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GENERATIVE AI: WHY AND HOW SHOULD TELCOS SKILL UP FOR SUCCESS?

Generative AI is expected to create significant value across the telecommunications industry. To capitalise on the opportunity, telcos must build new skills across their organisations. Getting this right is critical given the scale of implementation challenges and the significance of impact on how employees work.

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Executive Summary

Generative AI is estimated to bring the telecommunications industry between US$60 and US$100 billion of value annually[1]. The value add is expected across all telecommunication operator (telco) business units, owing to the democratised nature of generative AI, which puts powerful use cases in the hands of non-developers thanks to its ability to ingest and respond to natural language prompts.

Realising the value that generative AI can offer telcos does, however, pose challenges, not least because of the nascence of this technology. This is evident from our research programme with telco executives, which revealed that two-thirds of those interviewed had not yet implemented any generative AI use cases. Additionally, a survey of over 100 telco executives showed that 51% believe they lack the necessary internal technical expertise to implement and manage generative AI[2]. Challenges highlighted to STL by telcos included commercial (how to ensure investments in generative AI garner returns), technical (how to ensure data architectures are ready to support the use cases you want) and legal (how to handle risks associated with privacy, intellectual property, inequality and discrimination).

STL's research programme identified a range of skills and capabilities essential for telcos to develop for the successful deployment of generative AI (see Figure 1). All telcos will need to have the skills internally to complete some of the phases, such as vision definition, while others may be outsourced to partners, such as the development of foundation models.

Figure 1: Recommendations for building generative AI capabilities within telcos

Implementation phase	Recommended capabilities and skills for successful implementation
Vision definition	• Perform risk/reward analysis to separate hype from the reality • Conduct financial modelling and scenario planning to evaluate return on investment (ROI) • Obtain specialist legal counsel with an up-to-date understanding of artificial intelligence (AI) • Utilise public relations skills to integrate stakeholder needs into the vision
Model development and acquisition	• Cultivate a strategic model selection capability, which requires competency in commercial, technical and legal/risk evaluation • Maintain strategic flexibility to avoid being forced down a single path • Manage vendors/partners to maximise deployment success
Initial implementation	• Leverage data science and domain expertise to maximise data value • Employ data engineering and quality assurance to maintain high-quality data pipelines and use case performance • Design operating models and change management to ensure smooth delivery of a well-integrated solution

[1] The economic potential of generative AI: The next productivity frontier. McKinsey, June 2023.
[2] Telecommunications Generative AI Study. AWS & Altman Solon, September 2023.

Implementation phase	Recommended capabilities and skills for successful implementation
Model fine tuning	• Incorporate telco-specific domain knowledge so solutions address unique business problems • Apply machine learning (ML), data analysis and modelling skills to achieve optimal solutions • Use prompt engineering and in-context learning skills to minimise fine-tuning costs • Carefully evaluate complex datasets to avoid privacy and IP rights violations • Conduct vulnerability assessments and audits to address security risks • Exercise synthetic data skills to minimise the use of real customer data
Scaled implementation, optimisation and utilisation	• Optimise use case design to mitigate barriers to scale • Implement systems to share learnings and flag concerns • Practise prompt writing and prompt engineering to maximise the value of use cases for end users

Source: STL Partners

What are the next steps for telcos?

Most telcos will not have all the skills required for a successful generative AI implementation within their existing workforce, as these skills are already in short supply and there's significant competitive pressure from other technology players in the labour market. Therefore, telcos will need to move fast to upskill, hire and partner to capitalise on the new opportunities generative AI can unlock.

Telcos are at risk of overwhelming themselves if they don't make smart decisions that align with their existing goals and strategy. Telcos looking to accelerate their generative AI progress should consider the following recommendations:

- **Develop an implementable roadmap for generative AI adoption which is complementary but additive to existing AI strategies.** This can be achieved by telcos developing a strong understanding of the unique opportunities and risks generative AI poses to them, auditing existing capabilities and gaps, and aligning the strategy with the organisation's wider goals. A key element of this strategic roadmap will include identifying which use cases should be prioritised across which timescales, which is broadly determined by weighing a use case's potential to add value across the telco against how complex it will be to implement.

- **Create a detailed execution plan to mitigate varied implementation challenges.** By identifying challenges across each implementation phase, telcos can create action plans for how to prepare for and deal with them. This might involve setting hiring goals, governance and implementation guidelines, and identifying which stages require partner support.

- **Seek partners who can accelerate progress and plug capability gaps.** The complexity of generative AI implementation is likely to necessitate partner support, particularly during the most technical phases of implementation such as model fine tuning, initial implementation and scaled implementation.

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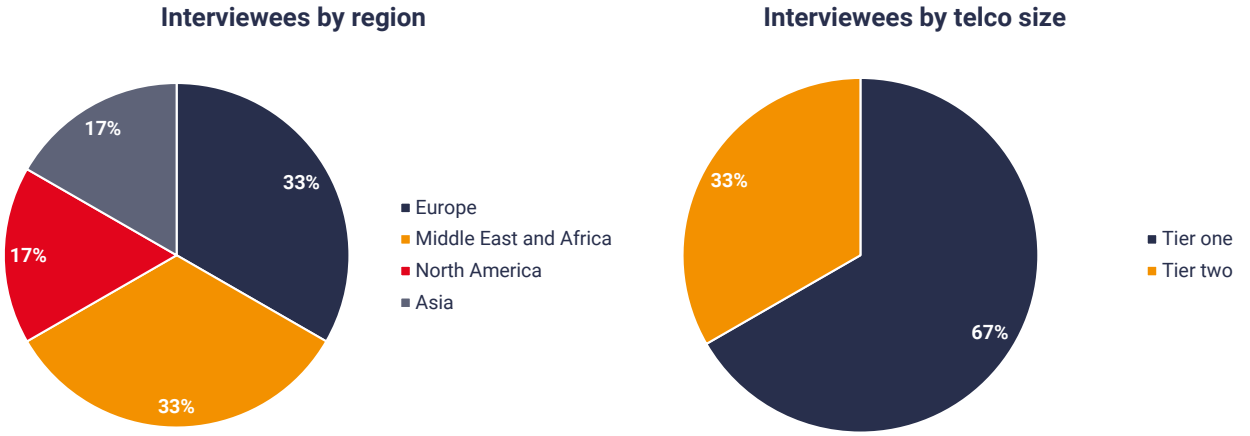
The generative AI journey has many challenges, but the destination is worth it

Generative AI is estimated to create US$60 to US$100 billion worth of value for the telecommunications industry each year, equivalent to 2.3% to 3.7% of its annual revenue globally. Much of this value will be achieved through increased internal operational efficiency, as well as through enhancements to existing telco products and services, and the introduction of new generative AI-as-a-service offerings for customers, as highlighted by our interview programme.

The following paper crystallises insights on the opportunities and challenges surrounding generative AI in the telco industry. The insights were gained through an in-depth interview programme with telco executives primarily in either data or strategy functions. A breakdown of the profile of interviewees can be found in Figure 2 below.

Figure 2: Our research programme consisted of in-depth interviews with six telco operators globally



Source: STL Partners

A key reason for the expected scale of impact of generative AI is the fact that it can be used by those without deep technical skills and coding experience. Models can be interacted with through natural language prompts, which removes a technical barrier to entry. With generative AI, it is possible for any employee across any business unit to leverage impactful use cases and improve their productivity. Some telco business units are expected to benefit from more than 17 discrete use cases[3]. STL will be augmenting our current financial impact assessment for AI and automation[4] to include these use cases and determine which have the most significant ROI impact in the coming months.

[3] Gen AI: Where should telcos start? STL Partners, September 2023.
[4] AI & automation for telcos: Mapping the financial value. STL Partners, January 2022.

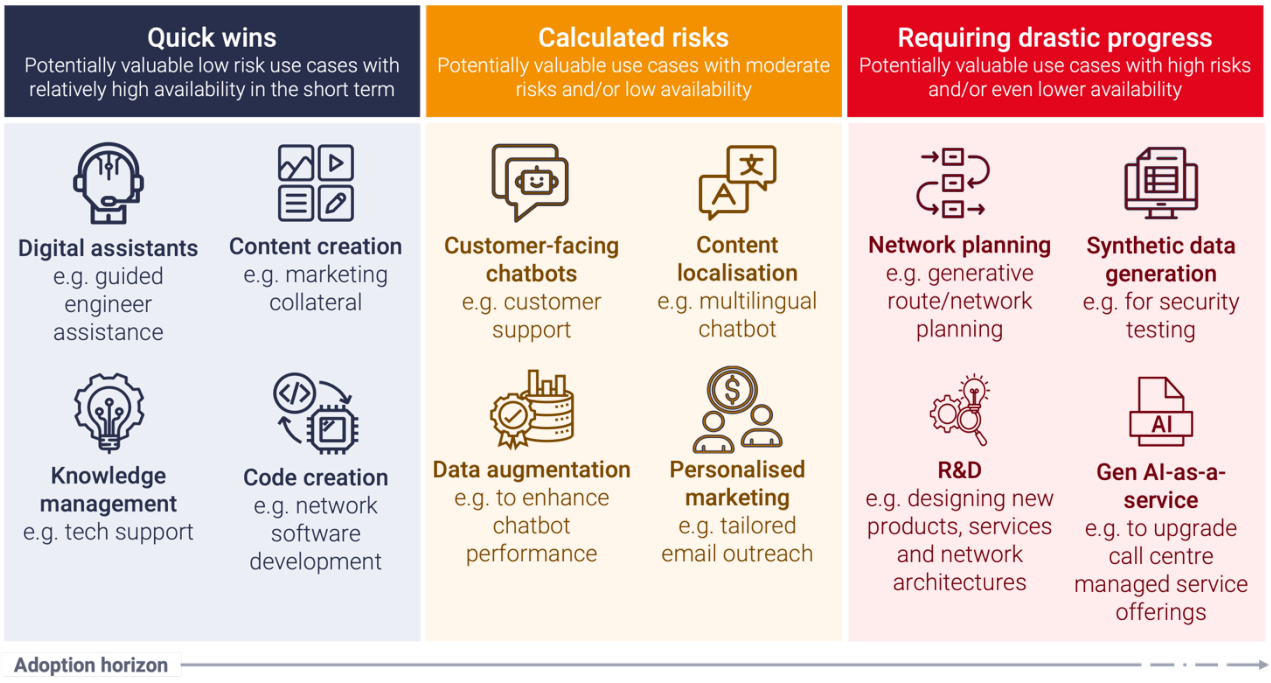
Furthermore, beyond purely financial value, generative AI is expected to deliver improved job satisfaction through creating an engaging work environment in which employees can focus more of their time on complex, creative and collaborative endeavours. A recent study shows that two thirds of over 2000 UK workers have experienced an increase in job satisfaction when they've embraced generative AI[5].

The potential scope of generative AI applications in telecommunications is broad. This is generating buzz within the industry, but telcos risk overwhelming themselves if they are overly ambitious without careful use case prioritisation. From STL's existing research and our interview programme, we understand the use cases that telcos want to prioritise in the near vs. medium vs. long term. The key factors affecting when telcos will seek to adopt different use cases include:

- Whether the use case unlocked demonstrable value for early adopters (even when these are from outside the telco industry).
- The availability of data to feed the model.
- The degree of risk associated with factors such as legal, data privacy and operational stability.

Figure 3 illustrates where telcos are focusing their attention across different time scales.

Figure 3: The costs of generative AI necessitate careful use case prioritisation



Source: STL Partners

[5] 'Generation AI': New wave of workers adopt generative AI in pursuit of greater job satisfaction. HRreview, October 2023.

Generative AI poses unique risks and challenges for telcos that require focused attention and expertise to solve

Many telcos want to become more like the largest technology companies (techcos), looking to new technologies to drive value while core connectivity growth is stalling. However, telcos, judged according to their reliability and sensitive handling of customer data, are concerned about the potential risks that generative AI use cases pose, particularly in their current, nascent form. For instance, one interviewee in North America suggested that security breaches have the potential to cost a telco over US$100 million per year. These risks feed into the multi-faceted challenges telcos will face when implementing generative AI. The following broad themes emerge across these challenges.

- **Commercial.** The cost of generative AI is daunting, ranging from US$0.5 million for basic coding aids to up to US$200 million to develop and train foundation models[6]. Investment carries risk due to the rapidly evolving nature of proprietary solutions, creating a challenge in "picking the right horse." Furthermore, the global regulatory environment (one that is in flux and is only just beginning to address the implications of this technology) makes it unclear whether vendor solutions will remain compliant with future legislation.

- **Technical.** The unique demands of data governance for the broad datasets needed for training and fine-tuning generative AI, along with the need for modernised data architectures and more capable technology stacks, adds a layer of complexity. Furthermore, limitations like those associated with the number of API calls some models can currently handle, can prohibit the scale required to meet customer demands for generative AI powered services. One of our interviewees stressed that their generative AI chatbot hasn't been able to go into production due to these constraints.

- **Legal and ethical.** Risks associated with privacy, intellectual property, inequality and discrimination are equally complex, with potential impacts on employment, inequality and privacy require careful consideration by telcos before diving into generative AI implementation. This is an area where telcos need to be particularly careful. As of November 2023, the US legal system was dealing with over one hundred AI related lawsuits and the pace of litigation is expected to accelerate over the coming years[7].

This report explores the findings of our research programme which centred around exploring the roles, skills and capabilities necessary for telcos to successfully mitigate the challenges they face across the different generative AI implementation phases.

[6] Technology's generational moment with generative AI: A CIO and CTO guide. McKinsey, July 2023.
[7] AI is about to face many more legal risks. Here's how businesses can prepare. Fortune, November 2023.

Figure 4: Skills requirements across different functional domains at each phase of generative AI deployment

Deployment phase

Functional domains	Vision definition	Model development and acquisition	Initial implementation	Model fine tuning	Scaled implementation, optimisation & utilisation
Strategy and C-suite	• Risk/reward strategic analysis skills to inform realistic Gen AI ambition • Stakeholder management skills • Financial modelling skills to assess model/use case ROI	• Strategic model selection capability that combines skills from procurement, governance, legal & risk, and Data, AI & project delivery teams • Strategic adaptability to avoid being locked in to decisions	• N/A	• N/A	• Target setting and monitoring skills to evaluate generative AI impact and continuously update the CSP's generative AI ambition and strategic priorities
Procurement	• N/A	• Commercial model evaluation competence • Understanding of vendor capabilities when it comes to fine-tuning • Vendor and partner management skills	• Vendor and partner management skills	• Knowledge of how to buy datasets e.g. through vendors or licensing • Vendor and partner management skills	• Skills for evaluating training suppliers
Governance, legal & risk	• Specialist legal expertise with AI and telecommunications knowledge • Stakeholder sentiment assessment (public relations)	• Legal & risk due diligence to avoid developing/acquiring models that introduce unnecessary risks to the CSP • Ethical evaluation competency to protect stakeholders	• Tool compliance assessment skills • Capability to advise on privacy, security and governance concerns	• IP legal expertise to assess usability of datasets • Cybersecurity skills to evaluate system vulnerability and security • Synthetic data skills	• Monitoring tool development and adherence to governance, legal and risk requirements skills • Continuous learning to maintain compliance with latest requirements
Data, AI & project delivery	• N/A	• Tech evaluation competence such as model data quality analysis skills to inform procurement decisions • AI/ML engineering capability if in-house development is chosen	• Data science and engineering to ensure data preparedness • Quality assurance skills to test model performance • Skills in operating model design and leading change	• ML, data analysis, and modelling skills to create telco use cases • Prompt engineering • Data pre-processing and quality assurance expertise • Synthetic data design and utilisation skills	• AI/ML engineering skills to limit barriers to scale and optimise (e.g. using RAG) • Prompt engineering skills • Computational expertise to support efforts to scale • User training & support skills
End users (these will exist in all major telco domains incl. networks and IT)	• N/A	• Generative AI awareness to identify promising models and use cases • Experience supporting the requirements gathering process	• Familiarity with Gen AI use cases and tools to test early prototypes and feedback on live deployments	• Ability to offer constructive feedback on early model iterations based on demos • Familiarity with iterative AI model fine-tuning process	• Gen AI literacy & awareness • Prompt writing skills • Collaborative mindsets to encourage learnings and best practice sharing • Awareness of risks and problems when using Gen AI

Source: STL Partners

A cross-domain effort is required to address challenges at different deployment phases

This section addresses the skills and capabilities telcos must access to address the challenges they face at each phase of their generative AI deployment journey.

Vision definition

Engaging senior leadership and defining a vision for generative AI

Engaging senior leadership and defining a clear vision for generative AI is essential to ensure adoption aligns with the company's broader strategic goals and that initiatives receive the necessary resources. Vision definition lays the foundation for successful implementation, telcos risk building a house on sand if they downplay the importance of this step. Skills required to build a solid foundation for generative AI implementation include:

> Without a clear company-wide generative AI strategy and a centre of excellence, you end up with many teams attempting to build niche use cases but very few scaling to production.
>
> *Emerging tech research, CITO office, Tier 1 NAM telco*

- **Risk/reward analysis.** Telcos must have a clear understanding of generative AI's risks and rewards to separate the hype from the reality and manage the expectations of stakeholders, crafting a vision that excites stakeholders but does not introduce unnecessary risks. It's also important to assess these risks on a use case by use case basis. For example, carefully assessing how you use generative AI on the network will be essential. While in some instances, it might be too risky to allow generative AI agency over the network, it could offer value in reporting network status updates to those who aren't network engineers.

> The network has the biggest impact on our bottom line. Generative AI use cases aren't mature enough to use to control our network. It's like using a gun to fish with.
>
> *Emerging tech research, CITO office, Tier 1 NAM telco*

> An inability to assess our ROI is limiting our conviction over investments and hence progress.
>
> *Internal Strategy Consultant, Tier 1 MEA telco*

- **Ability to accurately assess the ROI of generative AI and its different use cases.** Telcos must be adept at financial modelling that incorporates scenario analysis to ensure decisions are resilient to the rapid rate of change in generative AI and the high levels of uncertainty around how it will be regulated in different jurisdictions.

Accommodating for regulatory uncertainty and ethical concerns

Regulatory uncertainty can hinder the adoption of new technologies, particularly with generative AI which requires the ingestion of large amounts of potentially risk bearing data. Furthermore, ethical

adoption is essential. Employees must know that their jobs are not at risk to avoid cultural resistance, customers must know that generative AI does not sacrifice their privacy and safety and investors who are increasingly concerned with environmental, social and governance matters must know that a telco's generative AI vision is concordant with their investment values. Skills required to mitigate these risks include:

- **Specialist legal counsel.** That continuously updates its knowledge of AI legislation and telecommunications, so company policies around generative AI procurement, development and usage are coherent and comprehensive, accounting for the varied risks at every stage of implementation.
- **Public relations skills.** To support governance, legal and risk teams with understanding the sentiment of different stakeholder groups so they can adjust governance frameworks accordingly and advise leadership when a change in course may be necessary.

> "If progressing with AI puts our sustainability targets at risk, it may not align with our company's vision."
>
> *Senior Strategy Manager, Tier 1 European telco*

> "To address legal and ethical challenges, we've setup multi-functional policy groups and an ethics council to ensure compliance. We also make sure to internalise legislation such as the EU AI Act, even before it's enacted."
>
> *AI & NLP technologies manager, Tier 1 European telco*

Model development and acquisition

Once a generative AI strategy has been developed, telcos will need to build, buy, or even open-source foundation models for their chosen use cases.

Sourcing generative AI models, including vendor selection and management

Many telcos are trying to decide whether to develop generative AI capabilities through insourcing, outsourcing or even "co-sourcing," an approach being pioneered by SK Telecom and Deutsche Telekom that involves collaborating on custom-model development and splitting development costs. Each approach has a different level of risk and reward when it comes to customisation, cost management, quality control and data privacy. The best approach is likely to vary at the use case level.

Optimising model selection requires telcos to understand the pros and cons of buying, building or open sourcing foundation models. Buying in ready-made proprietary vendor models can be an effective way to quickly access high performing models, whereas building in-house may offer more customisability for niche telco use cases. Using open source models on the other hand, can enable telcos to marry the two and access high performing models for niche use cases, without investing as much as would be required for a self-built model. Leveraging open source models seems to be gaining a lot of traction. There are, already over 7,000 variants of Llama 2, for instance[8]. However, as with building in-house, leveraging open-source foundation models requires higher levels of expertise during

[8] The Llama Ecosystem: Past, Present, and Future. Meta, September 2023.

later phases of implementation which can hinder progress if telcos don't have access to skilled personnel. These considerations require the following model selection capabilities:

- **Commercial evaluation competency.** Telcos must understand how different models and vendors affect the telco's level of control and competitive advantage. From a financial perspective they need to understand the ROI and payback period of each approach. This will involve modelling the revenue and cost implications of different approaches. For instance, they will have to consider whether to use foundation models 'as is' and leverage prompt engineering to tailor the model or whether an industry-specific model is required. Using "off-the-shelf" models like ChatGPT can help avoid high infrastructure costs but may lead to high costs associated with an increased transactional volume. A comprehensive ROI / payback analysis is needed to understand whether to take this approach.

- **Technical evaluation competency.** This contributes to a clear commercial evaluation and requires telcos to evaluate their own technical capabilities and those of potential vendors and partners. For example, if a telco has access to skilled prompt engineers and in-context learning skills, they can use these skills to enable a foundation model to be more responsive and accurate, without the need for extensive, costly model development or retraining. Another key aspect of this evaluation will be assessing the ease of model integration with a telco's existing systems.

- **Legal/risk evaluation competency.** Understanding vendor and partner adherence to your own jurisdiction's legal and ethical requirements (in the form of responsible AI metrics), as well as their track record in handling sensitive data is required to minimise associated challenges early. For example, to mitigate risks associated with hallucinations or legal / IP infringements from model outputs, some vendors are incorporating indemnities into their contracts, ensuring that telcos are compensated for any damages incurred. Telcos, therefore, should be adept at evaluating indemnities and the extent to which they are actually protective.

- **Strategic flexibility.** Having the capability to make flexible and reversible decisions that do not force you down a single path and allow exploration into new approaches, vendors and partners in the future is critical. This is particularly important as models become better adapted to specific verticals and use cases, and some get smaller in size, resulting in lower costs, reduced electricity consumption, and improved latency.

> If you are big enough to be multi-cloud, then you are big in enough to be multi-vendor with generative AI. If you choose one though, you should go all in and leverage the hyperscaler's ecosystem.
>
> *Data & AI Executive, Tier 1 APAC telco*

- **Vendor/partner management.** Having dedicated personnel who manage the relationship with vendors to ensure timely delivery, adherence to quality standards, and alignment with the telco's specific requirements can mitigate project drift and alignment issues once models are integrated.

Initial implementation

Leading telcos have reached this stage where, in pockets, they are starting to implement small-scale, explorative generative AI use cases.

> You need to get data right before you can jump into generative AI. Success relies on the quality of your data, the complexity of your data ecosystem, where you're sourcing it from and how much protection you have around it.
>
> *Executive, Data & AI, Tier 1 APAC telco*

Data preparedness

Generative AI can be more demanding on telco data architectures and practices than other forms of AI. Datasets are increasingly diverse, expansive and unstructured making it more challenging to identify, organise and utilise the right data. For example, many telcos are implementing a knowledge management tool as one of their first generative AI use cases. This use case needs to have access to data from several unstructured datasets from siloes across a telco. Ensuring the model can access all those different siloes can be a significant implementation challenge. An example of this in practice was highlighted by an executive for a European telco: if a model has been asked to provide details on an active policy, it might find ten different versions of documents of that policy. If nine of these versions are outdated but not clearly labelled as such, it may not be able to identify which one is valid. The following areas of expertise were identified as necessary to mitigate these kinds of challenges:

> Generative AI requires far more attention to be paid to data quality, security and integration than previous "analytical" forms of AI.
>
> *Internal Strategy Consultant, Tier 1 MEA telco*

- **Data science and data domain specific expertise.** Once a model has been fine-tuned, ensuring it can leverage the most useful datasets during operation is critical. This requires close collaboration between data scientists who understand how different datasets feed into the success of different applications and domain experts who can assist in identifying datasets that may be useful due to their understanding of the telco's data environment, including how data is produced and regulated.

- **Data engineering skills.** To manage the data pipeline to ensure high-quality data remains available. This ensures that once a generative AI model has been fine-tuned and fully integrated into telco systems, it has access to the most up to date datasets.

- **Quality assurance analysis capabilities.** Once the model has been integrated, experts in quality assurance testing will be necessary to test the model against criteria for accuracy, efficiency, reliability and adherence to the telco's responsible AI metrics. This ensures that any performance issues are raised to the relevant engineers who have the capabilities to diagnose and cure the contributing problems.

Operating model design

Designing an operating model for generative AI use cases will have a significant impact on a telco's people, processes and technology. If operators are too gung-ho and operating models are not carefully considered, there is a risk of damaging operational efficiency and introducing risks that could damage service quality and ultimately an operator's brand.

> Keeping a human in the loop ensures accountability is maintained for any unintended consequences of using GenAI.
>
> *AI Governance Lead, Tier 1 European telco*

- **Skills in operating model design and change management.** These are critical to ensuring a smooth implementation. Effective project teams will ensure important information from technical teams, internal subject matter experts (SMEs), and other experts are shared across the organisation. These teams should also be adept at change management, fostering a collaborative environment to ensure lessons learnt by teams implementing initial generative AI use cases are shared with other relevant markets and business units. Several telcos stated they have internal intranets and feedback processes designed to ensure best practice is captured and proliferated across the organisation.

> Implementing generative AI is more a change management exercise than an IT exercise.
>
> *Data & AI Executive, Tier 1 APAC telco*

Model fine tuning

Not all generative AI use cases will require model fine tuning. For instance, some of the productivity tools being trialled within telcos today do not require this. However, when use cases diverge significantly from the tasks the model was trained to do, fine tuning with telecommunication-specific terminologies, workflows and customer interactions may be necessary. Engaging professionals with experience in implementing generative AI models at telco operators can help telcos determine whether fine tuning is necessary for specific use cases.

Model accuracy and use case relevance

This will require adapting the model to accurately interpret and use organisational-specific data. Such a process is demanding due to the need for an in-depth understanding of the telecommunications sector and rigorous data curation, which is complicated by the diversity of unstructured data required to fine tune generative AI models. Some of the skills necessary for successful fine tuning include:

- **Deep understanding of the telco and intended use cases.** Involving SMEs who understand the unique business problems a telco is looking to solve.
- **Skills in machine learning, data analysis and modelling.** Once target use cases have been set, machine learning and data specialists play a critical role in customising pre-trained models during the fine tuning process. They must possess a deep understanding of generative AI models so they can execute the fine tuning process, which involves preparing datasets and using those to train the model, before finally validating that it is achieving its intended objectives. For

many telcos, this is a key capability they will look for from partners, working with systems integrators, for instance, to help implement a foundation model within their specific organisation.

- **Prompt engineering and in-context learning skills.** Using prompt engineering and in-context learning during model fine-tuning enables the AI to better interpret and adapt to various contexts and user prompts. Doing this well can ensure the model learns to discern subtleties in data, leading to more accurate and relevant outputs. Ultimately, the successful application of these skills enhances a model's responsiveness and effectiveness for telco specific use cases.

Cybersecurity, privacy and IP rights

One key issue is security and ensuring user privacy and intellectual property rights are not inadvertently violated when generative AI is used. There are ways to mitigate these risks using teams that are highly skilled in the following areas:

> Security breaches can cost us over US$100 million per incident which makes it difficult to justify partnering with generative AI vendors who cannot guarantee security. As a result, we prohibit the use of GPT-4.
>
> *Emerging tech research, CITO office, Tier 1 NAM telco*

- **Complex dataset evaluation.** Ensuring that fine tuning models on telco datasets doesn't result in the exposure of telco-owned proprietary information or sensitive customer data to the wrong parties is critical. This requires a capability to evaluate datasets that are typically more challenging to label than datasets used for more traditional AI use cases.

- **Cybersecurity.** To address cybersecurity concerns, telcos need skilled cybersecurity experts to actively look for vulnerabilities in the AI system and patch issues once discovered. For example, by conducting vulnerability assessments and security audits, they might find that certain inputs can trigger unintended model behaviours or expose sensitive data, and then advise AI/ML engineers to adjust the model or its input filters to mitigate these risks.

> By conducting security audits during testing, we avoided implementing a use case that was inadvertently sharing customer data.
>
> *AI & NLP technologies manager, Tier 1 European telco*

- **Synthetic data.** Using synthetic data minimises the use of real customer data, which safeguards privacy and reduces security risks associated with data breaches. It can also be used to ensure the training process is free from IP rights infringements and that compliance and integrity in the model's development and application is maintained.

Scaled implementation, optimisation and utilisation

As generative AI use cases are proven, telcos will need to move rapidly to reskill their whole organisation for adoption at scale. They will also need to ensure that any vendors they have selected are actively supporting them on their journey.

Technical barriers to scale

Even once a use case has been successful at initial implementation, there are technical challenges associated with scale, such as those surrounding compute capacity such as constraints on the speed of responsiveness and model operational costs. Some vendors have limits to the number of requests you can make, slowing down response times and adding additional expenses. Being able to access partners and skillsets to address these issues is critical for scaling use cases. Below are some examples of the skillsets and partner traits that telcos should seek out.

> We're struggling to find partners who can design efficient enough chip sets and LLMs that are compact enough to minimise the compute we need to run generative AI.
>
> *Emerging tech research, CITO office, Tier 1 NAM telco*

> Given existing limits on proprietary vendor models, it's impossible to scale our customer facing chatbot to serve our 100,000+ daily users in real time.
>
> *AI & NLP technologies manager, Tier 1 European telco*

- **Finding partners who can support efforts to scale.** Engaging partners who can offer access to scalable infrastructure on-demand and efficient model/use case design capabilities will support telcos in mitigating the technical and commercial challenges associated with scaling implementation.

- **Use case design and optimisation skills.** One interviewee stressed the need for AI/ML engineers with a deep understanding of natural language processing (NLP), so they can advise on methodologies to reduce technical barriers to scale. One example of this would be familiarity with retrieval-augmented generation (RAG). RAG can be used to minimise compute requirements by using a retrieval system that focuses the model's processing power on smaller, more relevant subsets of data. Telcos should also look to leverage the toolsets of cloud providers to further optimise the compute required for both training and in-life running of generative AI solutions.

> We have expert LM engineers who are familiar with the RAG framework and have been able to minimise the compute we use for a knowledge management use case.
>
> *AI & NLP technologies manager, Tier 1 European telco*

User upskilling and behaviour change

Clearly, reaching the point at which generative AI tools becoming generally available to employees and customers is a challenge. However, much of the success of any generative AI implementation will rest on the end user's awareness and ability to leverage these tools to their maximum effect. Ensuring generative AI uptake and potential is maximised requires extensive education. Telcos must focus on providing education and training. Some of the skills end users will need include:

- **Collaboration.** End users must collaborate with one another to share their learnings. This allows best practice to spread organically and broadens awareness of the risks and rewards associated with generative AI usage. This should also include having mechanisms that users can activate to flag concerning results from a generative AI model that they believe are inaccurate or risky, to enable an investigation into why the model produced that output in the first place. If end users are trained in how to do this, it mitigates the need for other teams to have perfect oversight over human-generative AI interactions.

> We leverage questionnaires and an internal knowledge sharing platform that allows users to share learnings and best practice, and to flag issues.
>
> *Director, Advanced Analytics, Tier 1 European telco*

- **Prompt writing skills.** Regardless of whether end users have "prompt engineer" in their job title, having a strong understanding of how to write effective prompts can amplify their effectiveness when using prompt-driven generative AI use cases.

- **Support from prompt engineers.** Telcos may also want to offer regular end users support and training from more experienced prompt engineers to enable them to efficiently execute more complex tasks using generative AI.

> You don't get to realise the benefits of AI until people actually use it. Insights must direct action and realising the benefits of AI is more of a people than a technological problem.
>
> *Data & AI Executive, Tier 1 APAC telco*

Conclusion: Telcos must address skill and capability gaps to ensure success

It is clear from our analysis that telcos will need to prepare for the impact of generative AI across all business domains and ensure necessary skills, people and processes are in place. Our recommendations for telcos are:

- **Develop an implementable strategic roadmap for generative AI adoption which is complementary but additive to existing AI strategies.** For telcos looking to adopt generative AI, a strategic approach is critical. Initially, it is essential for telcos to gain a comprehensive understanding of the unique opportunities and risks associated with generative AI, balancing the potential for innovation and market leadership with awareness of implementation challenges and pitfalls. Following this, conducting a thorough audit of existing technological, operational, and skill-based capabilities and weaknesses is crucial. This audit lays the foundation for forming a robust generative AI strategy that is not only aligned with the telco's inherent strengths and areas for improvement but also tailored to its specific market context. Once a strategy is in place, telcos can use their enhanced understanding of generative AI's value potential and awareness of their own capabilities and weaknesses to prioritise which use cases to focus on.

- **Mitigate implementation challenges by creating a detailed execution plan.** To effectively manage the implementation of generative AI, telcos need to create a detailed execution plan that addresses the varied challenges they will face. This plan should include specific actions like setting hiring goals, establishing governance and guidelines for implementation, and identifying stages during which external partnerships will be necessary to overcome challenges. Simultaneously, telcos should initiate small-scale generative AI projects to foster innovation and prepare for future opportunities. This approach helps in balancing immediate execution with long-term strategic positioning, ensuring that telcos stay ahead with generative AI capabilities in their market.

- **Seek partners who can accelerate progress and plug capability gaps.** As this report has shown, generative AI implementation is highly complex and multi-faceted challenges exist across different phases that require highly skilled and experienced personnel to solve. Many telcos have skill and capability gaps that are difficult to fill with hiring and training, primarily due to scarcity of talent and competitive pressure for that talent.

> "Experienced AI talent is prohibitively expensive to hire and is far more likely to leave to non-telcos paying higher salaries."
>
> *Director, Advanced Analytics, Tier 1 European telco*

> "Even competing for skilled graduates commanding US$200k+ salaries is unviable."
>
> *Emerging tech research, CITO office, Tier 1 NAM telco*

  - **Most telcos will acquire foundation models from leading vendors rather than self-build.** Models are highly expensive to self-build and there's limited evidence to date that telcos definitely have unique enough requirements to need industry-specific foundation models. Acquiring models from leading vendors and in some instances, fine tuning them for telco-

specific use cases will be the wisest choice for most telcos. Working with partners that are experienced with generative AI implementation and have deep telco-specific domain expertise is likely a necessity for many telcos.

– **Implementation is a complex exercise that requires dedicated, highly capable teams to ensure models are well integrated into telco systems and workflows.** Telcos should ensure that they work closely with partners to create a data pipeline that enables generative AI models to deliver impactful use cases. Since most telcos will not be starting from scratch with their data architecture, integration with pre-existing data lakes and systems will be critical to guaranteeing smooth implementation.

> I think we need to partner as we don't have the capabilities to solve these challenges ourselves. We have some coding experience but we might not know how to apply that to Generative AI. We also aren't aware of how wide the skills gap is between ourselves and potential partners.
>
> *Senior Strategy Manager, Tier 1 European telco*

– **Telcos need to be able to start small and then scale fast.** Telcos should prioitise partners who will be open to supporting them during their experimentation through knowledge sharing of things like next and best practice. They should also seek partners who can help them to scale rapidly as and when the value of a particular use case has been proven.

Further reading

- GenAI: Where should telcos start? STL Partners, September 2023.
- Generative AI and beyond: Preparing for future A3. STL Partners, June 2023.
- The data-driven telco: How to progress. STL Partners, May 2023.
- Survey: Adoption, Barriers, and the Future of Generative AI in the Telco Industry. AWS, September 2023.

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