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Critical Analysis of Laws related to Submarine Communication Cables in India: Present Time and Way Forward

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ABSTRACT

For an economy and connectivity so drastically dependent on submarine communication cables, which carry 99% of India's international internet traffic, it must be a regulatory crisis affecting digital growth. The rules controlling these cables are archaic, inadequate, and fragmented in this country.

Because of the sensitive government communications and defense data that it carries, these cables constitute critical strategic assets. Given their vulnerability to hostile interference by tampering, surveying, or disrupting it, tough regulation is an obvious necessity. Most of such cables traverse contested regions and geopolitically sensitive regions.

The present regulations are very wanting in many respects. International Long-Distance Operators have not been given clear directives on their liability regarding cables landing in India. Licensing provisions for submarine cables remain ambiguous. The bureaucratic processes of cable repairs and installations incur costly delays, while modern technologies such as stub-cables remain unrecognized. India has to be more dependent on foreign vessels for repairs, as repair ships and facilities for storing are not available in the nation. On the contrary, Singapore, Australia, and the United States have implemented effective regulatory mechanisms and made the approval processes smoother, protected the corridors of cables, and maintained capabilities domestically.

For India to maintain its position as a global digital leader, reforming submarine cable regulations is not just an administrative task but a strategic necessity. Comprehensive reforms are needed to protect and enhance these critical digital infrastructures to meet the demands of an increasingly connected future.

Keywords: *Submarine cables, Telecommunications law, Cable landing stations, Digital infrastructure, Regulatory framework*

I. INTRODUCTION

Submarine communication cables are like underwater highways that carry nearly all (99%) of

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the world's internet traffic across oceans.[3] These cables are crucial for India, which is trying to become a digital leader and strengthen its economy through technology. Currently, India has 17 submarine cables connecting its 7,517-kilometer coastline to the rest of the world, with more being planned. This shows how important India is becoming in the global digital network, especially as a connection point between Europe and Southeast Asia.

However, there is a big problem. As India aspires to become a technological leader and steer its digital future through schemes like Digital India, rules and laws governing submarine cables are outdated and confusing[4]. The current system, mostly working through International Long Distance (ILD) licenses, does not adequately address important issues such as who can own these cables, how to handle cables connecting different Indian coastal cities, or what to do in case of emergency repairs. This is a cause of greater worry if a country thinks in terms of national security. Increased tensions in the Indo-Pacific combined with omnipresent and expanding cyber threats pose the cables at the critical threat of being lost unless some guidelines are defined or defined concerning it[5].

Additionally, to put on it, India solely depends on foreign shipping vessels for the submarine cable repairing as there is no existence of demarcated or dedicated places in Indian waters[6].

This paper examines those issues surrounding India's submarine cable policy and discusses how these issues would impact India's economic development, digital power, and national security. Comparing what India is doing with its peers and considering India-specific challenges, it recommends drastic overhauls that can help protect and strengthen this critical infrastructure.

II. UNDERSTANDING SUBMARINE COMMUNICATION CABLES

Submarine communication cables (SMCs) are the hidden highways of our digital world. Despite carrying almost all international internet traffic, these cables are surprisingly small - about as thick as a garden hose (just 17-22mm in diameter). Think of them as underwater fiber-optic cables that connect continents, allowing us to send emails, make video calls, or watch streaming videos across the globe.[7]

Modern submarine cables are engineering marvels with multiple layers. At their heart are

[3] TRAI, Recommendations on Licensing Framework and Regulatory Mechanism for Submarine Cable Landing in India, 1-2 (2023).
[4] Douglas R. Burnett et al., Submarine Cables: The Handbook of Law and Policy 123 (2014)
[5] Daniel Runde et al., Safeguarding Subsea Cables: Protecting Cyber Infrastructure amid Great Power Competition, CSIS Report, 2-3 (2024).
[6] Ibid
[7] Carter, L., et al., "Submarine Cables and the Oceans: Connecting the World"(2009).

glass fibers thinner than human hair, which carry data as pulses of light. These are wrapped in layers of copper (for power), steel (for strength), and plastic (for protection). A single modern cable can transmit data equivalent to streaming millions of HD videos at once. Building and laying these cables isn't cheap - it costs between $200-250 million and takes 5-7 years from planning to completion.[8]

Unlike satellites, which face issues like signal delays and limited capacity, submarine cables provide fast, reliable internet connections. These cables rest on the ocean floor, sometimes deeper than Mount Everest is tall. To keep signals strong over such long distances, signal boosters (called repeaters) are placed every 60-100 kilometers. When the cables reach land, they connect to special facilities called Cable Landing Stations (CLS), which link them to land-based networks.[9]

These underwater cables face many dangers - from fishing nets and ship anchors to earthquakes and deliberate sabotage. When damaged, repairs require special ships and can take weeks or months. That's why protecting these cables is so important - a single break can slow down internet services for entire countries.[10]

The Legal and Regulatory Framework for Submarine Communication Cables in India

1. Licensing Regime

India's submarine cable regulatory framework primarily operates under the Indian Telegraph Act, 1885, which provides the foundational legal basis for telecommunications infrastructure.11 The current licensing structure operates through two main licenses: International Long Distance (ILD) and National Long Distance (NLD) licenses under the Unified License regime.12 Only ILD licensees and Internet Service Providers (ISP) Category 'A' with international gateway permissions can establish Cable Landing Stations (CLS).13 However, the licensing framework lacks specific provisions for domestic submarine cables connecting coastal cities, creating a regulatory gap in this emerging sector.

2. Regulatory Bodies and Their Roles

The regulatory oversight involves multiple agencies with overlapping jurisdictions:

The Department of Telecommunications (DoT) serves as the primary licensing authority and

[8] Runde, D., et al., (2024). "Safeguarding Subsea Cables"(2024).
[9] TRAI Recommendations, "Licensing Framework for Submarine Cable Landing"(2023).
[10] Burnett, D., et al., "Submarine Cables: The Handbook of Law and Policy" (2014).
[11] The Indian Telegraph Act S-4(1), No. 13 of 1885, India Code.
[12] Dept. of Telecom., Guidelines for Unified License, 15-20 (2021).
[13] TRAI, Recommendations on Licensing Framework for Submarine Cable Landing 7 (2023).

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policy maker. The Telecom Regulatory Authority of India (TRAI) regulates access to essential facilities at CLS through various regulations and determines access facilitation charges. The Ministry of Environment, Forest and Climate Change (MoEFCC) oversees environmental clearances, particularly in Coastal Regulation Zones. National security aspects are managed by the Ministry of Home Affairs (MHA) and Ministry of Defense (MoD), who provide security clearances for cable laying and maintenance.

3. Clearance and Permission Process - The current clearance process is notably complex and time-consuming:

a) Pre-Installation Clearances: - Security clearance from MHA, Defense clearance from MoD, Environmental clearance from MoEFCC, Coastal Regulation Zone clearance, Landing permissions from port authorities

b) Operational clearances: Import permits for equipment, Route surveys permissions, Repair work authorizations, Customs clearance for repair vessels

This multi-layered clearance process generally leaves huge delays especially on emergency repairs with average waiting times at 10-15 days just for repair vessel clearance.

4. Ownership and Stakeholder Structure

Ownership structure in submarine cable sector in India has its own peculiarities: The present regulation is silent on the minimum ownership requirements of ILD licensees in submarine cable consortiums. On one hand, some operators have argued that flexibility in ownership structures may attract investment. On the other hand, others suggest that there should be some mandatory minimum Indian ownership to satisfy security interests.14

Stakeholder Ecosystem The stakeholders engaged in the cable system are: - Cable owners that are mainly telecom operators or consortiums. Landing party, ILD/ISP licensees CLS operators Maintenance providers Equipment suppliers[13].

5. Recent Developments

The recent TRAI recommendations of 2023 have proposed several reforms.

Establish clear ownership guidelines, introduce domestic submarine cable provisions, create streamlined clearance processes, and develop indigenous repair capabilities15. This complex regulatory framework shows the need for streamlined processes and clear guidelines to enhance India's submarine cable infrastructure while balancing security concerns with

[14] TRAI, Consultation Paper on Submarine Cable Landing Stations 22-23 (2022).
[15] TRAI, Recommendations on Licensing Framework and Regulatory Mechanism for Submarine Cable Landing in India 79-85 (2023).

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operational efficiency.

III. CRITICAL GAPS AND CHALLENGES IN INDIA'S SUBMARINE CABLE REGULATORY FRAMEWORK

1. Licensing Issues

Ambiguities and gaps in submarine cable licensing have emerged as extremely significant issues in the lack of effective regulation of the submarine cables. The two most important issues are unclear ownership and undefined minimum holdings for International Long-Distance licensees in submarine cable consortia16.

Domestic submarine cable provisions are another major omission. Neither the ILD nor National Long-Distance licenses provide for the laying of submarine cables connecting Indian coastal cities17. This regulatory space hinders the development of domestic submarine infrastructure that will be necessary for coastal connectivity. The framework also doesn't have provisions for stub-cables, which can bring in a lot of saving in future cable deployments and repairs. Network resilience can be evolved only when utilization of this technology is clear, in terms of regulations.18

2. Operational Challenges - The operations environment has a number of problems that directly affect efficiency:

This multilevel clearance requirements involving different authorities causes a delay. As clearances involve at least seven types of agencies, which are required because repairs usually require the cable, and some agencies take more than 15-20 working days for processing, thus bringing down the network considerably when there is an urgency of work.

India does not have any repair vessels under its flag, which is a critical vulnerability. The absence of Indian-flagged repair vessels means reliance on the limited global fleet, resulting in longer repair times and higher costs. In addition, the lack of cable depots along Indian coastlines necessitates storing spare cables in foreign locations, which complicates and delays repairs.

3. Security Concerns - The security implications of these regulatory gaps are significant:

Submarine cables are vulnerable to physical tampering, surveillance, and damage from hostile actors. The absence of dedicated cable protection zones and monitoring systems increases

[16] ibid.
[17] Id. At 41-42
[18] Dept. of Telecom., Guidelines for Infrastructure Providers 22-23 (2022).

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these vulnerabilities.19 Dependencies on foreign operators for repairs and maintenance raise additional security concerns, particularly given the sensitive nature of data transmitted through these cables.

Geopolitical implications are especially concerning in the Indo-Pacific region, where increasing maritime tensions could affect cable security. The lack of indigenous repair capabilities could become particularly problematic during international conflicts or tensions.20

4. Impact of Regulatory Gaps - The cumulative impact of these gaps manifests in multiple ways:

Economic Implications: - Increased operational costs due to delays and foreign dependence, Higher insurance premiums due to extended repair times, Reduced network reliability affecting business operations.21

Strategic Vulnerabilities: - Limited control over critical infrastructure, Increased risk of service disruptions during geopolitical tensions, Compromised network resilience.22

Future Growth Limitations: - Deterred investment in new cable systems, Delayed adoption of new technologies, Restricted development of domestic submarine infrastructure. 23

Investment Barriers: - Regulatory uncertainty discouraging private investment, Higher operational risks affecting project viability, Complex clearance processes deterring new entrants.

These gaps and challenges underscore the urgent need for comprehensive regulatory reforms to enhance India's submarine cable infrastructure while ensuring security and operational efficiency. The impacts of these gaps extend beyond immediate operational issues to affect India's long-term digital growth and strategic interests.

IV. INTERNATIONAL PRACTICES IN SUBMARINE CABLE REGULATION: LESSONS FOR INDIA

1. Singapore: The most successful in this regard is the regulatory model of Singapore under its authority, Info-communications Media Development Authority. Here, one can find the system consisting of:

[19] Ministry of Electronics & IT, National Cyber Security Strategy 67-68 (2023).
[20] Daniel Runde et al., Safeguarding Subsea Cables: Strategic Implications 12-13 (2024).
[21] TRAI, Economic Impact Assessment of Submarine Cable Regulations 25-26 (2023).
[22] National Security Advisory Board, Critical Infrastructure Protection Guidelines 34-35 (2023).
[23] TRAI, Study on Future of Digital Infrastructure 56-57 (2023).

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- Streamlined and well-oriented process with a pre-designated timeline of 4-6 weeks for each
- Unification of various clearances or permits in one permit only.
- Relieving clear guidelines for protecting cable and maintenance. Note also that IMDA can automatically provide Facilities-Based Operations for both landing and maintaining functions which reduce administrative loads for operation delay[24].

2. Protection Zones by Australia: Australia has its own protection zones through the Australian Communications and Media Authority (ACMA):

- Prohibited activity in these zones
- Severe punishment if done
- Mapping and notification clear processes
- Ongoing monitoring and compliance in these protection zones, it has been effective to avoid maritime activities from damaging the cables, protecting the environment, and giving operators the security of the law[25].

3. USA Licensing System: In the US, with a matured licensing system by the Federal Communications Commission (FCC), national security and operational efficiency are well-balanced in the following manners:

- 45-day routine application processing
- National security reviews of Team Telecom are integrated
- Environmental assessments and competitive market considerations
- Emergency repairs provisions[26].

Best practices for India: India can take inspiration from the above models as follows:

- Simplified Handling: Set proper timelines of approval and make single window clearance systems which are quite prevalent in Singaporean model
- Protection Structures: Set separate protection structures with enforcement mechanism as found in Australia.
- Security and Efficiency: Combine security check with an operational efficiency for

[24] Info-communications Media Dev't Authority of Singapore, Guidelines for Submarine Cable Installation and Maintenance (2023).
[25] Australian Communications & Media Authority, Submarine Cable Protection Regime (2023).
[26] Fed. Commc'ns Comm'n, Submarine Cable Landing License, 47 C.F.R. § 1.767 (2023).

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preparing Emergency Response Plans similar to a US model

Implementation Issues: India should be able to implement the above changes on a gradual scale, through consultations with all stakeholders in place, followed by scrutiny of the regulation on timely intervals, coupled with enhanced capacity building within the concerned regulatory authorities.[27]

Such international best practices would thus have to be carefully calibrated in the Indian context toward a balanced framework that at once secures national interests and facilitates efficient cable operations.

V. RECOMMENDATIONS FOR REFORM AND IMPLEMENTATION STRATEGY

A. Legislative Changes

The most fundamental changes in legislation are required, filling the current gaps in the submarine cable regulatory framework of India, to enable comprehensive reform. First, clear guidelines on ownership are needed, including the minimum stake requirements for ILD licensees in submarine cable consortiums. In weighing national security interests against the need to attract international investment, this may require a minimum 26% Indian ownership while allowing flexibility in consortium structures[28].

Special provisions will be required in the legislative framework for domestic submarine cables. They would differ from others due to different operational needs and strategic value. It should be included in the ILD and NLD licensing framework to clearly establish the jurisdiction and parameters of the cables connecting Indian coastal cities. Domestic routes should be allowed with a simplified license process, and proper security oversight should be maintained[29].

Another salient legislation requirement is the establishment of protection zones. Basing their practice on some examples in countries like Australia and Singapore, India should adopt dedicated legislation that creates or maintains cable protection zones in key landing points and routing points of the cables along with defined no-go area for specified activities and ensuring some monitoring and enforcement means to regulate those areas are taken. Coordination also between the monitoring agencies-the maritime agency, the marine operators involved-should

[27] TRAI, Recommendations on Licensing Framework and Regulatory Mechanism for Submarine Cable Landing in India (2023).
[28] TRAI, Recommendations on Licensing Framework and Regulatory Mechanism for Submarine Cable Landing in India 79-82 (2023).
[29] Dept. of Telecom., Draft National Digital Communications Policy, 45-47 (2022).

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also be stipulated by law.[30]

B. Implementation Roadmap

The implementation of these reforms will be phased and will be in line with the broader goals of India's digital infrastructure. In the short term (1-2 years), immediate actions should focus on streamlining existing processes and establishing basic protection measures. This includes the creation of a single-window clearance system for cable-related permissions, developing standard operating procedures for emergency repairs, and initiating the process for protection zone identification[31].

Medium term objectives (2-5 years): Domestic capabilities and infrastructure. Inshore cable depots. Development of protection zone monitoring systems. Training and research initiatives to develop technical expertise[32].

The 5–10-year horizon has to be accommodated with the vision of India to become a global digital hub. This will involve establishing submarine cable infrastructure that encompasses all major coastal cities as the backbone, making India the regional hub for repair and maintenance, and establishing an ecosystem for research and development in cables. The vision should also accommodate emerging technologies and predict future connectivity requirements[33].

Success of these reforms will critically depend on coordinated action among stakeholders and further political will for the desired changes. The implementation strategy will require regular review and adaptation to its effectiveness and relevance in a fast-moving landscape of technology. A wide-ranging approach to reform and implementation will be adopted and aimed at positioning India as a world leader in submarine cable infrastructure while ensuring strong protection for its strategic interests[34].

These suggestions and policies would be provided to create a clear outline to fill the regulatory gaps while working towards foundational development of India's submarine cable in the future. The overall impact of a successful set of reforms could have enormous impacts on both India's ranking in global digital economy as well as strategic independence over telecom infrastructure in the future.

[30] Douglas R. Burnett & Lionel Carter, International Submarine Cables and Biodiversity, 234-236 (2021).
[31] TRAI, Implementation Framework for Submarine Cable Regulations, 12-15 (2023).
[32] Ministry of Electronics & IT, Digital Infrastructure Development Plan, 67-69 (2023).
[33] National Digital Communications Policy, Vision Document 2030, 23-25 (2023).
[34] TRAI, Strategic Framework for Digital Infrastructure Development, 89-91 (2023).

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VI. CONCLUSION

India's submarine cable infrastructure stands at a critical juncture where regulatory reform is not just desirable but imperative for national security and digital growth. The current framework, marked by fragmented oversight, ambiguous ownership guidelines, and operational inefficiencies, significantly undermines India's potential as a global digital hub. The analysis reveals three critical areas requiring immediate attention: streamlining the licensing regime, developing indigenous repair capabilities, and establishing comprehensive protection mechanisms. The increasing geopolitical tensions in the Indo-Pacific region and India's growing digital economy make these reforms particularly urgent.

The stakes are exceptionally high - submarine cables carry over 99% of India's international internet traffic and are important for financial services, defense communications, and emerging technologies. The country's complete dependence on foreign repair vessels, coupled with the absence of cable protection zones and domestic repair infrastructure, creates significant vulnerabilities that could impact national security and economic strength. These challenges are further complicated by the rapid evolution of digital infrastructure technologies and increasing cyber threats.

Furthermore, India's strategic position as a key transit point between Europe and Southeast Asia presents both opportunities and responsibilities. The country has the potential to emerge as a regional hub for submarine cable infrastructure, but this requires a robust and forward-thinking regulatory framework. The proposed reforms, including clear ownership guidelines, streamlined clearance processes, and enhanced security measures, provide a roadmap for achieving this potential.

Looking ahead, India's ability to secure its digital sovereignty and maintain its competitive edge in the global digital economy will largely depend on how effectively it modernizes its submarine cable regulatory framework. The time for action is now - delays in implementing these reforms could significantly impact India's digital growth trajectory and strategic interests. As the country positions itself as a leading digital power, strengthening the regulatory framework for submarine cables must be prioritized as a matter of national importance.

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