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HOW IS GENERATIVE AI OPTIMIZING OPERATIONAL EFFICIENCY AND ASSURANCE?



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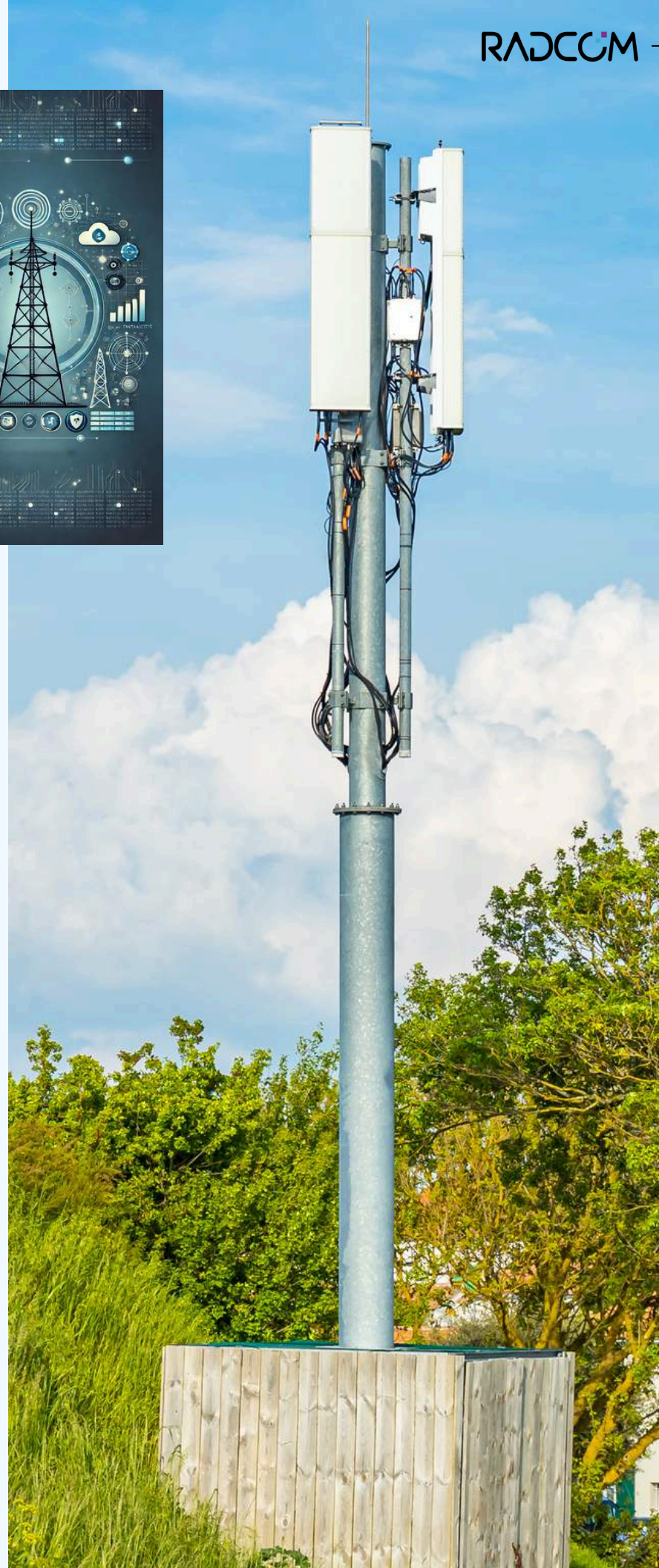
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RADCOM is a leading expert in automated service assurance solutions for telecom operators running 5G/4G networks. Empowering operators with the ability to navigate network complexity, save costs, and drive revenue growth, all while delivering exceptional customer experiences for subscribers.

For more information on our Generative AI applications, part of our automated assurance portfolio, RADCOM ACE, visit [RADCOM NetTalk](#)



INTRODUCTION TO GENERATIVE AI IN TELECOM

Generative AI is transforming the telecom industry by enhancing network performance, customer support, knowledge management, customer experience, and marketing strategies. This technology streamlines operations, improves efficiency, and elevates service quality.

In customer support, Generative AI-driven Q&A systems deliver precise, real-time responses, reducing the need for human involvement and boosting efficiency. Within organizations, it enhances knowledge management by providing quick access to accurate information, thereby improving productivity and decision-making.

Generative AI also optimizes operational efficiency and network performance through dynamic resource allocation, effective network planning, and proactive maintenance. In **network assurance**, Generative AI ensures high reliability and performance by predicting and addressing potential issues before they escalate. This capability is critical for maintaining robust, secure, and efficient networks. In marketing and sales, Generative AI enables personalized campaigns, automates content creation, and increases sales effectiveness.

Despite its significant benefits, integrating Generative AI brings challenges such as data management, privacy concerns, infrastructure scalability, and the need for specialized expertise. Addressing these challenges is essential to fully leveraging Generative AI's potential.

This article delves into the key use cases, benefits, and challenges of Generative AI in the telecom sector, underscoring its transformative impact.



GENERATIVE AI-BASED TELECOM USE CASES

In the next section, we explore key use cases of Generative AI in the telecom sector, categorized into five main areas: telecom Q&A solutions, customer experience management, operational and network efficiency, internal knowledge management, and personalized marketing and sales strategies.



LEVERAGING GENERATIVE AI FOR TELECOM Q&A SOLUTIONS

Generative AI is transforming how telecom operators manage customer support and internal knowledge. By employing Generative AI-powered Q&A systems, operators can significantly enhance customer interactions and boost employee productivity. These solutions harness the power of vast telecom-specific data repositories to deliver precise, real-time responses.



Transforming Customer Support with Gen AI based Telecom Q&A

Generative AI-powered Q&A systems excel in managing a broad spectrum of customer inquiries by drawing from extensive telecom-specific documents and datasets. These systems are adept at providing accurate, instant responses to customer queries, thereby minimizing the need for human intervention.

By automating routine customer support tasks, operators can allow their human agents to concentrate on more complex and nuanced issues.

The key benefits of Generative AI-powered automated customer support include increased efficiency. These systems can handle a high volume of queries simultaneously, ensuring timely assistance. They also offer consistency and accuracy in responses, reducing the risk of human error. Moreover, automating routine support tasks leads to significant cost savings, allowing telecom operators to allocate resources more effectively.



Enhancing Internal Knowledge Management with Gen AI

Generative AI is also substantially impacting internal knowledge management within the telecom sector. AI-powered systems assist employees by providing quick answers to questions based on internal documentation and data, enhancing productivity and accuracy. This capability enables employees to handle complex queries and tasks more efficiently.

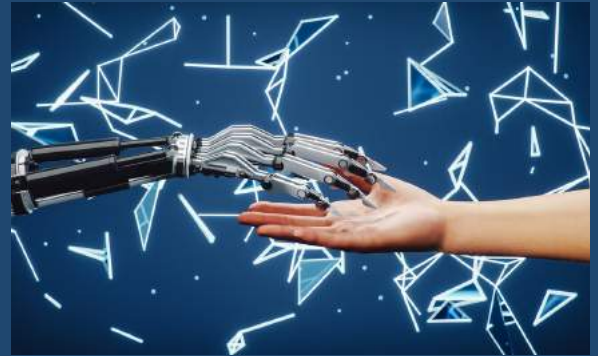
The benefits of Generative AI-driven, internal knowledge management, include enhanced productivity, as employees can rapidly locate the necessary information, reducing time spent searching through documents and data. Improved accuracy is another benefit, with AI systems providing precise answers based on up-to-date internal documentation, thereby reducing the likelihood of errors. Additionally, access to accurate and timely information fosters better decision-making, enhancing overall operational efficiency.

HOW OPERATORS ARE USING GENERATIVE AI FOR TELECOM Q&A SOLUTIONS?

OPERATOR	GENERATIVE AI FOR TELECOM Q&A SOLUTIONS
AT&T	Utilizes Generative AI to enhance productivity across various departments with its Ask AT&T tool . This tool allows employees to engage with Generative AI in plain language for tasks like data analysis and coding, improving operational efficiency and knowledge management.
BT Group	Enhances internal knowledge management by deploying Generative AI solutions that streamline operations and improve service management. An example is the expansion of their strategic relationship with ServiceNow to leverage ServiceNow's Now Assist for Telecom Service Management (TSM), expediting case summarization and review processes , reducing the mean time to resolve issues by a third and cutting case summarization and review times by 55%.
Deutsche Telekom	Business GPT is a Generative AI tool designed to enhance telecom Q&A solutions by providing a secure, data protection-compliant platform hosted on European cloud environments. It integrates internal company documents to ensure high productivity while maintaining strict data security and complying with GDPR and German data protection laws. It automates tedious tasks, speeds up workflows, and improves customer service interactions. Its adaptability for content creation, efficient research, and multilingual support enhances overall service quality.
Orange	The FIND tool leverages Generative AI to streamline information search processes for call center agents , significantly improving efficiency and reducing response times. FIND uses an advanced search engine to browse, collect, and retrieve information from multiple data sources, generating suggested answers for customer inquiries. Incorporating GPT technology, FIND provides enriched answers and links to relevant documents, enhancing the accuracy and speed of responses.
Verizon	Leverages Generative AI to enhance customer experience by deploying Q&A tools like the Personal Research Assistant . This tool helps frontline teams access and review thousands of resources quickly, ensuring that employees can provide accurate and personalized information to customers swiftly.

BOOSTING CUSTOMER EXPERIENCE USING GENERATIVE AI

Global operators are increasingly leveraging Generative AI to transform customer interactions. This transformation is vital for improving network and service assurance, ensuring customer satisfaction, and maintaining a competitive edge. By integrating advanced Generative AI capabilities, operators can offer more efficient, personalized, and responsive services.



Personalized Customer Support and Proactive Assistance

Generative AI chatbots and virtual assistants are enhancing customer support by handling routine inquiries and troubleshooting basic issues efficiently. They provide instant, accurate responses to common questions like billing, service plans, and technical support. Additionally, Generative AI analyzes customer interactions to detect sentiment and predict churn, enabling proactive interventions. This automation increases efficiency, allowing human agents to focus on complex issues, and improves customer satisfaction and retention through quick, personalized responses.

24/7 AI Chat Support and Multilingual Interactions

Generative AI chatbots provide immediate, 24/7 support with human-like accuracy and empathy, reducing wait times and improving customer satisfaction. They also offer multilingual support, making customer service more accessible and inclusive, ensuring consistent and accurate responses.

Advanced Search Tools and Content Generation

Generative AI-powered search tools and content generation enhance customer service efficiency. These tools minimize the time agents spend searching for information and automatically generate clear, concise content, ensuring customers receive easy-to-understand information. This reduces call center load and improves customer satisfaction by providing precise, straightforward information.

Intelligent Agent Pairing and Simplified Interactions

Generative AI simplifies interactions by automating routine tasks and intelligently matching customers with suitable representatives. This improves response times, accuracy, and resource allocation, enhancing overall service quality and customer satisfaction.

HOW ARE OPERATORS USING GENERATIVE AI TO ENHANCE CUSTOMER EXPERIENCE?

OPERATOR	GENERATIVE AI FOR ENHANCING TELECOM CUSTOMER EXPERIENCE
Deutsche Telekom and SK Telecom	Developed a telecom-specific large language model (LLM) in partnership to improve customer service accuracy and efficiency . This Generative AI solution offers personalized support, advanced search capabilities, 24/7 multilingual AI chat support, and intelligent agent pairing, ensuring timely and relevant assistance and enhancing overall customer satisfaction.
Etisalat	Enhances customer experience through Generative AI by offering personalized support, proactive assistance, and Generative AI-driven content generation. Virtual assistants powered by Generative AI provide 24/7 support , handling a wide range of customer inquiries with human-like accuracy and empathy. These AI-driven assistants can understand and respond to customer queries in multiple languages, significantly improving the efficiency and effectiveness of customer service operations.
LG Uplus	Leverages Generative AI to enhance customer interaction and service efficiency by integrating ixi-GEN into chat agents and mobile shop advisor services , allowing rapid application in telecommunications services.
Reliance Jio	Enhances customer experiences through JioBrain and Haptik's Kontakt platforms, offering personalized support and proactive assistance. Using OpenAI's GPT-3.5 and GPT-4, these platforms provide 24/7 AI chat support and multilingual interactions , handling text, audio, and image queries.
Telefónica	It uses Generative AI to power virtual agents, efficiently handling simple customer queries and freeing human agents for more complex issues. This boosts operational efficiency and customer satisfaction by providing quick, accurate, personalized support.
Verizon	Enhances customer experience with Generative AI tools like the Personal Research Assistant and Segment of Me . These tools provide personalized, efficient service, improving customer satisfaction and loyalty through quick, accurate information and tailored plans.
Vodafone	Transforms customer service with SuperTOBi, a Generative AI-based virtual assistant powered by Microsoft Azure OpenAI , providing faster, multilingual support. VOXI's AI chatbot, developed with Accenture, offers human-like interactions and personalized support, enhancing customer service experience.

OPERATIONAL AND NETWORK EFFICIENCY WITH GENERATIVE AI

In the rapidly evolving telecom industry, real-time analysis and response to network demands are critical. Generative AI provides powerful tools to enhance dynamic resource allocation, network design and planning, proactive maintenance, and overall operational efficiency. These capabilities ensure that telecom operators maintain high performance, reliability, and efficiency in their operations.



Dynamic Resource Allocation

Generative AI enhances Dynamic Resource Allocation (DRA) by predicting network traffic patterns, user behavior, and potential congestion points. This enables preemptive resource adjustments, dynamic configuration of network parameters, and efficient performance with minimal downtime. By continuously monitoring performance, detecting anomalies, and evenly distributing network traffic, Generative AI maintains high Quality of Service (QoS). Additionally, it manages virtual network functions, optimizes energy consumption, ensures optimal resource utilization, and provides a reliable network infrastructure.

Network Planning and Expansion

Generative AI assists telecom operators in predicting future demand by analyzing vast amounts of data on current network usage and demographic trends. This enables informed decisions about network expansions and enhancements, ensuring accurate demand forecasting, optimal resource deployment, and enhanced coverage and capacity.

Proactive Network Maintenance

Generative AI plays a crucial role in proactive network maintenance by analyzing network data to identify potential issues before they become critical. This approach allows operators to address problems preemptively, reducing the likelihood of network outages, increasing reliability, ensuring cost efficiency, and extending equipment lifespan.

Operational Efficiency Enhancements

Generative AI enhances operational efficiency by automating routine tasks, optimizing resource allocation, and improving process management. This results in reduced costs, improved productivity, and better service management, allowing telecom operators to maintain high service standards while reducing operational costs.

HOW ARE OPERATORS USING GENERATIVE AI TO DRIVE OPERATIONAL AND NETWORK EFFICIENCY?

OPERATOR	GENERATIVE AI FOR OPERATIONAL AND NETWORK EFFICIENCY
AT&T	Uses Generative AI for vehicle routing optimization, streamlining routes for field technicians to save costs and time. Real-time data processing enhancements with NVIDIA double operational efficiency.
BT Group	Employs Generative AI to optimize network performance and efficiency. While Amazon CodeWhisperer primarily enhances operational efficiency by automating coding tasks, Generative AI also contributes to network performance through dynamic resource allocation & proactive maintenance.
Etisalat	Etisalat leverages Generative AI to enhance operational efficiency by generating new ideas and prototypes based on market trends and customer feedback. This accelerates the development and deployment of new network solutions and services, optimizing operations and maintaining a competitive edge in the telecom landscape.
Orange	Uses Generative AI to enhance network maintenance by facilitating automation scripting and improving interactions between network operating centers (NOC) and field technicians. This improves network management and maintenance efficiency.
Reliance Jio	Enhances network performance through its Generative AI platform, JioBrain. This platform integrates seamlessly with existing network infrastructures, supporting standard data sources, data formats, and protocols, allowing for dynamic resource allocation and network optimization . JioBrain analyzes vast amounts of network data to predict and mitigate potential issues, ensuring seamless connectivity and improved service quality.
SK Telecom	Enhances operational efficiency with Telco LLM, providing real-time support and solutions. Developed with AI leaders like OpenAI and Anthropic, Telco LLM integrates multiple large language models for telecom-specific scenarios. It streamlines supply chain management, decision-making, legal services , marketing, and human resources, improving overall efficiency across departments.
Telefónica	Leverages Generative AI through its partnership with Microsoft and Azure AI Studio to enhance Kernel's capabilities. This integration allows for optimizing resource allocation, automating routine tasks, and streamlining internal processes , resulting in significant cost savings and improved operational efficiency.

MARKETING AND SALES STRATEGIES WITH GENERATIVE AI

Generative AI is enhancing marketing and sales in the telecom industry. By leveraging GenAI for personalized campaigns, content creation, and sales toolkits, telecom operators can enhance customer engagement, streamline processes, and boost productivity.

Personalized Marketing Campaigns

Generative AI enables telecom operators to create tailored marketing campaigns and targeted advertisements based on customer usage patterns and preferences. This level of personalization ensures that marketing efforts are more relevant and engaging, leading to improved marketing effectiveness and higher customer engagement. Key benefits include enhanced relevance, increased conversion rates, and improved customer loyalty through personalized offers and communication.



Automated Content Generation

Generative AI automates the creation of various marketing content, such as social media posts, advertisements, and promotional materials. This automation helps telecom operators maintain a dynamic and appealing presence in their marketing efforts without requiring extensive manual content creation. The benefits of Generative AI based content creation include significant time savings, consistent brand voice and quality, and the ability to scale marketing efforts efficiently by producing large volumes of content quickly.



Advanced Sales Toolkits and Offer Generation

Generative AI boosts sales productivity by providing AI-generated B2B offer generation and advanced sales toolkits. These tools assist sales teams in crafting compelling offers and proposals tailored to the specific needs of business clients, enhancing their ability to close deals and drive revenue. The advantages of Generative AI-driven sales toolkits include increased efficiency in generating tailored offers, higher conversion rates due to personalized and well-crafted proposals, and enhanced sales productivity by automating routine tasks, allowing sales teams to focus on strategic activities and client interactions.



HOW ARE OPERATORS USING GENERATIVE AI TO ENHANCE MARKETING AND SALES?

OPERATOR	GENERATIVE AI FOR ENHANCING MARKETING AND SALES
Etisalat	Employs Generative AI to craft personalized marketing campaigns and automate content creation. This technology analyzes vast amounts of customer data to generate targeted advertisements, emails, and social media posts, ensuring a more engaging and relevant customer experience. These strategies enhance sales by ensuring targeted and effective communications with customers.
LG Uplus	Integrates Generative AI into its marketing and sales strategies through the ' ixi production ' project, creating customized advertisements. The Generative AI-powered 'Target Insight' model reduces the customer analysis process from three months to two days. Future enhancements with ixi-GEN will further improve this analysis.
Orange	Uses Generative AI to deliver personalized recommendations for phones, plans, and services , enhancing customer satisfaction and lifetime value. This personalization boosts customer engagement and loyalty.
Verizon	Leverages Generative AI to create personalized marketing campaigns and automate content generation. It provides tailored recommendations and dynamic customer profiling to boost engagement and sales. Integrated into Verizon's myPlan offering , Generative AI offers personalized plan recommendations based on usage patterns and preferences, improving satisfaction and driving sales.

A person in a dark jacket and yellow pants is climbing a rock face. The background shows a sunset over a forested mountain range.

OVERCOMING CHALLENGES IN INTEGRATING GENERATIVE AI IN TELECOM

Implementing Generative AI in the telecom industry offers immense potential to enhance network efficiency, customer experiences, and operational productivity.

However, this advancement also introduces several key challenges that operators must navigate to realize its benefits fully. These challenges span technical, ethical, and operational domains, requiring a comprehensive approach to address them effectively. Below, we explore telecom operators' primary obstacles in integrating GenAI into their operations.

DATA MANAGEMENT, PRIVACY, AND SECURITY

Data management presents significant challenges in the telecom industry due to fragmented, siloed, and inconsistent data quality. Ensuring data accessibility requires extensive efforts in data cleaning and establishing robust policies around data security and privacy.

Telecom operators must navigate stringent regulations prohibiting data transfer across geographical boundaries, necessitating local data storage solutions and careful planning for compliance and continuity. Ensuring data movement does not violate regional regulations is crucial for maintaining legal and operational integrity.

Additionally, ensuring data privacy and security is paramount. Telecom companies handle vast amounts of sensitive customer data, necessitating robust security measures to prevent breaches and unauthorized access. Implementing sophisticated anonymization techniques and stringent data access controls is essential. Compliance with regional data protection regulations, such as GDPR, must be maintained to safeguard customer information and build trust.

According to a report by Altman Solon, 61% of organizations consider security, privacy, and data governance among the top three challenges in implementing Generative AI models.

A KPMG survey found that 76% of Technology, Media, and Telecom (TMT) executives consider privacy concerns with personal data a top risk management priority for Generative AI. These concerns highlight the importance of integrating strong data management practices with rigorous privacy and security measures.



INFRASTRUCTURE, SCALABILITY, AND CLOUD-READINESS

Integrating Generative AI in the telecom industry demands substantial computational resources, necessitating significant infrastructure upgrades and achieving cloud readiness. Cloud platforms provide the scalability and flexibility to handle Generative AI workloads efficiently. These platforms allow telecom operators to scale resources based on workload demands dynamically, ensuring optimal performance without the limitations of on-premises hardware.

Cloud platforms like AWS and Microsoft Azure are crucial in this transformation. AWS offers tools like Amazon Bedrock and AWS SageMaker, which provide pre-trained models and advanced AI infrastructure, enabling telecom companies to improve network operations and customer service efficiently.

For example, Deutsche Telekom has enhanced its customer service capabilities using AWS's Generative AI solutions. On the other hand, Microsoft Azure supports Generative AI scalability with its ND H100 v5 Virtual Machine series, equipped with NVIDIA Tensor Core GPUs, efficiently handling complex AI workloads.

These cloud platforms also reduce costs through pay-as-you-go models, eliminating the high upfront costs associated with traditional infrastructure. This makes generative AI technologies more accessible and sustainable for telecom operators.

Additionally, they offer advanced Generative AI tools and services that simplify the development, training, and deployment processes, including specialized hardware like GPUs and comprehensive development frameworks. Centralized access to data and models enhances collaboration, enabling teams across different locations to work seamlessly.

SKILLS AND TELECOM DOMAIN KNOWLEDGE

Integrating Generative AI in telecom requires dual expertise: deep knowledge of telecom domains and advanced data science skills. Professionals who can bridge these areas are essential for successful implementation.

There is a growing need for data scientists, machine learning engineers, and Generative AI specialists in the industry. Organizations must invest in upskilling their workforce through targeted training programs.

According to a report by Altman Solon, 51% of organizations report a lack of internal technical expertise to implement and manage Generative AI.

Additionally, domain-specific knowledge in telecom is crucial for AI and Generative AI professionals. Terms like "user," "traffic," "signaling," and "container" have unique meanings within telecom, which AI and Generative A experts must understand to train models effectively.

It's essential for these professionals to prioritize telecom-specific data sources, such as 3GPP standards, to ensure accurate insights and optimal network management. For example, a telecom operator initially misinterpreted "traffic" data in AI analysis due to a lack of domain-specific understanding, highlighting the need for specialized telecom knowledge in AI work.





IDENTIFYING OBJECTIVES AND ROI

Identifying clear objectives and justifying Generative AI's return on investment (ROI) is a significant challenge. Telecom operators must develop business cases outlining how Generative AI can drive efficiencies, enhance customer experiences, and generate new revenue streams. Setting specific, measurable goals, such as reducing customer churn or improving network performance, is essential.

Implementing Generative AI involves considerable upfront costs for technology, infrastructure, and talent. Justifying these expenses requires a strategic approach with a focus on tangible outcomes. A phased adoption allows for measurable improvements and ensures the benefits outweigh the costs. A clear demonstration of Generative AI's potential to drive efficiencies and enhance customer experiences is crucial for justifying the investment.



MODEL BIAS, FAIRNESS, AND TELCO TRUSTED DATA

Model bias and fairness are critical challenges. If the training data or algorithms are flawed, Generative AI systems can unintentionally amplify existing biases, leading to discriminatory outcomes in areas such as network allocation, customer service interactions, and marketing campaigns. For example, biased Generative AI models might result in an unfair distribution of network resources, inconsistent customer experiences, and exclusion or misrepresentation of specific customer segments. Ensuring diverse and representative training data is essential. Implementing vendor-agnostic assurance solutions can enhance data trustworthiness.

Trusted, telco-focused data is also crucial for accurate AI applications. Data must be correlated and contextualized for meaningful insights. Key parameters for trusted data include accuracy, completeness, consistency, timeliness, uniqueness, and validity. Addressing AI hallucinations, where models generate incorrect or misleading results, is critical. By focusing on these aspects, telecom operators can improve the reliability and fairness of their AI-driven services. According to KPMG, **66% of TMT executives cite lies and misinformation as a key risk** associated with GenAI, highlighting the importance of addressing model bias and fairness.

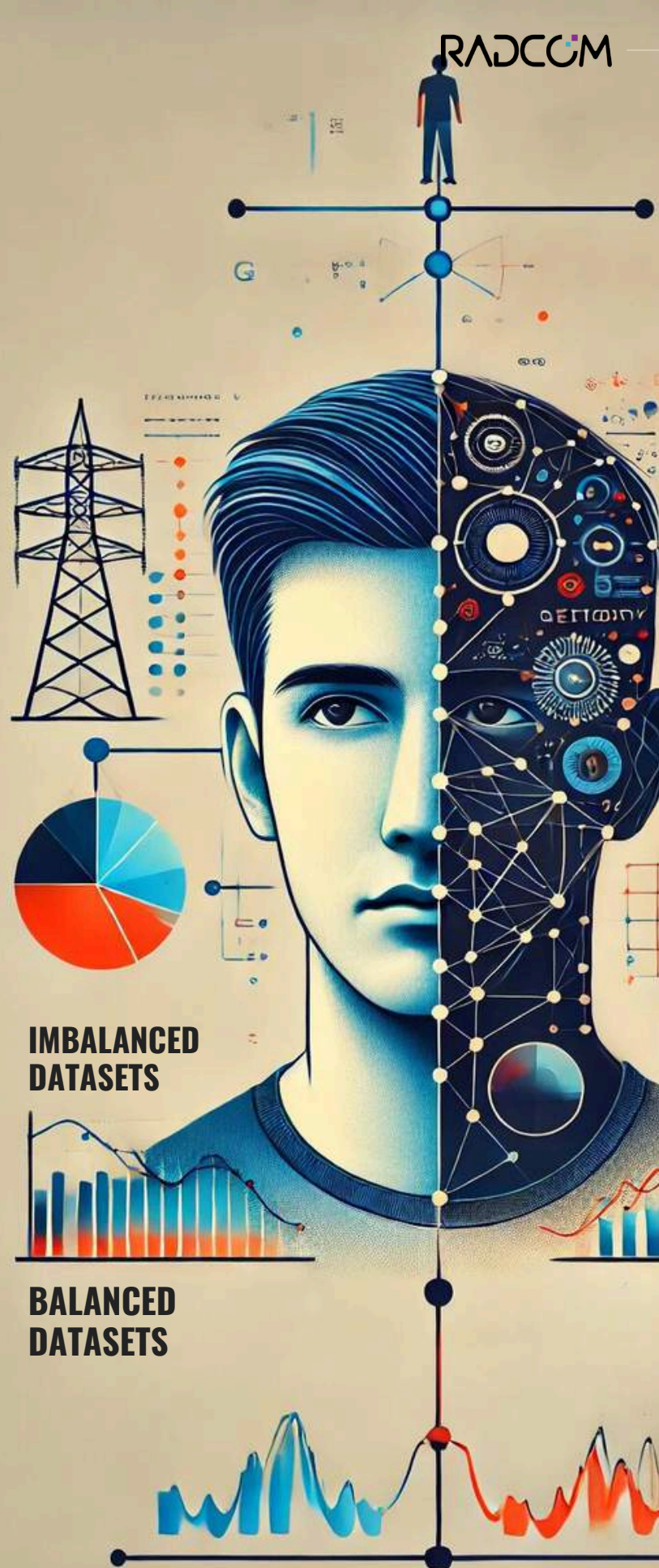
IMBALANCED VS. BALANCED DATASETS

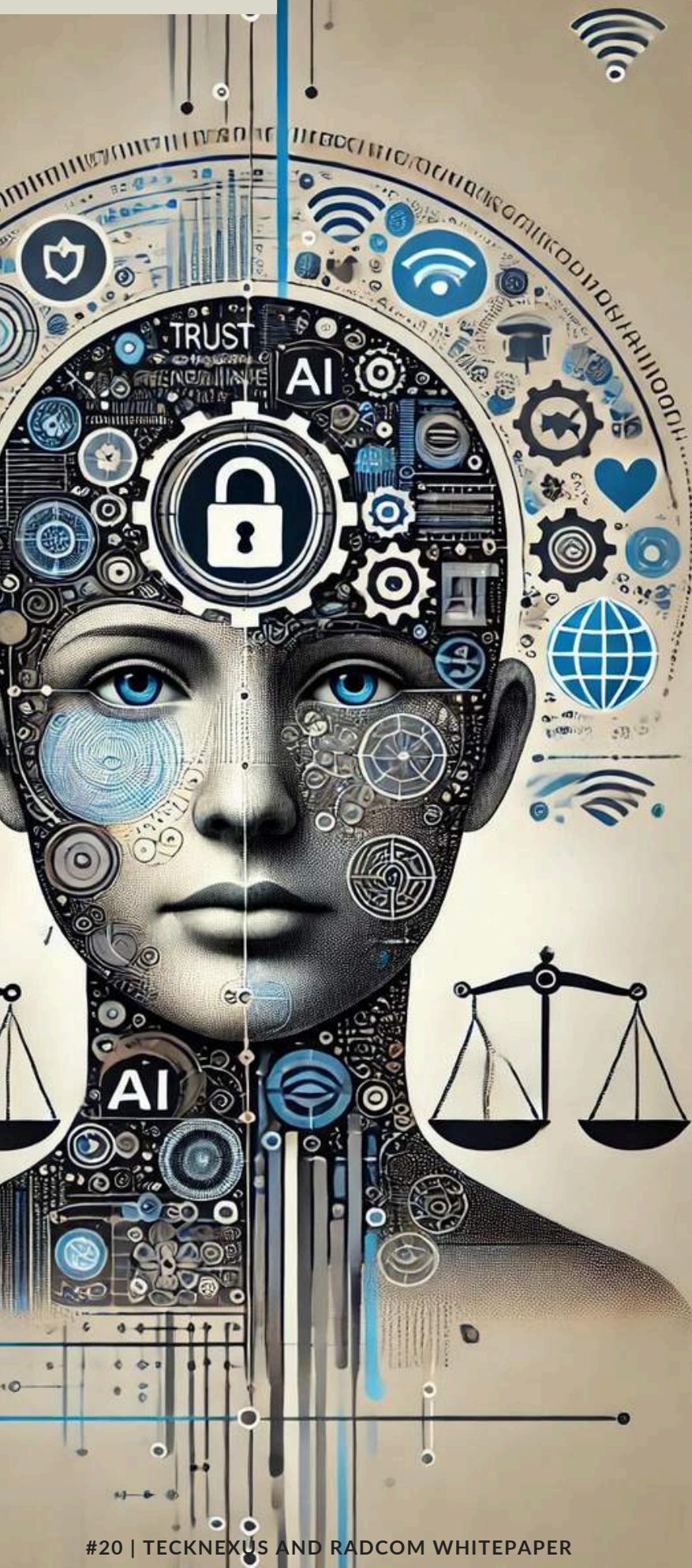
A significant challenge for Generative AI in the telecom space is dealing with imbalanced datasets. Although ample data is available, specific critical issues like network errors are often underrepresented, affecting AI model performance and accuracy.

In a two-class problem with 70% of data in one category and 30% in another, the imbalance can bias the classifier towards the majority class. This leaves the minority class, representing rare but crucial events like network failures, with insufficient data for effective learning. Consequently, the Generative AI system may underperform in identifying and responding to these critical events, compromising network reliability.

Generative Adversarial Networks (GANs) can address this by generating synthetic data to balance the dataset. GANs use a generator to create synthetic data and a discriminator to evaluate its authenticity. This process produces high-quality synthetic data that mimics real data distribution, balancing the dataset and enhancing the generalization capability of Generative AI models.

By generating additional examples of the minority class, GANs improve AI's ability to handle diverse scenarios and edge cases. This results in more robust and reliable systems for network management and optimization, ultimately improving performance and efficiency in Generative AI-driven telecom operations.





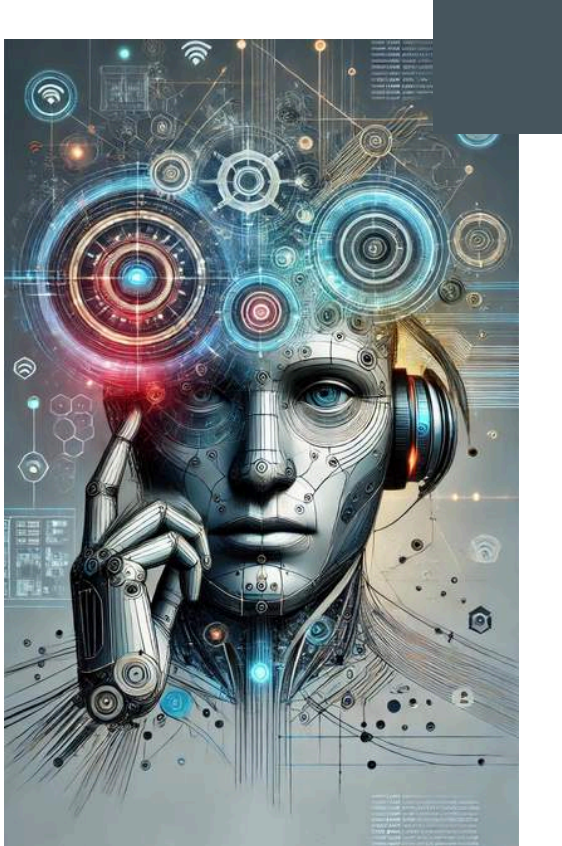
TRUST, TRANSPARENCY, AND ETHICAL GENERATIVE AI

Building trust and ensuring transparency is crucial for the widespread adoption of Generative AI in telecom. Users need to understand how Generative AI models work, the data they are trained on, and how decisions are made.

Transparency in AI practices, including clear communication about data sources and safeguards for accuracy and fairness, is essential. Implementing robust data governance frameworks and complying with GDPR and AI Act regulations address data privacy concerns and enhance trust.

To prevent misuse, bias, and unintended harm, ethical considerations must also be prioritized. Continuous monitoring and including diverse perspectives can help identify and mitigate ethical risks. Simplifying model architectures, incorporating human oversight, and ensuring training data is referenceable and auditable are essential to ensuring explainability and transparency.

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