



rent-avoiders. In this study, the regulatory frameworks create a degree of property rights for the licensee by licensing. Although these rights can be revoked under some conditions, the sunset clause can be a better leverage to control the market and rent seekers. Indeed, any improvement in the current regulatory processes may constrain monopolistic behaviors and foster competition.

#### IV. CONCLUSION

Internet connectivity has become a critical component of humans' lives. Despite this, the lack of the Internet is still a challenge for almost one-third of the world's population.<sup>245</sup> This is because internet connectivity and accessibility may not be readily available. Moreover, internet prices are not affordable for everyone. One potential reason is that different countries may have limited operators due to lack of competition which results in inadequate investment and infrastructure. At this point, the LEO satellite constellation comes into play as a solution provided by the market to facilitate internet access globally. Part of its business is conducted in space where states are inclined to dominate. Although international treaties were ratified to increase the collaboration between countries, states are apt to dictate their orders and priorities to the players in this market. Despite the fact that technological advancements are largely desirable, governments are prone to shaping the market with their preferred accounts of national security and imposing their expectations. *Prima facie*, one of the instruments of states is a regulatory framework that can undertake their varying expectations. Consequently, national security concerns are incorporated into the telecommunications sector and dominate the political discourse in various countries, irrespective of the level of economic development. These concerns are increasingly being extended to space activities, and regulatory frameworks are equipped to set the lines for entities in the LEO satellites market.

This interference is not without cost. In some cases, an improper regulation might render rent-seeking at its height. A robust regulatory framework is essential for the LEO satellite industry. The LEO satellite industry is delicate, making it susceptible to any radical or uncalculated changes in the market order. Hence, the government is required to protect the interests of both customers and service providers. This framework should adhere to transparent and efficient solutions to curb rent-seeking and anticompetitive behaviors. Similarly, national security should not be broadly interpreted to hamper foreign investments and protect local LEO satellite businesses. The broader context of national security that includes protectionism might be useful in the short term, but it is inconsistent with the customers' preferences and brings about higher transaction costs and economic imbalances.

This article has examined the effectiveness of the regulatory framework for the use of LEO satellites for internet connectivity across five countries in the Asia-Pacific region. It highlights how the government's priorities in regulating the use

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245. INT'L TELECOMM. UNION, *supra* note 24.

of LEO satellites through licensing might encourage or hamper the provision of satellite internet. In this respect, this article relies on transactions cost and the relevant rent-seeking literature to bridge the gap between the current regulatory frameworks and a robust one. The paper has highlighted that satellite technology is capital-intensive with a limited number of entities. The environment is susceptible to a monopoly of the LEO satellite provider, which in turn could potentially stifle market competitiveness, choice, and accessibility for internet connectivity for users in the Asia-Pacific region. Despite this, these countries employ the concept of national security to various degrees to safeguard diverse goals. Although some of these goals might be legitimate, their impacts result in a deviation from a robust framework, prompting monopolistic or rent-seeking behaviors. Instead, a robust framework should avoid protectionism encapsulated in the territorial jurisdiction and employ an effective mechanism to manage spectrum. Otherwise, a reactionary system cannot constrain counterproductive vertical integrations which in turn weakens harmonization and worsens collaboration in fostering international competition in space activities. In fact, looking to the borders to save one's market cannot be viable to deal with cutting-edge innovations in the LEO satellite market.