

EXECUTIVE-LEVEL DECISION-MAKING IN THE DEVELOPMENT AND OPERATION OF LARGE-SCALE TELECOMMUNICATIONS NETWORKS

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Abstract. This study is dedicated to the anatomy of executive-level decision-making under conditions of high uncertainty. The focus lies on the key paradox of modern telecommunications, the so-called “investment scissors” - the necessity of exponentially increasing capital expenditure (CapEx) for the deployment of 5G and fiber optics against a backdrop of stagnating ARPU and the commoditization of traditional services. The paper analyzes how C-level management transitions from deterministic financial models to probabilistic ones (Real Options Analysis) and Smart CapEx strategies. The phenomenon of “organizational ambidexterity” - leadership’s ability to balance the rigorous exploitation of legacy networks with the venture development of innovations - is examined. Particular attention is paid to overcoming the epistemic gap between technical and commercial teams through the implementation of Digital Twins of an Organization (DTO) and Agile transformation. The results show that the long-term viability of an operator depends less on the choice of technologies than on leadership’s ability to build a culture of antifragility, implement a Zero Trust security architecture and accept ethical responsibility for the algorithmic governance of future networks.

Key words: executive leadership, telecommunications strategy, capital expenditure (CapEx), risk management, zero trust, smart CapEx, ESG in telecom.

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Introduction. The telecommunications industry currently stands at a juncture of irreversible innovative transformation. On one hand, global connectivity has become the “nervous system” of the modern economy, rendering telecom operators indispensable. On the other hand, the industry has encountered severe commoditization of services. Data transmission is now transforming into a basic utility service, the value of which is not apparent to the consumer as long as it functions correctly. Within these modifications, the traditional management model, relying on stable cash flows from voice services and simple traffic resale, has ceased to be viable [1, 2].

Executive-level decision-making in telecommunications is no longer confined to equipment vendor selection or regional expansion. Today, it more closely resembles paradoxical management: how to invest colossal funds in next-generation infrastructure (5G, Fiber-to-the-Home) when the monetization of these technologies remains ambiguous, while capital expenditure (CapEx) grows exponentially? [3] Executives are forced to operate under the concept of “investment scissors”. Network traffic and load are skyrocketing, while ARPU (Average Revenue Per User) stagnates or declines under pressure from OTT services and regulators [4].

The architectural shift presents particular complexity, since, with the development of technological breakthroughs, the network is now a Software-Defined Networking (SDN) environment. This fundamentally alters the competency requirements for top management. The CEO or CTO of a major telecom operator today must be a true visionary, capable of assessing the risks of implementing immature technologies (Open RAN, Edge Computing) and restructuring an inert corporate culture to fit Agile development methods [5].

An additional layer of complexity is introduced into the decision-making matrix by the sustainability factor (ESG), relevant to our century. Naturally, telecommunication networks are major energy consumers and amidst energy price volatility, the issue of energy efficiency transitions from the realm of corporate social responsibility to the plane of operational survival [6]. Executives are forced to seek a balance between the necessity of network densification (deployment densification) to improve 5G coverage and the imperative of reducing the carbon footprint, which requires absolutely new solutions for infrastructure lifecycle management and energy supplier selection [7].

Furthermore, strategic planning today is impossible without accounting for the geopolitical fragmentation of technological standards. Decisions regarding equipment vendor selection have ceased to be purely techno-economic and have acquired the status of national security and even digital sovereignty issues. Senior leadership faces the necessity of diversifying supply chains (supply chain resilience) to minimize risks associated with sanctions restrictions and global logistical disruptions, which often conflicts with cost optimization goals and stands alongside green planetary goals [8].

Materials and methods. The relevance of this article is substantiated by the fact that the telecommunications industry is currently experiencing arguably the most dramatic moment in its history. Never before have telecom operators been so critically essential to the functioning of civilization, effectively becoming its “digital nervous system”, while simultaneously remaining so vulnerable from a business model perspective. Legacy profit extraction methods (voice, SMS) are obsolescing, whereas new avenues (5G, IoT) demand colossal immediate sacrifices, promising only nebulous returns in the future [9]. Chief Executive Officers and top management are compelled to rewrite their professional code - transforming from administrators of stable infrastructure into venture capitalists playing “all-in” on the technological field. Understanding the decision-making mechanics at this bifurcation point, where the cost of error is measured in billions and national security implications, is vital for the industry’s survival.

The novelty of this study lies in the attempt to transcend the artificial barrier between engineering and managerial discourses. Traditionally, academic literature treats telecommunications either as a set of technical protocols or as a financial asset. The scientific contribution consists of adapting the concept of “organizational ambidexterity” to the realities of the telecom sector - demonstrating how successful leaders engineer “business schizophrenia”, compelling one part of the company to operate for stability while the other works to disrupt this stability for the sake of innovation [10]. This offers a novel perspective on the asset-light strategy, interpreting the divestment of towers as a mechanism to liberate management’s cognitive resources for a focus on digital services.

This research is qualitative and analytical in nature, based on the systematic literature review methodology combined with the case study method [11]. The methodology aims to identify key executive-level decision-making patterns under conditions of high uncertainty regarding the

technological transition (from 4G to 5G/6G) and business model transformation. The study's information base comprises three groups of sources covering the period from 2020 to 2025: industry analytics (reports from global consulting firms such as McKinsey, Bain & Company, Deloitte and industry associations like GSMA, TM Forum, providing aggregated data on Capital Expenditure (CapEx), revenue dynamics (ARPU) and technological trends), corporate reporting (Annual Reports and Earnings Call transcripts of major Tier-1 telecommunications operators, including Deutsche Telekom, Vodafone, Telstra, Rogers Communications, for the analysis of strategic declarations and actual investment decisions) and academic and theoretical works (fundamental studies on strategic management, real options theory and organizational psychology).

The source search was conducted using the following keywords: "Telecom Executive Strategy", "Infrastructure Investment Decision", "Organizational Ambidexterity", "Telecom Risk Management", "Digital Transformation Leadership". Theoretical models were applied to interpret the collected data and structure the managerial challenges. Organizational ambidexterity theory was utilized to analyze leadership's ability to balance between the exploitation of existing networks and the exploration of new technologies. Real Options Analysis (ROA) was applied as an alternative to traditional DCF modeling to evaluate the efficiency of phased infrastructure investments under uncertainty [12]. The Three horizons framework was used to classify the investment portfolios of telecom operators [13]. The Three lines of defense model was applied to assess the effectiveness of corporate risk management and compliance structures.

The study employs the purposive sampling method. Specific cases demonstrating polar development scenarios were selected to illustrate managerial dilemmas: Deutsche Telekom and Vodafone (analysis of Divestment strategies and infrastructure management), Optus and Rogers Communications (analysis of failures in risk management and operational Resilience), Spark New Zealand and Telstra (analysis of successful Agile transformation and the implementation of cross-functional teams) [14]. The selection of these companies is conditioned by their scale, the availability of public information and their representativeness for the global telecommunications market. The ethical aspect of using AI and algorithmic governance was examined through the prism of modern ESG standards and the Explainable AI (XAI) concept [15].

It must be acknowledged that this study, being qualitative in nature, is limited by the framework of the chosen methodology and the specifics of the subject matter. The focus was predominantly on the strategies of Tier-1 operators (national giants) possessing significant financial resilience. Therefore, the findings may not be fully relevant for local players or virtual operators (MVNO) operating in a different economic reality. Furthermore, the qualitative case study analysis, while allowing for a deep dive into decision-making logic, does not provide the statistical breadth inherent in quantitative methods. The factor of temporality must also be considered - the telecommunications market is characterized by a high rate of technological obsolescence and conclusions valid for the current moment of transition to 5G Standalone may require revision upon the emergence of 6G standards, making this work a cross-section of a technological transit era rather than a universal recipe for decades.

Results and Discussion

The role of executive leadership in telecommunications companies:

The contemporary landscape of the telecommunications industry cultivates a unique and highly aggressive environment for executive decision-making. In contrast to the majority of high-technology sectors, where the focus is skewed towards either innovation or operational efficiency, the leadership of telecommunications giants is compelled to exist in a state of permanent managerial dualism. On one hand, C-level management bears the responsibility for maintaining critical infrastructure with "five nines" (99.999%) reliability requirements, which presupposes conservatism and risk minimization. On the other hand, the rapid commoditization of telecommunications services demands entrepreneurial agility and a readiness for venture risks from these very same individuals to transform the company from a mere Connectivity Provider into an ecosystem player (TechCo) (see: Figure 1. The investment scissors).

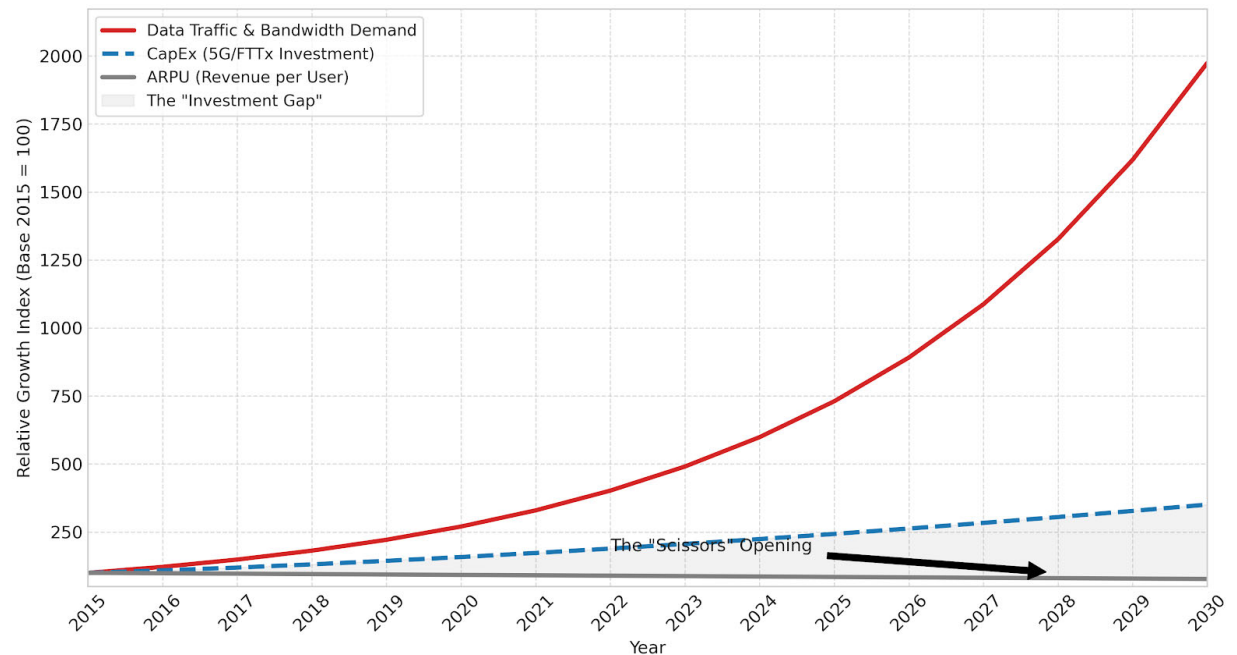


Figure 1. The investment scissors

In management theory, this unique organizational capability to simultaneously succeed in exploiting current assets and exploring new opportunities is termed “organizational ambidexterity”. For the senior leadership of a telecom operator, this entails the necessity of operating across two conflicting time horizons. They are compelled to rigorously optimize operational expenditure (OpEx) and extract efficiency from legacy networks to satisfy shareholder dividend demands today, while simultaneously defending colossal investment programs in tomorrow’s technologies (5G SA, 6G, AI) before the same shareholders, despite the Return on Investment (ROI) remaining unobvious and long-term. The ability to maintain this balance without sliding into stagnation or exposing the company to financial collapse is becoming a key competency of the modern CEO and a paramount necessity [17].

The role of technical leadership is also undergoing a distinct evolution. The boundaries between the responsibilities of the Chief Technology Officer (CTO) and the Chief Information Officer (CIO) are blurring as the network transforms from a collection of physical hardware into software code (virtualization, SDN/NFV). Here, the top technical manager ceases to be merely the chief engineer responsible for hardware. They become a genuine strategic business partner, whose primary task is to overcome the language barrier between engineers and commercial teams [18].

A successful executive today is one capable of translating technical metrics (latency reduction, jitter) into intelligible business values (new revenue streams from B2B verticals), justifying the necessity of multi-billion investments not only by engineering necessity, but also by market potential (see: Figure 2. Organizational ambidexterity in telecom).

Finally, a crucial aspect of leadership becomes the management of cultural entropy. Telecommunications companies have historically been hierarchical structures with a pronounced “silo effect”, where departments operate in isolation. When a new product launch requires the synchronous effort of network engineers, IT developers, marketing and customer service, the leadership role shifts from directive management to an architecture of interactions. Leaders are forced to dismantle established bureaucratic barriers, introducing Agile methodologies into an environment that has resisted change for decades [19]. It is precisely the top management’s ability to restructure the organization’s mentality, rather than simply purchasing new equipment, that determines whether the company will become a leader in the digital era or remain a raw traffic provider for more agile competitors.

Another critical vector of senior leadership attention is the radical revision of talent strategy. The ambition to become a technology company (TechCo) pits telecom operators in direct competition for talent against Big Tech giants, where operators lose out in flexibility and compensation levels. Leadership faces the painful “Build vs Buy” dilemma: whether to invest years and millions in the

reskilling of their own engineering personnel, risking quality loss during the transition phase or to aggressively hire ready-made teams from the market, creating salary imbalances and social tension within the collective.

Decisions in this area have ceased to be a function of the HR department and have moved to the agenda of board meetings, as the lack of necessary competencies (for example, in the fields of Cloud Native or AI) is today the main blocker of strategic development [20].

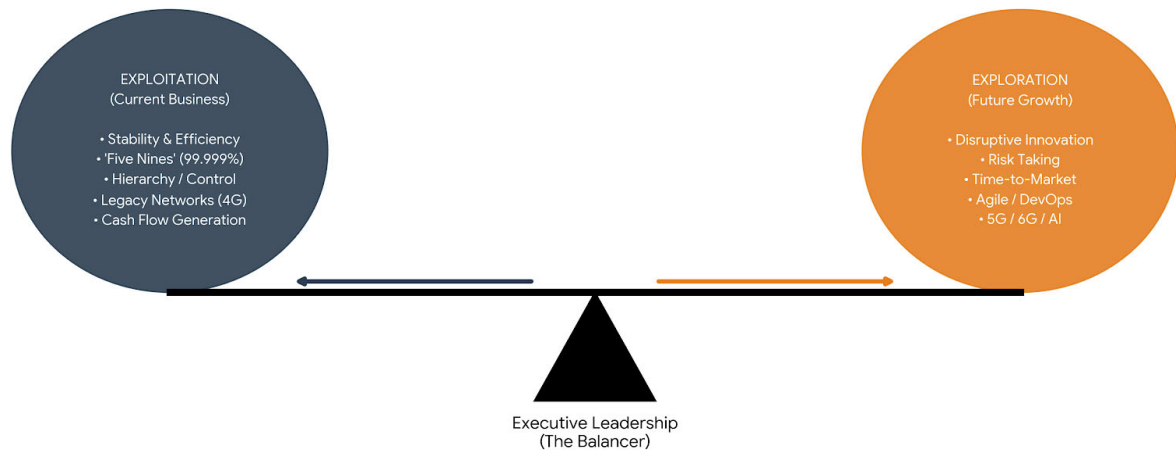


Figure 2. Organizational ambidexterity in telecom

Finally, the very instrumentation of decision-making is undergoing a fundamental shift. The era, where executive authority relied upon retrospective monthly reports and managerial intuition is receding into the past. Modern telecom top management is rapidly gravitating towards a data-driven leadership model, where strategic network evolution decisions are predicated upon predictive analytics and AI modeling. However, a novel challenge emerges here. Leadership must possess sufficient digital literacy to discern genuine data insights from algorithmic errors. The capacity to entrust algorithms with traffic management or investment matters, while retaining critical thinking and ultimate human-in-the-loop accountability, is becoming the new standard of professional aptitude for C-level positions.

Strategic planning and infrastructure investment decisions:

In the telecommunications industry, strategic planning is inextricably linked to capital expenditure (CapEx) management. Telecom remains one of the most capital-intensive industries globally. Operators annually reinvest between 15% and 20% of their revenue into network development. Executive-level investment decision-making occurs today under unprecedented pressure, as it is necessary to finance the deployment of 5G and fiber-optic networks (FTTx) against a backdrop of revenue stagnation and the rising cost of debt capital.

Classical financial valuation methods, such as Net Present Value (NPV) and Internal Rate of Return (IRR), are losing their effectiveness under conditions of high technological uncertainty. Linear planning for 5-7 years ahead becomes impossible when standards change faster than equipment payback periods, creating a significant problem.

Advanced management teams are transitioning to the real options analysis methodology. This approach views investments not as a one-time commitment, but rather as a series of staged decisions (options) that can be expanded, deferred or conversely, abandoned depending on the market situation. This allows leadership to maintain flexibility - for example, to commence with targeted 5G coverage in industrial zones (private networks) before making a decision on a large-scale national rollout.

Nevertheless, one of the most painful strategic decisions of the last decade has been the revision of the attitude towards asset ownership. Historically, the ownership of passive infrastructure (towers, cable ducts) was considered a significant competitive advantage. However, pressure on margins has compelled top management to seek methods for monetizing these assets. Strategic planning now encompasses a complex choice between three models: Build, Share and Divest. The first implies full

control but maximum debt burden. The second involves Radio Access Network (RAN) Sharing with competitors. However, it is worth emphasizing that such an approach requires an unprecedented level of trust from leadership and complex legal agreements with direct rivals. The latter is based on carving out tower infrastructure into separate companies (TowerCos) and selling them. This decision yields a rapid cash inflow (Cash-in) to cover debts or fund 5G investments, but deprives the operator of strategic control and shifts expenses from CapEx to long-term OpEx (lease) [21].

The era of carpet coverage, where networks were built ubiquitously for the sake of marketing claims regarding coverage areas, has ended. It has been succeeded by the Smart CapEx concept (see: Figure 3. Smart CapEx cycle). Investment decisions are now made based on granular big data analytics linking technical metrics with the commercial potential of a specific location (see: Figure 4. Traditional planning vs real options). Management utilizes predictive models to invest only in those cells, where real growth in high-margin traffic is expected or where the risk of valuable client churn (VIP Churn) exceeds threshold values. This shifts the focus of boardroom discussions from the question “- How many base stations will we build?” to “- What Economic Value Added (EVA) will each invested euro generate?”

The Smart CapEx Cycle: From Data to ROI



Figure 3. SmartCapEX cycle

Furthermore, strategic planning in telecommunications is impossible in isolation from state regulation. Executives are compelled to balance between commercial logic (investing in densely populated cities) and license obligations regarding the bridging of the “digital divide” (coverage of unprofitable rural or sparsely populated territories). A successful strategy often entails complex negotiations with the state regarding subsidies or tax incentives in exchange for infrastructure investments, rendering GR (Government Relations) an integral part of the investment process.

The scale of the challenge is corroborated by GSMA data. In the period from 2022 to 2025, global operators will invest over \$600 billion in network development, of which 85% will be allocated to 5G. Concurrently, according to research by Bain & Company, European telecom operators have encountered a decline in Total Shareholder Return (TSR) against the backdrop of a rising CapEx/Sales ratio, which has reached critical levels of 20-25% for a number of players. This creates an unprecedented “investment gap”, compelling management to seek unconventional financial models.

A. TRADITIONAL PLANNING (Rigid Model)



B. REAL OPTIONS ANALYSIS (Flexible Model)

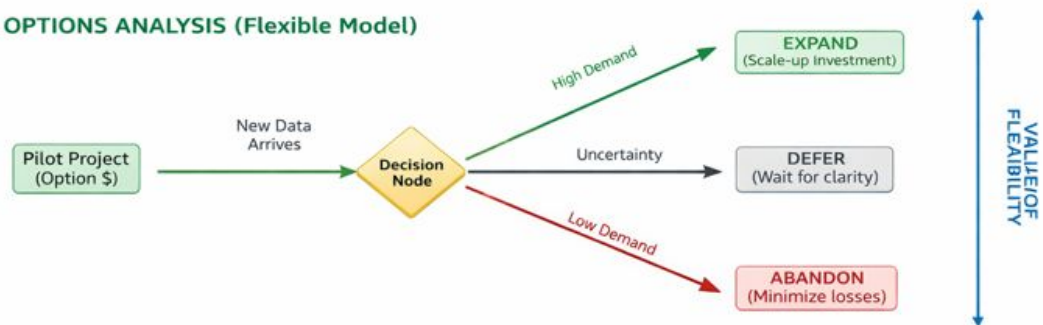


Figure 4. Traditional planning vs real options

A vivid example of this strategy was the transaction executed by Deutsche Telekom in 2022 to sell a 51% stake in its tower division, GD Towers, to an investor consortium for €17.5 billion. This decision enabled the German giant not only to reduce its debt burden by \$11 billion, but also to retain operational control over critical infrastructure through a lease-back mechanism.

Vodafone Group followed an analogous path by carving out its infrastructure into a separate entity, Vantage Towers and conducting an IPO in Frankfurt, which allowed the release of capital for investment in the digitalization of the network core.

Empirical data confirm the efficacy of such an approach. According to McKinsey estimates, the integration of advanced analytics into the capital expenditure planning process allows for a CapEx reduction of 10-15% without compromising coverage quality. For instance, the utilization of AI models for cell load forecasting makes it possible to forego the modernization of up to 20% of sites that traditional engineering models would have flagged as requiring upgrades, thereby redirecting these funds into zones of tangible revenue growth.

Coordination between technical teams and executive management:

A fundamental problem in managing large-scale telecommunications networks is the historically established semantic and value gap between the technical block (Network/IT Operations) and commercial leadership (C-suite). This phenomenon, often referred to as the “corporate Tower of Babel”, lies in the fact that the parties operate with fundamentally different success metrics. Engineers focus on network stability, uptime, and technical Quality of Service (QoS) parameters, while leadership thinks in categories of market share, EBITDA and Time-to-Market.

Effective coordination is impossible without creating an intermediate layer for data interpretation. Senior management cannot make decisions based on raw engineering reports regarding “jitter” or “packet loss”. The key task here is the transformation of technical Service Level Agreements (SLA) into business metrics.

The engineering problem of “congestion in a base station sector” must be translated for the CEO as “the risk of losing 15% of corporate clients in the city’s business center”. To address this task, progressive companies are implementing the role of “business architects” or product owners, acting as translators, who convert technical risks into financial models (cost of inaction).

The classical hierarchical structure of a telecom (where the network department is a separate state) is becoming the main brake on innovation. Under conditions of Software-Defined Networking (SDN) deployment, coordination is shifting to the Agile tribe model. Instead of throwing technical specifications “over the wall”, mixed teams are formed, including network engineers, developers, marketers and finance specialists working on a specific product (for example, 5G Launch for gamers).

The transformation of giants such as Spark New Zealand or Telstra, which have transitioned to a full Agile model, has demonstrated a reduction in Time-to-Market by 30-40% and a significant improvement in employee engagement (eNPS).

A frequent cause of desynchronization is the contradiction in the incentive system. The Chief Technology Officer (CTO) receives bonuses for network reliability, which motivates them to freeze changes and resist the implementation of new software. The Chief Commercial Officer (CCO) receives bonuses for launching new services, which requires constant changes in network configuration. An Executive-level solution comes to the rescue - the implementation of Shared OKR. For example, when the technical team also bears responsibility for the business metric Churn Rate and commercial staff share responsibility for service stability during the launch of promotional campaigns.

The absence of necessary coordination spawns the dangerous phenomenon of “Shadow IT”, where commercial divisions, tired of waiting for request implementation from the sluggish technical block, begin purchasing cloud solutions (SaaS) bypassing the IT department. At the scale of a telecom operator, this creates serious security risks and data fragmentation. Leadership’s task here is not to prohibit initiative, but on the contrary, to create “fast tracks” within the IT department for the rapid testing of business hypotheses, legalizing experiments without detriment to the network core (see: Figure 5. Scheme overcoming the epistemic gap).

In reality, the deep-seated cause of coordination difficulties lies not so much in processes as in the epistemic gap between engineering and managerial cultures. Engineering thinking in telecommunications is deterministic. It strives for technical perfection and Zero Outage, perceiving any risk as a system deficiency. Managerial thinking, being probabilistic and opportunistic, demonstrates that for a CEO, risk is a resource for profit generation. This cognitive dissonance results in technical teams often being prone to “gold-plating” - the creation of excessively reliable and costly systems, where the business demands a Minimum Viable Product (MVP). Resolving this conflict necessitates that leadership cultivate an atmosphere of psychological safety, where engineers are unafraid to report issues and managers are prepared to accept the concept of technical debt as a deliberate financial instrument rather than an indication of IT incompetence.

At the instrumental level, coordination transitions from the exchange of Excel spreadsheets to the utilization of the renowned and ingenious Digital Twin of an Organization (DTO) technology. Modern platforms enable the creation of a virtual network replica superimposed upon business processes. This establishes a “single source of truth” accessible to both the engineer and the Chief Financial Officer. Instead of abstract debates, DTO facilitates scenario modeling: “- If we reduce maintenance costs in this region by 10%, how will NPS change in three months?”

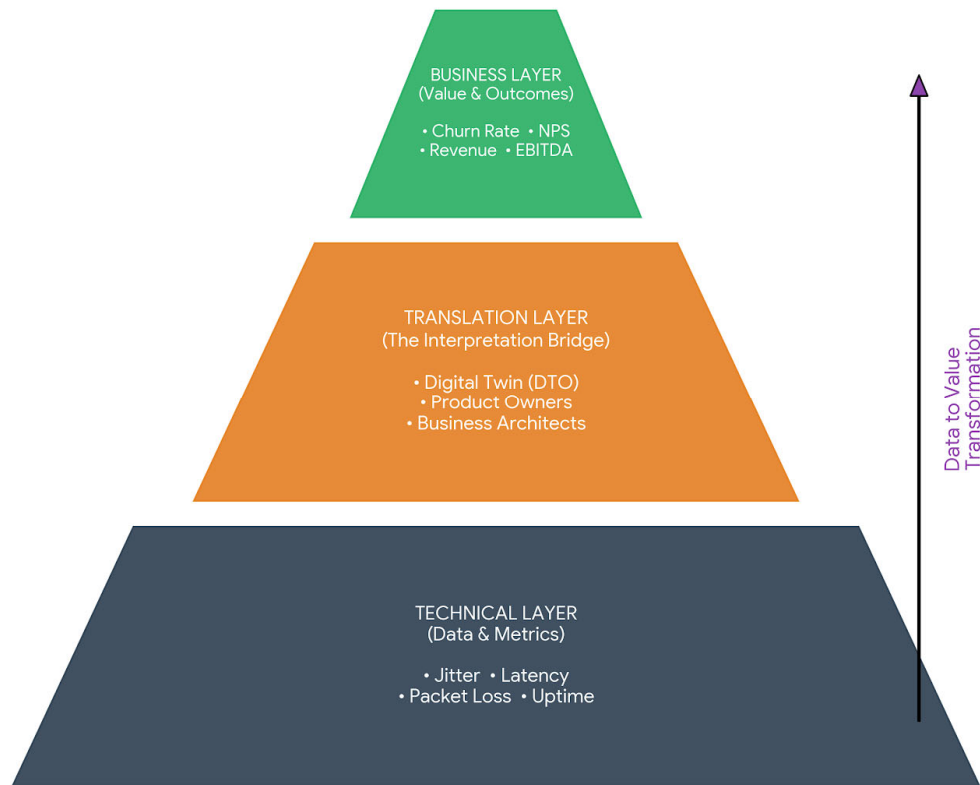


Figure 5. Scheme overcoming the epistemic gap

The technology objectifies the dialogue, shifting the conflict from the realm of opinion to the realm of data, visualizing the non-obvious correlations between engineering staff reductions and long-term revenue decline.

Accountability and risk management in telecom operations:

Telecommunications networks are classified by the governments of most nations as Critical National Infrastructure (CNI). This imposes a particular level of responsibility on executive leadership, transcending customary fiduciary duties to shareholders. A failure in the core network of a major operator today is an event of macroeconomic magnitude, capable of paralyzing banking transactions, the operation of emergency services and the logistics of an entire country.

The traditional risk landscape of telecommunications (physical cable cuts, equipment failure) has become radically more complex. Cybersecurity is becoming the paramount challenge for the C-suite. Operators possess a “gold mine” of data - geolocation, call metadata and the internet activity of millions of citizens. Leadership is compelled to transition from the concept of “perimeter defense” (which is untenable in the cloud and IoT era) to a Zero Trust Architecture (ZTA) [25]. However, the security horizon is rapidly shifting towards the impending Q-day - the theoretical point, when quantum computers will breach current cryptographic standards. In this context, the hybrid governance model described in this study, balancing the rigid “Zero Trust” protocols with Agile innovation - offers a ready-made framework for U.S. regulators, such as the Federal Communications Commission (FCC) and the Cybersecurity and Infrastructure Security Agency (CISA). This model provides a blueprint for navigating the dichotomy between ensuring national security in a post-quantum world and fostering the rapid development of 6G technologies. It allows regulators to standardize a safe harbor for innovation while enforcing strict compliance for critical network layers, effectively solving the dilemma of how to secure national infrastructure without stifling the technological competitiveness of the telecom sector.

The attack on the Australian operator Optus in 2022 (a data breach affecting 10 million customers) led not only to multi-million dollar fines, but also to the resignation of the Chief Executive Officer (CEO), demonstrating the personal liability of top executives for cyber risks [26].

Telecom operators are deeply integrated into global supply chains. Dependence on equipment vendors (Ericsson, Nokia, Huawei) and cloud hyperscalers (AWS, Google Cloud) creates risks that the operator cannot directly control. The strategic task of leadership is diversification. The decision to transition to Open RAN architecture is often dictated precisely by the desire to mitigate dependence on a single supplier (Vendor Lock-in), even if it is economically more expensive in the short term.

To ensure accountability, progressive companies are implementing a rigorous three-tiered corporate risk management structure. Operational management comprises business process owners managing risks “on the ground”. Risk & Compliance is based on a risk directorate establishing methodology and controlling the first line. Internal Audit is built upon independent assessment for the Board of Directors. A problem for many companies is the blurring of responsibility between the first and second lines. The CEO’s task here lies in the clear demarcation of the boundary: who is responsible for risk acceptance (business owners) and who for its monitoring.

Unlike risk management (an attempt to prevent failure), operational resilience is the system’s capacity to function during a failure and recover rapidly. The Rogers Communications case (Canada, 2022) demonstrated that a massive outage, which left 12 million people without connectivity and disabled Interac payment systems nationwide, was caused by an error during a network core configuration update. The incident revealed a failure in change management procedures [27]. Executive leadership must personally participate in crisis situation simulations (war games). Decisions regarding which services to restore first (hospitals vs banks) must be prescribed in Business Continuity Plans (BCP) in advance, rather than being made in the panic of the “fog of war”.

Financial liability for privacy violations has become a significant factor. Fines can reach 4% of global turnover. This transforms compliance into a key element of the shareholder value protection strategy. Leadership is compelled to invest in automated Governance, Risk and Compliance (GRC) systems to minimize the human factor.

Furthermore, the pinnacle of managerial mastery is the transition to antifragility. This is the system’s capacity to improve under the influence of stress. For example, the implementation of the “chaos engineering” practice (popularized by Netflix), wherein engineers intentionally break servers in production to identify vulnerabilities. To a traditional Board of Directors, the idea of breaking one’s own network sounds like madness and immense leadership courage is required to sanction such methods for the sake of the system’s long-term immunity.

The human aspect also cannot be ignored. Pressure on C-level executives during major incidents reaches peak intensity. In the social media era, any outage instantly becomes public, triggering a reputational tsunami. A modern leader must possess high psychological resilience and crisis communication skills, as a single incorrect word in the public sphere (such as the phrase “- We are working on it” without specifics) can crash stock quotes faster than the technical failure itself.

Leadership impact on innovation and long-term network development:

Under conditions of revenue stagnation from traditional connectivity services (Voice & Data), the capacity of executive leadership to stimulate innovation becomes the sole condition for the company’s long-term survival. Leaders confront the classic innovator’s dilemma (as postulated by Clayton Christensen). Rational decision-making impels them to invest in the enhancement of existing products for incumbent customers, where disruptive technologies capable of reshaping the market initially appear niche and financially unattractive.

Effective leadership in telecommunications necessitates the application of the “Three horizons framework” concept for balancing investments. Horizon 1 (Core): optimization of the current network (5G NSA) and process automation. The objective is the defense of current margins. Horizon 2 (Emerging): the scaling of new businesses, such as Private Networks for Industry 4.0 or IoT platforms. Horizon 3 (Future): bets on future technologies, such as 6G, quantum communications and neuromorphic computing. The CEO’s task is to shield Horizon 3 budgets from optimization during crisis periods, as it is precisely they that determine the network architecture in 10 years.

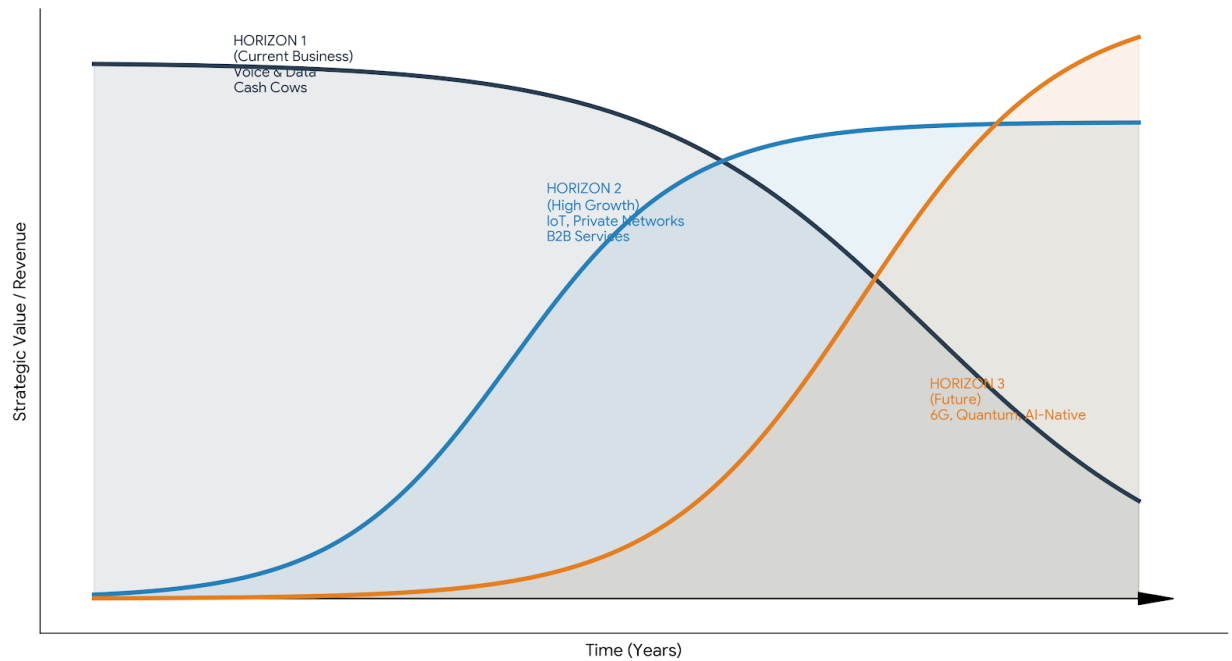


Figure 6. Three horizons of innovation model

The main vector of long-term development is the transition to the concept of Zero-Touch Networks (see: Figure 7. Zero-Touch Networks). Leadership must sanction the transition from human-scripted algorithms to AI-Native Networks. This necessitates a fundamental shift in mentality - leaders must be prepared to entrust critical decisions regarding traffic rerouting and network self-healing to algorithms. This represents a transition from deterministic control (“if A, then B”) to probabilistic governance, which frequently elicits psychological resistance from conservative engineering management.

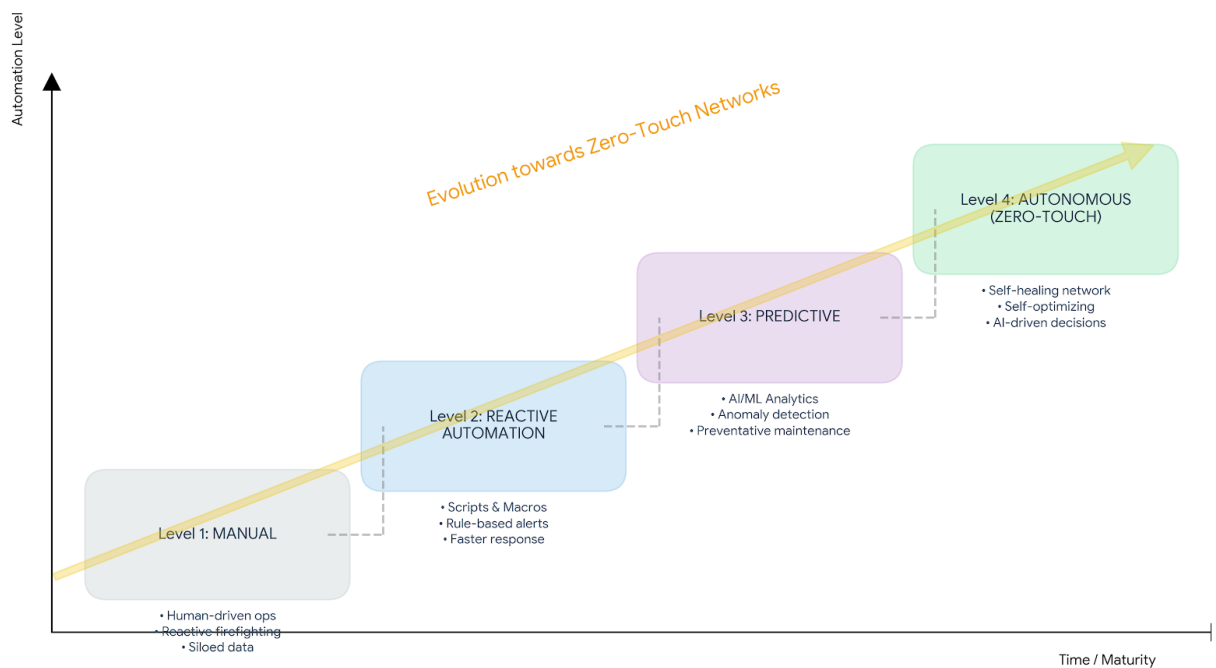


Figure 7. Zero-Touch Networks

The Bell Labs era, where all inventions were generated in-house behind closed doors, has passed. Contemporary telecom leaders must possess the competency of ecosystem orchestration. Today, innovations emerge at the intersection of partnerships with hyperscalers (AWS, Azure),

startups and universities. Management must construct “co-opetition” (competitive cooperation) strategies by exposing their network API to third-party developers. For instance, the GSMA Open Gateway initiative, where operators agreed to harmonize API to enable application developers to leverage network capabilities (quality on demand) globally. This strategic decision shifts the focus from the sale of SIM cards to the vending of software code.

The most arduous challenge for leadership is the reconciliation of two antagonistic cultures. The Operations culture (Ops) demands “five nines” (99.999%) reliability and is intolerant of error. The Innovation culture (R&D) necessitates a “fail fast” approach, where failure is an integral component of learning. Senior management must establish organizational sandboxes, where innovation teams are sequestered from the bureaucracy of the core network yet retain access to live data. The leader’s capacity to shield experimenters from the corporate immune system, which strives to reject anything novel, is a critical success factor.

As networks become autonomous, leadership confronts the issue of algorithmic ethics. If, during congestion, an AI network decides to shed traffic in an impoverished district to preserve connectivity quality in the financial district, would this decision be technically correct? Yes. Would it be ethical and lawful? This is a grey area. Future telecom leaders are obligated to integrate ethical committees into the AI development process to obviate algorithmic bias and ensure the transparency (Explainable AI) of “black box” neural network decisions.

Finally, long-term network development is a matter of the executive’s personal legacy. Infrastructure cycles in telecommunications (10-15 years) frequently exceed the average CEO tenure (4-5 years). This engenders a temptation to cut corners - to demonstrate short-term profit at the expense of underinvestment in long-term architecture. Truly visionary leadership consists of the capacity to make unpopular investment decisions today (for example, the complete replacement of copper with fiber), the fruits of which will be reaped by successors. This demands a high level of professional altruism from top management and accountability for the company’s future.

Conclusions. The study corroborates that the function of executive leadership within the telecommunications sector has undergone a fundamental metamorphosis. The executive can no longer suffice as a mere efficient administrator of stable infrastructure. Contemporary reality demands competencies from the CEO capable of orchestrating “organizational ambidexterity” - rigorously optimizing incumbent operations for profit extraction with one hand, while simultaneously investing in unproven technologies (6G, AI) with the other, notwithstanding the absence of immediate ROI.

Traditional linear planning methodologies (NPV/IRR) are deemed insufficiently agile for the turbulent telecommunications market. The industry is pivoting towards scenario modeling (Real Options Analysis) and Big Data-driven investment decision-making (Smart CapEx). “Asset-Light” strategies (specifically, the divestment of tower assets to TowerCos) are identified as a strategic maneuver liberating managerial bandwidth to focus on the creation of digital services.

The primary impediment to innovation remains the semantic and axiological barrier between engineers (oriented towards uptime and “five nines”) and the business (oriented towards Time-to-Market). The solution resides in the realm of structural reforms - the transition from functional “silos” to cross-functional teams, the implementation of shared KPI and the utilization of Digital Twins of an Organization (DTO) as a single source of truth for all stakeholders.

Under conditions, where the network is becoming critical national infrastructure, risk management has evolved from a mundane compliance function into a board-level imperative. The industry’s future hinges on the adoption of Zero Trust architecture and the concept of antifragility. Finally, regarding the impending threat of Q-day, the study concludes that the proposed hybrid governance model serves as a practical toolkit for policymakers. It demonstrates how regulatory bodies, including the FCC and CISA, can utilize the principles of organizational ambidexterity to architect a regulatory environment that ensures robust defense against quantum threats (via Zero Trust integration) while simultaneously accelerating the deployment of 6G networks.

Furthermore, long-term success is unattainable without ethical leadership capable of assuming accountability for “black box” Artificial Intelligence decisions and prioritizing investments in green development (ESG) over short-term profit.

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