STRATEGIC COUNTRY REPORT: TUNISIA

Infrastructure, Security & Geopolitics Analysis

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Contents

Chapter 1

Geopolitics

Executive Summary

Tunisia's digital landscape presents a dichotomy of **market liberalization** and **structural centralization**. While the retail ISP market exhibits healthy competition among major players like TUNISIANA and TOPNET, the underlying network topology remains heavily dependent on state-affiliated backbones, specifically the Tunisia BackBone AS (TN-BB-AS) and the Agence Tunisienne d'Internet (ATI).

Strategic analysis indicates that Tunisia is actively pivoting toward international integration, leveraging frameworks like the "Digital Tunisia 2020" program and the EU's "Pact for the Mediterranean" to modernize infrastructure. However, the concentration of inter-dependencies within a few critical Autonomous System Numbers (ASNs) creates distinct chokepoints, posing risks for network resilience and offering potential vectors for centralized information control.

1.1 Network Architecture and Critical Chokepoints

1.1.1 Structural Centralization

Despite a competitive consumer market, the national network architecture is characterized by a high degree of centralization at the infrastructure level. Analysis of inter-dependency (`d.hege`) reveals that the stability of the Tunisian internet relies disproportionately on a single entity.

> **Critical Insight**: **TN-BB-AS (Tunisia BackBone AS)** is the primary choke-point, possessing **72 incoming dependencies**. This makes it the central nervous system of the national grid, heavily relied upon by other networks for connectivity.

Following the backbone, the hierarchy of critical infrastructure providers includes: * **TUNISIANA**: 70 dependencies. * **ORANGE-**: 45 dependencies. * **ATI-TN (Agence Tunisienne d'Internet)**: 32 dependencies.

The prominence of ATI-TN is historically significant; formerly the sole gateway for internet traffic, it remains a critical node. These ASNs represent potential single points of failure or

control; disruption at the TN-BB-AS or ATI level would likely result in cascading outages across the national territory.

1.1.2 Market Influence and Reach

Market influence, using population reach as a proxy, is distributed among three primary commercial entities, reducing the risk of a commercial monopoly but not mitigating the infrastructure risks mentioned above.

- **TUNISIANA**: Dominates with **30.98%** population reach.
- **TOPNET**: Controls **25.74%**.
- **ORANGE-**: Holds **20.78%**.
- **Tunisie-Telecom**: The incumbent retains **12.78%**.

Collectively, the top five ASNs (including GLOBALNET-AS) account for the vast majority of the user base, leaving less than 3% of the market to smaller ISPs.

1.2 Regulatory Framework and Strategic Alignment

1.2.1 Modernization and Liberalization

Tunisia's regulatory posture is defined by a drive to attract foreign investment and modernize legacy systems. The "Digital Tunisia 2020" program served as a foundational roadmap for ICT development [Source 3]. The government has adhered to WTO telecom service commitments, allowing full market access and national treatment for foreign providers [Source 3].

However, infrastructure development faces logistical friction. The World Bank identifies a lack of infrastructure sharing among operators as a key inefficiency, suggesting regulatory reforms are needed to reduce costs [Source 1]. Furthermore, the dominance of Tunisie Telecom in the fixed broadband sector and international connectivity—specifically regarding sub-sea cable management—remains a strategic bottleneck [Source 3].

1.2.2 Cybersecurity and Data Sovereignty

While specific data localization laws remain opaque in open-source intelligence, the regulatory trend is moving toward "digital sovereignty" through security frameworks. * **Cybersecurity Culture**: Stemming from the Tunis Agenda (WSIS), there is a state-level mandate to "protect the Internet and other ICT networks from threats and vulnerabilities" [Source 2]. * **Investment Climate**: The government is fostering an environment for Public-Private Partnerships (PPPs) via the 2015 PPP Law to upgrade digital defenses and infrastructure [Source 1].

1.3 Future Strategic Outlook (2025-2029)

Intelligence suggests that Tunisia's network evolution over the next 3-5 years will be heavily influenced by supranational agreements rather than purely domestic initiatives.

- **EU Integration**: The **Pact for the Mediterranean (2025-2029)** is a primary strategic vector. This EU initiative prioritizes "digital transitions" in southern Mediterranean partners, implying potential funding and technical assistance for Tunisian infrastructure upgrades [Source 2].
- **Developmental Aid**: The World Bank's Country Partnership Framework (2023-2027) explicitly targets "Access to internet" as a priority service area [Source 4].
- **Regional Connectivity**: Broader continental trends, such as the African Continental Free Trade Agreement (AfCFTA), are pushing for diversified connectivity routes and upgrades to "legacy infrastructure" in the last mile [Source 3].

Assessment: Tunisia is positioned to benefit from significant external investment to upgrade its bandwidth and resilience. However, unless these initiatives explicitly address the centralization of the TN-BB-AS backbone, the underlying fragility of the network topology will persist.

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[Source 1] Tunisia Infrastructure Diagnostic - Open Knowledge Repository (https://openknowledge.worldbank.o 2e97-5bc3-bfa5-5114181ddcd5/content) [Source 2] The Pact for the Mediterranean - European Parliament (https://www.europarl.europa.eu/RegData/etudes/BRIE/2025/779223/EPRS_BRI(2025)779223_ [Source 3] Tunisia - Telecommunications Equipment & Services (https://www.trade.gov/country-commercial-guides/tunisia-telecommunications-equipment-services) [Source 4] MENA Regional Gender Action Plan 2025-2030 - The World Bank (https://thedocs.worldbank.org/en/doc/7d66bb7bdc59ff26de4 0280012025/original/MENA-Regional-Gender-Action-Plan-2025-2030.pdf)

Chapter 2

Infrastructure

Executive Summary

Tunisia's national infrastructure strategy is currently defined by a dual-track modernization effort: reinforcing physical connectivity with Europe through high-value submarine projects and consolidating the domestic digital market. The nation is positioning itself as a critical "energy and digital bridge" between North Africa and the European Union.

Key strategic observations include: * **Cross-Continental Integration:** The simultaneous development of the ELMED (energy) and Medusa (telecom) submarine cables highlights a strategic pivot toward deeper integration with EU grids and networks, supported by EU funding mechanisms like the Connecting Europe Facility (CEF). * **Market Concentration:** The domestic internet landscape is heavily concentrated, with the top three Autonomous System Numbers (ASNs)—Tunisiana, Topnet, and Orange—controlling over 77% of the population's digital access. * **Upstream Dependency:** The national incumbent relies significantly on a single Tier-1 provider (Lumen) for international transit, presenting a potential single point of failure for external connectivity.

2.1 International Connectivity & Submarine Infrastructure

Tunisia is currently executing two major infrastructure projects that will significantly alter its strategic standing in the Mediterranean basin. These projects transcend simple connectivity, representing geopolitical alignment with European energy and digital strategies.

2.1.1 The ELMED Energy Bridge

The ELMED project is a High-Voltage Direct Current (HVDC) submarine power line designed to integrate the Tunisian and Italian electricity grids. While primarily an energy asset, it constitutes critical infrastructure for national resilience.

- **Strategic Alignment:** The project aligns with the EU's REPowerEU objectives and is included in the Mediterranean Master Plan 2030 by Med-TSO [Source 1].

- **Technical Specifications:** The 600 MW, 500 kV cable will span approximately 220 km (200 km underwater), reaching depths of 800 meters in the Strait of Sicily [Source 1].
- **Landing & Backbone:** The Tunisian landing station is planned for **Mlaabi** (Cap Bon peninsula). This will connect to a new electrical conversion station, integrating directly into the national grid managed by Steg (Société Tunisienne de l'Électricité et du Gaz) [Source 1].

2.1.2 The Medusa Submarine Cable System

To bolster digital resilience and reduce the digital divide, Tunisia is integrating into the Medusa cable system, which connects the Mediterranean region.

- **Landing Point:** The designated landing station is **Bizerte** [Source 2].
- **Stakeholders & Infrastructure:** Orange plays a central role, utilizing its redundant fiber optic infrastructure to link the Bizerte landing point to major European hubs and data centers. The project is co-financed by the European Union under the Global Gateway strategy [Source 2].
- **Operational Capacity:** The Marseille-Bizerte segment spans 1,050 km, designed to increase bandwidth availability and secure international routing [Source 2].

  Analyst Note: The involvement of the EU in financing both the Medusa (via CEF) and ELMED projects indicates a concerted effort to stabilize Tunisia's infrastructure as a southern flank for European energy and data security.

2.2 National Network Architecture

2.2.1 ASN Market Share & Dominance

The Tunisian digital landscape is characterized by a high degree of centralization. Based on population reach (`r.percent`), the market is dominated by three primary entities:

1. **TUNISIANA:** 30.98%
2. **TOPNET:** 25.74%
3. **ORANGE:** 20.78%

The remaining market share is held by the incumbent **Tunisie-Telecom** (12.78%) and **GLOBALNET-AS** (6.13%). This structure suggests a market where competitive dynamics are limited to a few major players, potentially simplifying regulatory oversight but increasing systemic risk if a major provider suffers a catastrophic failure.

2.2.2 International Transit & Upstream Dependency

Analysis of the national incumbent, **TUNISIANA**, reveals a reliance on Western Tier-1 transit providers. The top three upstream providers identified are: * Lumen-Level3 * Lumen AS3356 * LEVEL3

This heavy reliance on the Lumen ecosystem suggests that Tunisia's international routing is centralized, which may pose risks regarding redundancy and sovereign control over traffic routing.

2.3 Regulatory & Strategic Framework

Tunisia's regulatory environment is evolving to support its ambition of becoming a regional ICT hub. The government's "Tunisie digitale 2025" strategy aims to leverage the country's 910 Gbps bandwidth capacity and skilled workforce to attract foreign investment [Source 3].

2.3.1 Key Regulatory Bodies

- **National Information Security Agency (ANSI):** Established following the 2004 Law on Information Security, ANSI is the primary authority responsible for cybersecurity and the secure functioning of information systems [Source 4].
- **Telecommunications Regulator:** The sector is overseen by a dedicated regulatory body that has transitioned from a public administrative entity to a share corporation, signaling a shift toward a more market-oriented regulatory approach [Source 4].

2.3.2 Market Liberalization

The adoption of a new telecommunication law has facilitated the opening of the sector to the private sector. Currently, the market supports 12 Internet Service Providers (ISPs), comprising seven public and five commercial entities [Source 4]. This mix indicates a hybrid model where state influence remains strong despite liberalization efforts.

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[Source 1] https://elmedproject.com/ [Source 2] https://newsroom.orange.com/orange-hosts-the-medusa-submarine-cable-at-its-infrastructure-in-marseille-for-its-first-landing/ [Source 3] https://www.tradecommissioner.gc.ca/en/market-industry-info/search-country-region/country/canada-tunisia-export/information-communications-technologies-market.html [Source 4] https://www.itu.int/itunews/manager/display.asp?lang=en&year=2005&issue=09&ipage=tunisia&c

Chapter 3

Market

Executive Summary

Tunisia's telecommunications sector is characterized by a maturing competitive landscape, significant strides in market liberalization, and a strategic pivot toward digital governance. While the market demonstrates healthy competition in the cellular and broadband sectors—led by major players such as Tunisiana and Topnet—the underlying network architecture reveals critical vulnerabilities regarding international connectivity and resilience.

Intelligence derived from network topology indicates a high degree of centralization in upstream transit dependencies. Key domestic ASNs exhibit 100% dependency on a limited set of foreign Tier-1 providers, specifically Lumen and Telecom Italia Sparkle. This creates potential single points of failure that could impact national digital continuity. Furthermore, while the government actively pursues infrastructure modernization through initiatives like "Digital Tunisia 2020" and the "GovTech" project, the low participation in local Internet Exchange Points (IXPs) suggests that traffic routing remains inefficient, potentially relying on international tromboning.

3.1 Market Composition and Influence

The Tunisian internet service market has evolved from a historic state monopoly into a competitive environment, particularly following the opening of the cellular market to foreign competition in the early 2000s [Source 3]. Current network intelligence indicates a shift in market dominance based on population reach.

3.1.1 Key Operators

Based on population reach as a proxy for market share, the landscape is defined by three primary tiers:

- **Market Leaders: TUNISIANA** currently holds the largest share of population reach at **30.98%**, followed closely by **TOPNET** at **25.74%** and **ORANGE-** at **20.78%**.

- **Historic Incumbent: Tunisie-Telecom**, the historic state-owned operator, retains a significant but smaller portion of the reach at **12.78%**.
- **Challengers: GLOBALNET-AS** holds **6.13%**, with remaining providers holding marginal shares.

Despite Tunisie Telecom's historic dominance in the fixed broadband sector, regulatory pressures are mounting to address this asymmetry and encourage infrastructure sharing to foster new market entrants [Source 1].

3.2 Strategic Infrastructure and Resilience

3.2.1 International Connectivity and Dependency

Tunisia's international connectivity architecture presents a strategic risk profile characterized by high centralization. Analysis of the top 10 ASNs by inter-dependency (`d.hege`) reveals a critical reliance on foreign transit providers.

> **Critical Vulnerability:** The top 10 most dependent ASNs in Tunisia—including critical entities like **ATI-ISP**, **AFDB** (African Development Bank), and **Arab-Tunis-Bank**—exhibit a dependency score of **1.0 (100%)**.

These entities rely heavily on a narrow set of upstream providers: * **SEABONE-NET (Telecom Italia Sparkle):** Serves 6 of the top dependent ASNs. * **Lumen (Level 3):** Serves 6 of the top dependent ASNs. * **Orange (Opentransit):** Serves 4 of the top dependent ASNs.

For **TUNISIANA**, identified as the dominant ASN by reach, the primary upstream transit providers are **Lumen-Level3**, **Lumen AS3356**, and **LEVEL3**. This concentration of upstream connectivity highlights potential single points of failure; a disruption in these specific Tier-1 carriers could severely impact Tunisia's internet resilience.

3.2.2 Domestic Topology and IXPs

The physical topology of Tunisia's internet infrastructure shows limited localization of traffic. Only six ASNs are identified as members of local Internet Exchange Points (IXPs), including **ATI-TN**, **TN-BB-AS** (Tunisia BackBone), and **WOODYNET**. The low number of IXP participants suggests that a significant portion of domestic traffic may still be routed internationally, increasing latency and exposure to foreign surveillance or disruption.

3.3 Regulatory and Developmental Landscape

Tunisia is actively refining its regulatory framework to attract investment and enhance digital sovereignty. The government has implemented the "Digital Tunisia 2020" program, a national ICT development plan aimed at enhancing connectivity and digitizing administration [Source 3].

3.3.1 Key Regulatory Trends

- **Liberalization:** Tunisia meets its WTO commitments, offering full market access to foreign telecom providers [Source 3].
- **Investment Reform:** The PPP Law of 2015 and revisions to the Investment Code are designed to facilitate Public-Private Partnerships, which are viewed as essential for funding future infrastructure projects [Source 1].
- **Cybersecurity:** Stemming from the Tunis Agenda, there is a strong mandate to "protect the Internet and other ICT networks from threats and vulnerabilities" and build a global culture of cybersecurity [Source 2].

3.3.2 Future Initiatives

Current initiatives are focused on bridging the digital divide. The World Bank-supported "Gov-Tech project" (active through 2025) explicitly targets the expansion of broadband access in underserved areas and the modernization of public services [Source 1]. This project acknowledges that inequitable access is a major obstacle to the adoption of digital solutions. While specific technical deployments regarding DNSSEC or BGP security are not detailed in current reports, the digitization of "life-events" services implies a forthcoming necessity to harden network architecture against cyber threats [Source 1].

References

[Source 1] Tunisia Infrastructure Diagnostic - Open Knowledge Repository (https://openknowledge.worldbank.o 2e97-5bc3-bfa5-5114181ddcd5/content) [Source 2] WSIS: Tunis Agenda for the Information Society - ITU (https://www.itu.int/net/wsis/docs2/tunis/off/6rev1.html) [Source 3] Tunisia - Telecommunications Equipment & Services (https://www.trade.gov/country-commercial-guides/tunisia-telecommunications-equipment-services) [Source 4] Tunis Commitment - ITU (https://www.itu.int/net/wsis/docs2/tunis/off/7.html) [Source 5] 2024 Investment Climate Statements: Tunisia - State Department (https://www.state.gov/reports/2024-investment-climate-statements/tunisia)

Chapter 4

Localization

Executive Summary

Tunisia's digital landscape is characterized by a highly concentrated market structure and a significant reliance on external digital infrastructure, particularly foreign Content Delivery Networks (CDNs). While the "Digital Tunisia 2020" program and subsequent "GovTech" initiatives aim to modernize the state's digital capacity, the network topology reveals critical dependencies on a limited number of upstream transit providers and a massive reliance on Cloudflare for service availability.

The regulatory environment is transitioning from a state-monopoly legacy toward a liberalized market compliant with WTO commitments. However, infrastructure development remains uneven, with a marked "digital divide" between coastal urban centers and rural interior regions. Strategic vulnerabilities exist in the form of centralized international transit chokepoints and a lack of domestic data hosting depth, forcing reliance on external entities for resilience.

4.1 Market Composition and Influence

The Tunisian Internet Service Provider (ISP) market exhibits an oligopolistic structure dominated by three primary entities. Using population reach as a proxy for market share, the ecosystem is heavily weighted toward the incumbent and two major competitors.

- **Dominant Players:** TUNISIANA holds the market lead with **30.98%** reach, followed closely by TOPNET (**25.74%**) and ORANGE- (**20.78%**).
- **State Incumbent:** Tunisie-Telecom retains a **12.78%** share, while GLOBALNET-AS captures **6.13%**.
- **Market Tail:** The remaining ISPs collectively represent less than **3%** of the market share.

This concentration suggests that control over national information flow is vested in fewer than five administrative domains, simplifying regulatory oversight but increasing systemic risk in the event of targeted outages against top-tier ASNs.

4.2   Network Topology and Critical Chokepoints

4.2.1   International Dependency and CDNs

Analysis of inter-dependency (`d.hege`) reveals a stark reliance on external infrastructure. The network topology is not anchored by domestic heavyweights but by foreign content delivery systems. > **Strategic Observation:** Cloudflare entities (`CLOUDFLARENET`, `Cloudflare, Inc.`) register **956 incoming dependencies**, vastly outstripping local infrastructure.

By comparison, the most critical domestic nodes show significantly lower dependency scores: * **TN-BB-AS (Tunisia BackBone AS):** 18 incoming dependencies. * **TUNISIANA:** 14 incoming dependencies. * **ORANGE-:** 9 incoming dependencies.

This disparity indicates that while physical connectivity is managed locally, the *availability* of services and content is heavily dependent on US-based CDN infrastructure.

4.2.2   Transit Centralization

Tunisia's international connectivity is centralized. TUNISIANA, the market leader, relies on a narrow set of upstream transit providers. * **ASN 7155:** Serves as an upstream for 4 dependent ASNs. * **ASN 37705:** Serves 2 ASNs. * **ASN 328853:** Serves 1 ASN.

This funneling of international traffic through a limited number of gateways creates potential chokepoints for cross-border data flow.

4.2.3   Local Interconnection

Domestic traffic exchange is facilitated by the **TunIXP** (Tunisian Internet Exchange Point). Key participants include: * ATI-TN (Agence Tunisienne d'Internet) * TN-BB-AS (Tunisia BackBone AS) * AFRINIC-ANYCAST * WOODYNET-1

While an exchange point exists, the heavy reliance on external CDNs suggests that a significant portion of local traffic may still hairpin through international links or rely on edge caches controlled by foreign entities.

4.3   Regulatory and Legal Framework

Tunisia's regulatory posture is defined by a tension between historical state control and a push for liberalization to attract foreign investment.

4.3.1   Infrastructure and Investment

The government has actively pursued market liberalization to meet WTO commitments, opening the cellular market to foreign competition and encouraging Public-Private Partnerships (PPPs) via the 2015 PPP Law [Source 1]. * **Market Access:** Tunisia offers full market access and national treatment to foreign telecom providers [Source 3]. * **Regulatory Reform:** There is

a recognized need to revise regulations regarding rights of way and duct access to break the historical dominance of Tunisie Telecom in the fixed broadband sector [Source 1].

4.3.2 Cybersecurity and Data Localization

Current intelligence indicates no explicit laws mandating strict data localization. However, the regulatory trajectory suggests a tightening of data governance: * **Cybersecurity Focus:** The Tunis Agenda emphasizes the "global culture of cybersecurity" and the protection of ICT networks from threats [Source 2]. * **Institutional Oversight:** The *Instance Nationale des Telecommunications* (INT) serves as the regulatory authority, likely overseeing future cybersecurity mandates [Source 1]. * **Business Environment:** Cybersecurity is identified as a growing business sector, driven by digitization of administration and smart city projects [Source 3].

4.4 Future Infrastructure Outlook

Government initiatives are currently focused on bridging the "digital divide" and modernizing public administration, though concrete timelines for core network upgrades in the immediate 1-3 year window are not publicly detailed.

- **GovTech (2020-2025):** The "Digital Transformation for User-Centric Public Services" project aims to digitize government services, which will necessitate backend infrastructure improvements [Source 2].
- **Connectivity Gaps:** Despite claims that schools have high-speed access, the infrastructure reality is often poor, with fixed broadband speeds averaging a low 8 Mbps (ranked 166th globally) [Source 3].
- **Rural Access:** The "Connecting the Unconnected" project continues to target healthcare centers and schools in isolated areas, where access remains inequitable compared to coastal regions [Source 1] [Source 2].

4.5 Intelligence Gaps

- **RPKI Adoption:** Technical data regarding Route Origin Authorization (ROA) coverage is currently unavailable, preventing an assessment of the network's resilience against BGP hijacking.
- **Censorship Mechanisms:** OONI data analysis yielded no results for specific TCP, DNS, or HTTP blocking events, limiting visibility into active technical censorship measures.
- **Data Center Locations:** Specific geolocation data for ASN-affiliated data centers is missing, hindering physical target analysis.

References

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Chapter 5

Security

Executive Summary

Tunisia's digital landscape is characterized by a high degree of centralization within its critical internet infrastructure, creating distinct "chokepoints" that pose systemic risks to national network resilience. While the market shows some diversity in consumer access—dominated by TUNISIANA, TOPNET, and ORANGE—the underlying logical topology relies heavily on a few key Autonomous Systems (ASNs) with high hegemony scores.

Physically, Tunisia has established robust international connectivity through multiple sub-sea cables managed by both state and private entities. However, the domestic peering ecosystem remains underdeveloped, with indications that local traffic may still transit through Europe due to regional connectivity challenges. Future infrastructure development is pivoting toward Public-Private Partnerships (PPPs) to address funding gaps and expand broadband coverage. Significant intelligence gaps remain regarding the implementation of routing security standards (RPKI/MANRS) and active censorship mechanisms, obscuring the full view of the country's cyber defense posture.

5.1 Critical Infrastructure & Network Topology

5.1.1 Market Concentration and Hegemony

The Tunisian internet service market is heavily concentrated among a few major players. In terms of population reach, the market is dominated by three primary entities: * **TUNISIANA:** 30.98% market share. * **TOPNET:** 25.74% market share. * **ORANGE-:** 20.78% market share. * **Tunisie-Telecom:** 12.78% market share.

While this distribution suggests a competitive retail market, the logical topology reveals significant centralization risks. Analysis of "hegemony" scores—a metric measuring the dependency of the network on specific ASNs—identifies critical bottlenecks:

> **Strategic Warning:** `TN-BB-AS Tunisia BackBone AS` exhibits the highest hege-

mony score at **0.960** with 65 incoming dependencies. Similarly, `TUNISIANA` holds a score of **0.846** with 35 incoming dependencies.

These high scores indicate that these networks act as central hubs for domestic traffic. A failure or targeted attack on `TN-BB-AS` would likely result in cascading connectivity loss across the national grid.

5.1.2 International Transit Diversity

Despite domestic centralization, Tunisia exhibits a degree of resilience in its international transit connections. Analysis of upstream provider diversity shows that key operators maintain multiple pathways to the global internet: * **TOPNET:** 9 upstream providers. * **Tunisie-Telecom & ATI-ISP:** 8 upstream providers each.

This high number of topological hops suggests that Tunisia's major ISPs have established redundant international transit options, mitigating the risk of isolation due to a single upstream provider failure.

5.2 Physical Infrastructure & Development Projects

5.2.1 Subsea Connectivity and Redundancy

Tunisia has actively invested in sub-sea cable infrastructure to ensure digital independence and bandwidth capacity. * **State Infrastructure:** Tunisie Telecom manages three sub-sea cables, including a fiber-optic link connecting Kelibia to Mazara, Italy [Source 4]. * **Private Sector Redundancy:** Since 2014, private operators Ooredoo and Orange Tunisie have operated their own sub-sea cables, significantly augmenting national bandwidth and reducing reliance on the state monopoly [Source 4].

5.2.2 Future Development and Funding Models

Following the conclusion of the "Digital Tunisia 2020" program, the government is shifting its strategy toward Public-Private Partnerships (PPPs) to finance infrastructure expansion. * **PPP Project Development Fund:** A dedicated fund was formally created in Q1 2022 and is expected to commence operations in 2024 for an initial five-year period. This fund aims to strengthen the pipeline of sustainable infrastructure projects [Source 2]. * **Regulatory Reform:** The World Bank has highlighted the need to reduce internet access costs by addressing Tunisie Telecom's dominance in the fixed broadband market and encouraging infrastructure sharing among operators [Source 5].

Additionally, infrastructure resilience is being tied to energy security, with the Tunisian Solar Plan targeting 30% renewable energy by 2030 to support the power requirements of digital services [Source 5].

5.3 Traffic Exchange & Regional Peering

The primary domestic exchange point is **TunIXP** (Tunisia Internet Exchange Point), which is a recognized member of Euro-IX [Source 1]. However, the efficiency of local traffic exchange remains a strategic concern.

Regional analysis indicates a "lack of IXPs" across the MENA region, which often forces domestic or regional traffic to "trombone" through exchange points in Europe before returning to the destination. This increases latency and transit costs [Source 4]. While TunIXP exists, the broader regional context suggests that political and economic turbulence can negatively impact internet inclusion and network performance [Source 4].

> **Intelligence Gap:** Technical data regarding the specific ASN membership of TunIXP and the presence of Content Delivery Networks (CDNs) is currently unavailable. This limits the assessment of how much content is served locally versus retrieved via international transit.

5.4 Regulatory Environment & Security Hygiene

5.4.1 Legal Framework

The regulatory environment governing Tunisia's telecommunications sector is complex and currently under scrutiny for reform. The State Department's Investment Climate Statements (2024/2025) acknowledge the sector's importance but do not detail specific recent laws in the available open-source extracts [Source 1] [Source 2].

However, regional trends in North Africa regarding encryption and cybercrime (e.g., lawful interception mandates) suggest that Tunisian ISPs likely operate under strict government requirements for data access and assistance in criminal investigations, although specific legislation was not explicitly isolated in this review [Source 4].

5.4.2 Security Posture (RPKI & MANRS)

There is a significant intelligence gap regarding the "security hygiene" of Tunisian networks. Data on the adoption of Resource Public Key Infrastructure (RPKI) and the implementation of Mutually Agreed Norms for Routing Security (MANRS) is unavailable. Given the high hegemony scores of `TN-BB-AS` and `TUNISIANA`, the lack of visibility into their routing security practices (such as Route Origin Validation) represents a potential vulnerability to BGP hijacking or route leaks.

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[Source 1] 2025 Investment Climate Statements: Tunisia - State Department (https://www.state.gov/reports/20 investment-climate-statements/tunisia) [Source 2] Bridging the infrastructure gap: A project

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Chapter 6

Governance

Executive Summary

Tunisia's telecommunications governance is characterized by a **hybrid state-centric model** where the government retains significant operational control, even within nominally private or foreign-invested entities. While the sector has undergone partial privatization, the state maintains dominance through direct ownership of the incumbent (Tunisie Telecom), management control over Orange Tunisie via public administration, and residual shares in Ooredoo.

Strategic analysis of the Internet Yellow Pages (IYP) data reveals a critical dichotomy: while Tunisia is aggressively pursuing infrastructure modernization—funded largely by European partners and anchored by the Medusa submarine cable—its logical network security posture is fragile. Major operators exhibit low adoption of Resource Public Key Infrastructure (RPKI), creating vulnerabilities in routing security. Furthermore, the regulatory environment lacks specific, enforceable national cybersecurity frameworks for network operators, relying instead on broad international commitments.

> **Strategic Assessment:** The convergence of high state influence, reliance on foreign capital (Qatar, France, EU), and weak routing security protocols creates a complex governance landscape. Tunisia's digital sovereignty is currently heavily leveraged against European financing and Egyptian transit infrastructure.

6.1 Market Structure and Ownership

The Tunisian telecommunications market is an oligopoly defined by a mix of state ownership, foreign investment, and post-revolution nationalization efforts.

- **Tunisie Telecom (The Incumbent):** As the largest operator, it is definitively state-owned and holds a dominant market position. It leads in international connectivity and manages sub-sea cables [Source 1]. Intelligence indicates that its state-owned nature contributes to its market dominance and potential competitive advantages [Source 2].

- **Ooredoo (Foreign/State Hybrid):** Formerly Orascom Telecom Tunisia, this entity is a major mobile player. Following the 2011 revolution, shares were nationalized. Currently, Qatar Telecom (via Wataniya) holds a 90% stake, while the remaining 10% of government shares were intended for sale but remain with the state [Source 1]. This represents a significant foreign influence vector (Qatar) alongside historical state entanglement.
- **Orange Tunisie (State-Managed):** While capital is split between Tunisian (51%) and French (49% via France Telecom) interests, the governance reality is stricter. The Tunisian majority shares were nationalized in 2011, and the company is currently managed by a public administrator [Source 1]. This signifies strong state control despite the French investment.

Market Reach: Population reach serves as a proxy for market influence. IYP data indicates the following hierarchy in population coverage: * **TUNISIANA (Ooredoo):** 30.98% * **TOPNET:** 25.74% * **ORANGE-:** 20.78% * **Tunisie-Telecom:** 12.78%

6.2 Infrastructure and Strategic Development

Tunisia's infrastructure roadmap is guided by the **National Digital Strategy 2021-2025**, which prioritizes high-speed broadband, 5G deployment, and administrative digitization [Source 1].

6.2.1 International Connectivity & The Medusa Project

A critical component of Tunisia's future connectivity is the **Medusa submarine cable system**. * **Strategic Dependency:** The cable will connect Tunisia to the broader Mediterranean network. However, the landing architecture relies on a partnership between **AFR-IX Telecom** and **Telecom Egypt**, with the primary gateway located in Port Said, Egypt [Source 1][Source 2]. * **Implication:** This configuration creates a topological dependency on Egyptian infrastructure for Tunisia's next-generation connectivity.

6.2.2 Modernization and Foreign Funding

The modernization of the backbone and the shift to 5G are heavily reliant on Western financing: * **Tunisie Telecom** is upgrading its mobile access to 5G and expanding Fiber-to-the-Home (FTTH) to 200,000 households [Source 2]. * **Financing:** These projects are supported by a €50 million committed tranche from the **European Bank for Reconstruction and Development (EBRD)**, complemented by guarantees and grants from the **European Union (EU)** [Source 2].

6.3 Network Security and Resilience

Despite ambitious infrastructure plans, the logical security layer of Tunisia's network exhibits significant weaknesses, particularly regarding routing security standards.

6.3.1 RPKI Adoption and Routing Hygiene

There is a notable lack of correlation between market dominance and security best practices.
* **Low Adoption:** The top operators by population reach—**TUNISIANA**, **TOPNET**, and **ORANGE-**—are listed as "Not Validating RPKI ROV" (Route Origin Validation). * **Incumbent Status: Tunisie-Telecom** shows mixed status, indicating inconsistent validation.
* **Exceptions: GLOBALNET-AS** and **ATI-TN** (Agence Tunisienne d'Internet) are among the few validating RPKI ROV.

> **Risk Analysis:** The top 5 ASNs with the lowest RPKI adoption (zero valid prefixes) include ASN 13335 and ASN 37693. This lack of validation exposes the national network to routing hijacks and Man-in-the-Middle (MitM) attacks, posing a risk to data integrity.

6.3.2 Regulatory Framework

The governance of cybersecurity remains underdeveloped at the regulatory level. * **Lack of Specific Mandates:** There are no known national cybersecurity frameworks or regulations that explicitly impose detailed compliance requirements on network operators. * **International Alignment:** Governance relies on adherence to WTO commitments and participation in the ITU's Global Cybersecurity Index [Source 1][Source 2]. The focus remains on market access and general infrastructure rather than enforceable cyber-defense mandates for the private sector.

References

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- [**Source 1**] AFR-IX telecom signs landing party agreement with Telecom Egypt (https://afr-ix.com/afr-ix-telecom-signs-landing-party-agreement-with-telecom-egypt-for-medusa-submarine-cable/)
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Chapter 7

Strategic Synthesis & Roadmap

7.1 Executive Summary & Diagnosis

Tunisia stands at a critical geopolitical and technological juncture. It is actively positioning itself as a "Digital Bridge" between North Africa and Europe, evidenced by high-profile submarine projects (Medusa) and energy integration (ELMED). However, a distinct dichotomy exists: while the **physical layer** is modernizing through EU-backed investments, the **logical layer** remains fragile, centralized, and insecure.

The market exhibits "retail competition" (Tunisiana, Topnet, Orange) masking "structural centralization." The reliance on a single state-affiliated backbone and foreign content delivery networks creates a network topology that is brittle and susceptible to cascading failure.

7.1.1 Critical Diagnosis: Structural Blockers

1. **The "TN-BB-AS" Bottleneck:** The Tunisia BackBone AS is a massive single point of failure with 72 incoming dependencies and a hegemony score of 0.960. It acts as the central nervous system; if it fails, the national grid collapses.
2. **Routing Security Vacuum:** The top three market leaders (Tunisiana, Topnet, Orange) are **not** validating RPKI Route Origin Authorization. This leaves the country highly vulnerable to BGP hijacking and route leaks.
3. **External Sovereignty Paradox:** While seeking digital sovereignty, Tunisia relies heavily on US-based Cloudflare (956 dependencies) for service availability and US/EU Tier-1 providers (Lumen, Sparkle) for transit.
4. **Inefficient Traffic Exchange:** Low participation in local Internet Exchange Points (TunIXP) suggests domestic traffic is "tromboning" through Europe, increasing latency and costs.

7.1.2 SWOT Analysis

Strengths	Weaknesses
EU Strategic Alignment: Strong backing via the "Pact for the Mediterranean" and CEF funding (Medusa, ELMED).	**Logical Centralization:** Heavy reliance on TN-BB-AS and ATI creates systemic fragility.
Competitive Retail Market: Healthy competition among Ooredoo, Orange, and Topnet.	**Security Hygiene:** Critical lack of RPKI adoption among dominant operators.
Infrastructure Growth: Active deployment of 5G and FTTH via PPP models.	**State Heavy-Handedness:** Hybrid ownership models slow down true market dynamism.

Opportunities	Threats
Green Data Hub: Leveraging the ELMED energy bridge to power green data centers.	**Cyber Resilience:** Vulnerability to routing attacks due to poor hygiene.
Regional Gateway: Becoming the primary landing point for African traffic to Europe.	**Transit Dependency:** Reliance on Egyptian infrastructure (Telecom Egypt) for the Medusa cable landing.
Digitization: "GovTech" initiatives driving demand for secure cloud services.	**Brain Drain:** Skilled workforce exiting to Europe, hampering local maintenance.

7.2 Strategic Roadmap

7.2.1 ## A. Short Term (0 - 12 Months) - "Security & Hygiene"

- **Mandate RPKI Implementation:** The regulator (INT) must issue an immediate directive for Tier-1 operators (Tunisiana, Topnet, Orange) to implement Route Origin Validation (ROV) to close the security gap.
- **Audit TN-BB-AS Redundancy:** Conduct a stress test on the Tunisia BackBone AS to identify physical and logical single points of failure. Immediate patch plans must be deployed for the most critical nodes.
- **Formalize Cybersecurity Compliance:** Move from "culture of cybersecurity" (Tunis Agenda) to enforceable regulation. Define specific penalties for operators failing to meet minimum security standards.
- **Cloudflare Dependency Review:** Analyze the 956 Cloudflare dependencies to understand what critical government or banking services are reliant on external CDNs and establish a continuity plan.

7.2.2 ## B. Medium Term (1 - 3 Years) - "Infrastructure & Efficiency"

- **Liberalize the Wholesale Market:** Break the monopoly/bottleneck of TN-BB-AS by allowing private operators (Orange, Ooredoo) to build or lease independent national backbones to ensure redundancy.
- **Revitalize TunIXP:** Incentivize local peering. Offer tax breaks or regulatory fast-tracks for ISPs that route >50% of domestic traffic locally via TunIXP to stop international tromboning.
- **Operationalize PPP Funds:** Accelerate the deployment of the "PPP Project Development Fund" to finance last-mile fiber in rural areas, reducing the digital divide between coastal and interior regions.
- **Data Center Localization:** Leverage the "GovTech" initiative to anchor data locally. Build domestic hosting capacity to reduce reliance on foreign Tier-1 transit for local content.

7.2.3 ## C. Long Term (3 - 5 Years+) - "Sovereignty & Integration"

- **The "Green Digital" Nexus:** Integrate the ELMED (energy) and Medusa (data) strategies. Market Tunisia as a "Green Data Haven" for Europe, using renewable energy to power hyperscale data centers in Cap Bon and Bizerte.
- **Diversify International Transit:** Reduce reliance on the Lumen/Sparkle duopoly. Actively seek south-bound connectivity into Africa to become a true regional transit hub, rather than just a spur off the European grid.
- **Full Digital Sovereignty:** Transition from state-owned legacy infrastructure to a sovereign cloud model where critical national data resides on Tunisian soil, protected by domestic encryption standards.

7.3 Final Verdict

Investability Score: MEDIUM Tunisia offers high potential due to its strategic geography and strong EU financial backing (Global Gateway, CEF). However, the "Medium" score reflects the operational risks posed by the centralized backbone (TN-BB-AS) and the heavy state influence in the telecom sector, which can stifle agility.

Maturity Score: DEVELOPING While the retail market appears **Mature** with high penetration and competition, the underlying infrastructure is **Developing**. The lack of routing security (RPKI), the reliance on external CDNs, and the centralization of the logical topology indicate a network that has grown in size but not yet in sophistication or resilience.