

GenAl-driven transformation

Preparing your company for success with GenAI on every level

Generative AI (GenAI) is clearly here to stay. Not only that, it is bringing profound change – transformation, indeed – to virtually every aspect of business as we know it. This study traces the meteoric rise of artificial intelligence (AI) back to tentative beginnings in the 1930s. It affirms that even now, as the initial hype begins to ebb, what remains is truly astonishing in terms of its potential to advance automation, improve quality outputs and deliver stunning gains in productivity.

The study goes on to discuss those forces that are shaping the emergence of this transformative technology today and will continue to do so in the future. Drawing on input from more than 100 top managers, it highlights areas and business functions where the greatest benefits are anticipated before asking one critical question: Are companies ready for what lies ahead? And if not, how can they best prepare themselves?

The latter question takes pride of place as Roland Berger delves into its own experience with GenAI, outlines several insightful case studies and presents multiple practical guidelines to help companies quickly adapt their own organizations in order to reap lasting benefits on a coordinated, enterprise-wide scale.

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The GenAl-powered transformation – Key drivers and factors that every company needs to know



This chapter briefly traces the history of Al development to the present day and outlines capabilities, costs and regulation as three key drivers that will heavily influence its future trajectory.

rew technological innovations have possessed the transformative power of the Internet and the personal computer to reshape and revolutionize our world. Now, however, a new era is dawning: an era that will be defined by Generative AI (GenAI). GenAI too has the potential to redefine our lives in ways we can scarcely imagine. Programs developed using the latest AI technologies can already emulate human-like behavior in numerous ways. Some experts even liken what is unfolding today to the Industrial Revolution, which replaced manual labor on a large scale. Yet what sets GenAI apart even from such epoch-defining advances is the incredible speed with which it is bringing change.

Its explosive growth today is rooted in early AI concepts dating back to the 1930s. In the meantime, the development of AI has been an iterative process, with each new advance being developed and commercialized much faster than its predecessors. GenAI products such as ChatGPT, for example, mark a step change from the traditional pace of technological diffusion: While Facebook and Instagram took ten and 2.5 months respectively to reach a million users, ChatGPT needed just five days – and only two months to chalk up 100 million users. Such rapid market penetration is literally unprecedented in any domain. And all the signs are that the current frantic pace of evolution will grow faster still, with successive generations of AI and GenAI models entering the market with almost staccato frequency.

Yet speed alone does not explain why GenAI is such a huge global draw – especially given that many business leaders freely admit they do not yet truly grasp the technology itself or its profound implications. What does get the business world excited is the promise of unheardof gains in productivity – a promise increasingly backed up by hard evidence: Studies from the likes of Stanford, Harvard and MIT cite substantial productivity boosts for people using GenAI (chatbots) over non-AI users. Integrating GenAI in business processes clearly enhances efficiency, improves output quality and supports creative problem-solving.

To help us understand where this complex and at times mind-bending technology is headed and its ramifications for practically every aspect of every business going forward, Roland Berger has conducted an in-depth survey of leading experts and executives. These discussions led us to identify three key factors that heavily influence both the growth and dissemination of GenAI: the capabilities of AI models, the costs associated with them and the regulatory environment.

SURVEY METHODOLOGY

Roland Berger conducted a wide variety of extended interviews with hyperscalers, LLM providers, tech startups, industry experts and business leaders across various industries.

We also surveyed more than 100 managers and executives from diverse sectors. We wanted to know what impacts on organizations can be anticipated from the rapid development and spread of GenAl and how companies should respond. The insights gained from these interactions are discussed in detail in this report.

Capabilities

MAKING GENAI WORK - WITH MORE COMPUTING POWER AND MORE TRAINING DATA

The capabilities of GenAI models rely heavily on computing power: The more power is available, the more training data can be used and the better the resultant model and outcomes. The volume of data used to train a model is thus a good indicator of the progress being made. Figure A illustrates the point, contrasting the training tokens (see glossary) used for Meta's Llama2 models with its newer and more advanced Llama3 models, for which significantly more data was processed. The same is true for Google's PaLM models. While only estimates exist for the newest closed-source LLMs (see glossary), it is believed that GPT-4 was trained on around 13 trillion tokens, Google's Gemini Ultra on between 20 and 40 trillion tokens, and Anthropic's Claude 3 Opus on 40 trillion tokens.

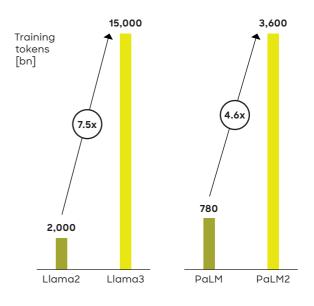
Powering the massive data centers needed to run these AI models made GPU producers like NVIDIA standout performers in 2023 and 2024. Hyperscalers too are fully committed to growing this technology, with AWS (Amazon) planning to invest some USD 150 billion in new infrastructure for the AI-powered future. Similarly, GCP (Google) and Azure (Microsoft) are investing in new data centers around the globe.

FROM UNIMODAL TO MULTIMODAL

Aside from sheer volume, there has also been a major shift in the kinds of training data employed. Traditionally, most LLMs were "unimodal" models trained predominantly on extensive text-based datasets. However, 2024 has seen the emergence of "multimodal models", such as GPT-40, that are trained on (and can generate) text, audio, images and even videos. Combining data from multiple sources in this way can deliver more relevant and accurate information with better contextual awareness, as the model can better discern and interpret the relationships between different

A Improvements in model training

Each new model or version is trained on increasing amounts of data



Source: Meta, Google

types of data. It also creates a more engaging, intuitive and human-like user experience across multiple modes of communication, which in turn opens the door to many compelling use cases in areas such as engineering, sales, marketing and customer relations.

ENLARGING THE CONTEXT WINDOW

Linked to the advent of multimodality, leading language models such as OpenAI's GPT and Google's Gemini have shown remarkable progress with regard to the "context window", a measure of processing power that indicates how much information a model can process efficiently in a single interaction. Between GPT-3.5 Turbo and the latest

GPT-4 Turbo and GPT-40 models, for example, OpenAI realized an eightfold increase in its context window capacity. Yet Google's premier language models leave even these advances far behind, boasting a 63-fold increase in processing capability. **B**

"LET US REASON TOGETHER..."

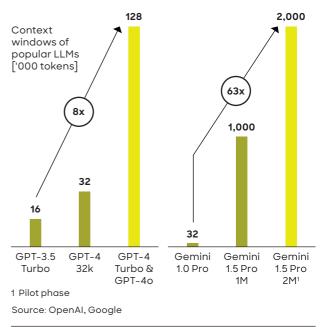
Upscaled training data and computing power have in turn significantly improved the reasoning capabilities of large language models such as OpenAI's GPT and Anthropic's Claude. These models now demonstrate a sophisticated level of understanding and contextual analysis, closely resembling human-like reasoning and even exceeding human performance in many standardized tests. Each new model iteration or update shows augmented capabilities in language comprehension, mathematics and coding. Although it is uncertain whether future developments will emulate the substantial leaps in language understanding observed between GPT-3.5 Turbo and the GPT-4 model family, or between Claude 2 and Claude 3 Opus in coding, ongoing enhancements in model architectures and training methodologies are likely to bring the next generation of AI models even closer to achieving perfect scores based on common evaluation metrics.

AI AGENTS AS GAME CHANGERS

AI may not yet have agency in the strict sense of the term, but AI agents (see glossary) are already adding an extra dimension. While large language models currently excel at solving clearly defined problems (such as summarizing extensive texts), they reach their limits with highly complex problems. However, AI agents are now demonstrating an ability to optimize precisely this kind of performance. An AI agent is a computer program that can perform tasks (semi-)autonomously by making decisions based on its environment, inputs and predefined goals. Such agents can solve specific problems more effectively than the basic

B The latest GenAI models can process vastly more data

For popular LLMs, the context window is opening wider and wider



capabilities of LLMs would allow. Advanced AI agents are managed using what are known as agent graphs (see glossary), which are effectively structured networks of interconnected, specialized agents that work collaboratively to tackle complex goals. By using graph-based agents, organizations can develop more sophisticated and adaptable AI solutions that are capable of handling complex tasks and can thus be deployed for a wider range of complex business processes. A good design guidance would be to define the graph in a way that each subtask is not too small to leverage the GenAI generalization capabilities and not too big that the agent responsible for the subtask has not enough capabilities.

Cost considerations

CHIP PRICES WEIGH HEAVY

The high-end graphics processing units (GPUs) used by data centers to train large language models (LLMs) and run GenAI solutions are extremely powerful but also very expensive, currently costing as much as USD 40,000 apiece. This naturally drives up costs for the tech companies that train and develop LLMs. However, it also forces large corporate users to think very carefully about whether they can afford to train and fine-tune models of their own. That said, since most companies neither train their own LLMs nor operate their own data centers, they only have to pay usage fees, which are relatively low and falling as the big LLM providers wage a bitter price war (see next page). It therefore remains to be seen whether tech providers will be able or willing to pass on their own high hardware costs to downstream users.

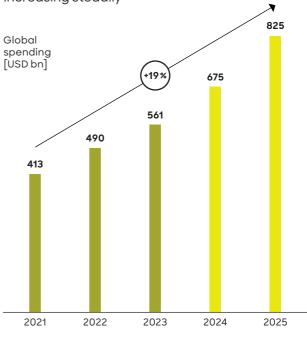
At the same time, the chips themselves are increasingly becoming much more efficient. Some manufacturers are now even developing new types of chips specifically designed to run GenAI applications more cost-efficiently. Accordingly, even if end users do end up having to pay more for hardware, they should still get better value for money as the advance in chip capabilities far outstrips any increase in price. Demand for chips certainly remains buoyant and, apart from inflating prices, is also projected to expand the market for GPUs for use in GenAI data centers from USD 100 billion today to an estimated USD 3 trillion by 2040.

INCREASING SPENDING ON THE CLOUD

Cloud costs are the second major cost factor, as most GenAI solutions typically run in public clouds provided by AWS, GCP or Azure, who together account for roughly 67% of the total cloud market. Research by Gartner shows that global spending on public cloud services is increasing by 19% every year, from USD 413 billion in 2021 to an estimated USD 825 billion in 2025. > C

C Cloud costs over time

Global spending on public clouds is increasing steadily



Source: Gartner

While users of GenAI applications must clearly prepare themselves for further rising costs associated with cloud services, the value proposition for end users once again continues to improve significantly. Even as overall spending increases, the capabilities and functionality of cloud services expand – including more computing power, better data management tools and more sophisticated AI services – due to competition between Amazon (AWS), Google (GCP) and Microsoft (Azure). Business users benefit from this and can essentially achieve more with less. At the same time, flexible pricing models let them tailor expenditures to actual usage.

MODEL FEES

Model (or license) costs are another significant expense item. Open-source models such as (many of) the French Mistral models do not demand a license fee, but they do require self-hosting, which incurs infrastructure costs. In contrast, closed-source (fee-paying) models, like OpenAI's GPT models, Google's Gemini and Anthropic's Claude, are used heavily to power GenAI applications such as customer support chatbots, coding assistants, translation tools and even the 3D design generators used in R&D.

Either way, fierce competition between these companies and more efficient model-building techniques are driving down the cost of using large language models (LLMs). The figure below shows how far the prices of successive GPT-4 and Claude models have already dropped. Similarly, the newest Gemini model (Gemini 1.5 Pro) is also priced very competitively, starting at USD 3.5 per million input tokens.

To put these declining costs into perspective, consider the case of a corporate ChatGPT-like chatbot powered by OpenAI's GPT models: If an enterprise consumes 10,000,000 tokens per day – the equivalent of 7,000,000 words – the daily cost to the enterprise would be USD 600 with the older GPT-4 32k model, but only USD 50 using newer models (such as GPT-4o). Since token costs are expected to become more cost-efficient with every iteration, such massive cuts in costs will enable companies to better scale their GenAI applications.

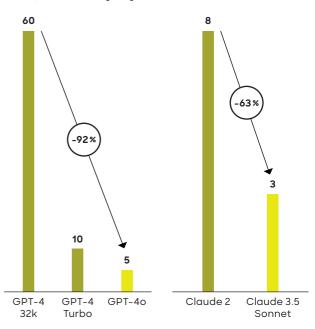
HIDDEN COSTS

It must be said that there is another cost inherent in GenAI's anticipated triumphal march: a cost to the environment and potentially to the climate. We estimate that by 2040, the energy needed to run Generative AI hardware in data centers could soar to something like 4,800 terawatt-hours per year, surpassing the electricity consumption of the entire United States today if significant advances in energy efficiency are not made. Moreover, powering GenAI systems consumes huge amounts of water

D Decreasing model fees

Usage fees for popular closed-source models

Price¹ per 1M tokens [USD]



1 Price of input tokens as of July 28, 2024 Source: OpenAl, Anthropic

to cool their processors. Some experts thus predict that we are heading toward an "AI energy crisis", as future GenAI models could consume as much power as whole countries are doing in 2024. That said, technology (and energy) providers are working very hard to make data centers more energy-efficient, but also to switch to more and more renewable energy and substantially reduce their carbon footprint in other ways. Given the importance and scale of the anticipated advances in GenAI, it is to be hoped that these efforts bear fruit sooner rather than later.

Regulation

LAISSEZ-FAIRE, HEAVY-HANDED OVERSIGHT OR SOMETHING IN BETWEEN?

Emerging technologies often transition from a phase of minimal or virtually no regulation to increased oversight as time goes on. This was true of the Internet, and artificial intelligence is no exception to the rule. The European Union is at the forefront of legislative moves, with the EU AI Act slated to become law in 2026. Some other countries, such as the USA and Japan, have begun to introduce basic regulations and/or voluntary guidelines. Most regions,

however, have no regulations at all at the present time. For a technology as comprehensively transformative as AI, though, standards and regulations will doubtless be needed – as in every other industry – and will take shape over time. **E**

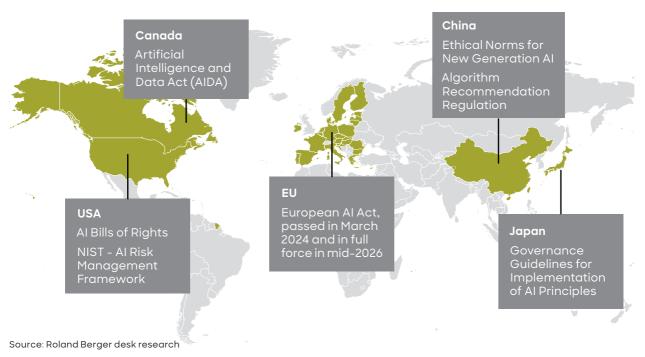
Future outlook

WHAT THE POST-HYPE FUTURE HOLDS... ...AND HOW TO PREPARE FOR IT!

GenAI has had a wild ride over the past 24 months. Predictions in 2022 ranged from profoundly skeptical to

E The EU leads the world in GenAI regulation...

... while most regions have so far done nothing at all



massively overhyped. And with tools such as ChatGPT not yet on the market, awareness of and interest in this technology were minimal. Since their launch, however, the initial hype has given way to thoughtful, often experimental implementation – and GenAI adoption rates have soared. The release of the GPT-40 model alone exemplifies how swiftly technological breakthroughs such as multimodality can impact on the market.

Model capabilities are still improving at pace as computing power increases and market competition is pushing prices down. Productivity gains – in terms of model quality and usability – are likewise projected to rise substantially. In all probability, GenAI will therefore become increasingly affordable, better at what it does and ubiquitous in all walks of business life. Moreover, as the residual hype dies down, users will increasingly discover scaling as a key solution to many of the challenges they face. The key factors outlined in this chapter – capabilities, costs and regulation – will largely determine how quickly GenAI is adopted going forward. But so too will another factor we have not yet looked at: the readiness of organizations to harness GenAI in a way that genuinely transforms their business.

Companies that understand how to leverage this technology and can adapt their organization accordingly – regardless of how fast technological developments and adoption rates unfold – will enjoy a significant competitive advantage. Yet precisely this issue, more so than fears of flattening curves, regulatory own goals, or even disappointing performance, poses a very real threat to the success of GenAI implementation at many companies. Why? Because most organizations are quite simply not yet prepared to "adopt and adapt". To get themselves ready, however, they must first understand exactly what the impact of GenAI will be in their chosen line of business.

"As we move toward a
GenAl-enabled future, every
company faces a brutal choice:
Adopt Al or be unable to compete.
Al is here to stay, and those who
integrate it effectively will get better
products to market more quickly
and at lower cost. This technology
will quite simply impact all industries
and all regions, reshaping how
businesses operate globally."

Maria Mikhaylenko Senior Partner, Global Managing Director

"When the hype starts to die down, that's when you begin to see whether a technology is genuinely the disruptive game changer it was made out to be. And if anything, people are getting even more excited now as it becomes apparent that GenAl really is going to change everything."

Dr. Jochen Ditsche Senior Partner, Head of Digital

Expected impact of GenAl - Insights from industry experts



This chapter outlines what benefits practitioners in different industries expect from GenAl. It also asks whether their organizations are sufficiently mature to reap the full rewards of this technology.

ur expert survey findings are unequivocal: GenAI will have a powerful impact on whole organizations and on all business functions, albeit to varying degrees. GenAI operates in two main ways: first, by enabling a wide range of tasks to be automated, and second, by enhancing the accuracy, value and professionalism – i.e., the quality – of outputs. We will now address each area of potential in turn.

POTENTIAL FOR AUTOMATION

In our survey, expert assessments singled out "customer relations, sales & marketing" and "service & support" as the business functions with the highest potential for GenAI-based automation, as these units commonly require

creative capabilities, a nuanced understanding of language and good writing skills. That said, ratings of "moderate to high potential" predominate in virtually every named business function. Although some functions are clearly seen to have less potential than others, more than 50% of respondents expect GenAI to have at least a moderate impact on automation even in "business development & strategy", which brings up the rear. > F

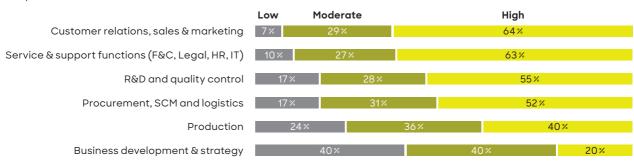
POTENTIAL FOR QUALITY IMPROVEMENTS

The perceived potential for GenAI to improve the quality of outputs (see chart G on the next page) shares some similarities with chart F (below), but also reveals certain striking differences. "Customer relations, sales & marketing" are again seen as the business functions where GenAI can deliver the greatest impact. But interestingly, second place this time goes to "R&D and quality control" – two disciplines exposed to a vast array of inputs and

F The potential of GenAl to automate tasks in different business functions

Even where potential is seen as weakest, more than half of experts still expect a moderate to high impact

Deep dive - Potential for automation¹



1 Question: Please rate the potential of GenAl to automate tasks in the following business functions in your industry. Source: Roland Berger GenAl expert survey (N = 100+)

variables. Research and development in particular also presuppose iterative cycles of prototyping, testing and changing, and the emergence of multimodality and AI vision models has caused potential for GenAI-driven quality improvements to skyrocket in these areas. In industrial design in the context of R&D, for example, GenAI is now churning out deliverables with remarkable accuracy.

The next two sets of business functions – "Production" and "Procurement, supply chain management (SCM) and logistics" – are all tightly interwoven with each other. They are also generally capex-driven and follow certain investment cycles. Here, embedding GenAI in the software systems used is again clearly believed to yield substantial benefits, but will also require coordinated adoptions simply due to the number of parties involved (in supply chains and procurement, for instance).

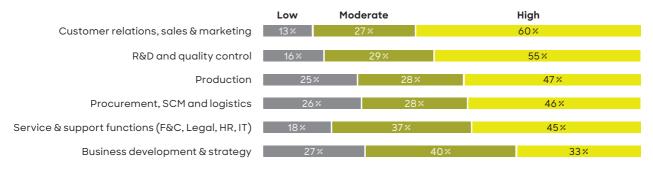
Shared "service & support functions" (such as finance and controlling, legal departments, HR and IT) rank lower in terms of expected quality improvements from GenAI than is the case for automation potential. This is perhaps due to the repetitive and largely data-driven nature of many of their core activities, which lend themselves more to automation and streamlining than to other aspects of improved quality. Even here, however, more than 80% of the experts surveyed are convinced that the impact of GenAI on quality will be moderate to high. \triangleright G

As with automation potential, the spread of assessments here largely reflects the "strengths and weaknesses" of GenAI with regard to different tasks. Those areas – such as "customer relations, sales & marketing" where nuanced linguistic capabilities are at a premium – are understood to be the ones where the potential for quality improvements is greatest. On the other hand, it is (still) difficult to teach an AI model

G The potential of GenAl to improve the quality of outputs in different business functions

Here again, even the "lowest" scores see a majority anticipating major improvements due to the deployment of GenAl

Deep dive - Potential for quality improvements¹



¹ Question: Please rate the potential of GenAI to enhance the quality of outputs in the following business functions in your industry. Consider improvements in accuracy, value and professionalism.

Source: Roland Berger GenAl expert survey (N = 100+)

the wealth of implicit (or soft) knowledge that is commonly needed to grasp the intricacies of "business development & strategy". It is nevertheless worth noting that the majority of observers still expect GenAI to unfold a moderate to high impact even in such comparatively "weaker" areas.

their GenAI capabilities if they are to capitalize on its benefits and secure a competitive edge in the race to a GenAI-enabled future. The next chapter therefore goes from theory to practice and looks at best-in-class ways to do precisely this.

Maturity in GenAl?

ORGANIZATIONAL PREPARATIONS TO OPTIMIZE THE BENEFITS OF GENAI ARE STILL LARGELY MISSING

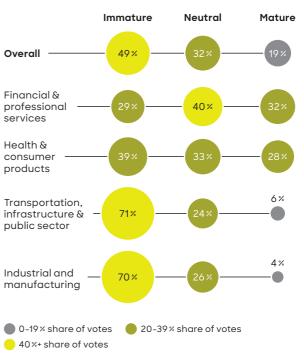
Despite widespread recognition of the huge potential that GenAI holds for all business functions, there is a conspicuous mismatch between anticipated impact and the current maturity levels of those companies that claim to be serious about implementing GenAI. Overall, only 19% of the managers surveyed consider their industries - or indeed themselves - to be mature in terms of GenAI integration and application. Almost half (49%) describe their status as immature, indicating that GenAI implementation is still in its early days (if at all) and that they lack strategic direction in this area. Again, there are logical and historical reasons why this is so: Strictly "white collar" industries such as "financial & professional services" have long embraced the digital transformation, cloud computing and big data and have thus already acquired considerable digital maturity. On the other hand, traditionally "blue collar" sectors such as manufacturing have tended to focus digitalization more on automation and robotics rather than aspects such as GenAI. > H

This vast gulf between vision and reality, between perception and practical preparedness, highlights a critical challenge for today's businesses: Although the potential of GenAI to transform business functions through automation and quality improvements is readily acknowledged, many companies and industries have yet to cultivate the maturity they will need to fully leverage this technology. In other words, the necessary groundwork has not yet been done. This fact underscores the need for organizations to invest in advancing

H Current level of GenAl maturity in different industry clusters

Only two clusters are currently anywhere near matching what they expect from GenAl to what they are doing about it

Deep dive - Maturity¹ by industry



1 Question: Based on your experience and expertise, how would you rate the current level of maturity in the implementation and integration of GenAl within your industry?

Source: Roland Berger GenAl expert survey (N = 100+)

Transforming your organization - Getting it right



This chapter introduces and discusses four key principles to help business leaders permeate their organization with suitable GenAl in a strategic, coordinated, enterprise-wide manner. Case studies – and our own GenAl journey – add texture and practical insights to underscore the value of this approach.

e have established that, for all the unknowns that still lie ahead, the role of GenAI will unquestionably grow – in terms of spread and impact – in just about every corporate scenario we can conceive of (and probably some we can't). And we have established that most organizations are not yet fully ready for the implications of this productivity revolution. All of which leads us to one question of central importance to every business leader: "How can I best position my organization to be ready for the future of GenAI?" The question is all the more crucial because merely accepting the value proposition of GenAI and putting a few people to work on it will not be enough: A technology that, as we have seen, will heavily impact virtually every business function must be integrated systematically across the entire organization. That takes careful strategic thought.

ROLAND BERGER'S OWN JOURNEY TO THE FUTURE OF GENAI

We at Roland Berger set out on our own transformative GenAl journey in 2022. It has been a fascinating and instructive experience to date and is obviously still very much a work in progress as we continue to develop and improve a variety of use cases.

The first step was to set up a dedicated team: a strategic, enterprise-wide GenAI unit that reports directly to our Global Managing Directors. This team quickly began collecting, prioritizing and defining the most promising use cases and built a proprietary GenAI platform as the bedrock on which these will stand. A series of training sessions, guidebooks, Q&A sessions and the like has been gradually rolled out to enable our people to use GenAI efficiently and for the benefit of the whole organization. This instruction initiative was flanked by formulation of an enterprise-wide AI policy, including guiding principles for everyone's use of AI at Roland Berger.

Lastly, to keep things aligned across different parts of the organization, we assembled a second dedicated team to oversee any of the compliance issues that will inevitably crop up along the way.

Working on (Gen)Al strategies for ourselves and as part of various client engagements has taught us six lessons that we believe are applicable to any company, many of which are reflected in the pages of this document:

- 1. Define strategic objectives focused on value creation through deployment of GenAI: Set clear and achievable company goals and secure both the commitment and support of top management.
- **2. Define a clear governance structure:** Identify how strategic goals are to be translated into use cases and spell out who is responsible and accountable for each prioritized use case.

- **3. Put robust project management in place:** Every project should have a standardized management plan including named responsibilities, unambiguous milestones and a budget to match. That said, agility and flexibility must be "built in", because challenges will require adaptation as the journey unfolds.
- **4. Clarify conformity implications:** To keep the whole organization aligned on the development and application of GenAI use cases, involve all relevant departments and clarify any conformity issues from the outset.
- 5. Align everything you do with the target operating model: The strategic Al goals, governance structures and use cases defined for the organization should always inspire and align with the target operating model. Regular steering committee meetings, including C-level involvement, are an imperative in this context.
- 6. Establish effective change management: Upskilling and reskilling initiatives are needed to equip employees with the necessary capabilities. It is also important to address employees' concerns and communicate clearly and transparently with stakeholders on all levels.

From our in-depth interviews with leaders and experts across a multitude of industries, and from our own ongoing GenAI journey (see box), we have distilled four key principles that will help guide businesses toward successful organization-wide implementation of GenAI: First, business leaders must accept and embrace the reality that GenAI in various forms will significantly influence core tasks across all business functions. Second, establishing a strategic AI unit will be essential to ensure transparent, coordinated governance of the AI transformation and keep it from degenerating into an anarchic free-for-all. Third, the profound impact that GenAI will have on the workforce

will necessitate substantial investment in upskilling and change management. Last but not least, since the last word on where GenAI will take us has not yet been spoken, organizations must initiate and maintain robust data management practices and establish a flexible AI architecture that can keep pace with what will surely be a rapidly evolving market.

FOUR PRINCIPLES

Principle #1: GenAI can enhance productivity and competitiveness at every level of the organization, from AI robotics changing manual labor on the shop floor to data analytics and customer care.

Principle #2: To maximize the benefits of Generative AI (GenAI), organizations should establish a strategic AI unit with central coordination. This unit should align with defined strategic objectives and focus on value creation. Without such coordination, several issues may arise. Siloed approaches could lead to overinvestment and inefficient resource usage. Organizations might end up with a technological patchwork of disjointed solutions, as well as overlapping or conflicting initiatives.

Principle #3: The workforce must be properly prepared for the far-reaching changes ahead, so new skills must be taught and change management must be comprehensive.

Principle #4: Vast quantities of data will have to be managed in a constantly evolving environment, so adaptability and a continuous development cycle must be built into GenAI structures from the ground up.

Principle #1: GenAl really will get everywhere!

WHAT KINDS OF TASKS WILL BE AFFECTED, AND WHY

GenAI applications come in all shapes and forms, each of which can be tailored to the different types of tasks found in every business function. Precisely this variability and adaptability is the reason why this technology really is expected to get everywhere and affect everything. At root, there are three basic forms: conversational AI, AI agents connected via graphs, and GenAI-powered robotics. Conversational AI, currently the most mature form, primarily enhances customer support through advanced chatbots. AI agents are specialized programs tailored to specific tasks such as research, coding or data analysis. These agents can be integrated in larger networks known as agent graphs to better handle complex business processes. The third variant, AI robotics, focuses on creating robots that perform tasks requiring physical interaction, precision and adaptability. More and more of these robots will be deployed in business functions such as manufacturing and production.

These three types of GenAI correspond to the three main categories of organizational tasks: communication tasks, knowledge tasks and manual tasks. Communication tasks involve the exchange of information and are crucial to effective collaboration and customer service, for example. Knowledge tasks require cognitive efforts to solve problems and generate new insights. On the other hand, manual tasks involve physical work, such as manufacturing, construction and assembly.

Taken together, these three task categories essentially cover the entire, vast spectrum of modern business functions. And the fact that GenAI can add value and productivity in all of them – from improving the efficiency of communication through AI-driven chatbots to automating complex decision-making processes in knowledge tasks and relieving humans of heavy and dangerous physical work in manual tasks – demonstrates precisely why strategic, coordinated, enterprise-wide deployment is a must to reap its full benefits.

Principle #2: The case for a strategic Al unit

SEEING THE BIG PICTURE - AND AVOIDING (REDUNDANT) INSULAR SOLUTIONS

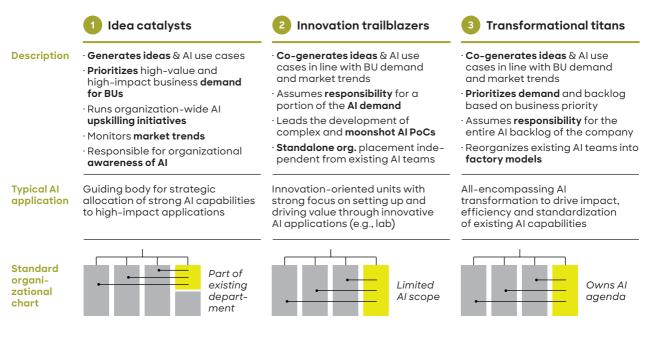
The true potential of GenAI can only be realized through a well-orchestrated strategy focused on the value creation and efficiency that integrates AI initiatives across the overall organization. A well-designed change management program must accompany this approach. To properly integrate GenAI in every aspect of an organization, each step must be closely aligned with the overall company strategy. It is important to understand that trial and error will play a big part in developing, testing, improving and iterating use case development throughout the organization. That is all well and good, an essential part of agility and responsiveness. However, if there is no central oversight and coordination, such an experimental mindset can all too easily degenerate into a mismatch of non-aligned and half-baked applications that add no value for the company. The rationale for a centralized strategic AI unit thus becomes self-evident: A central "unit" ensures effective management and governance of AI technologies and can drive value creation across the enterprise, while also ensuring compliance with regulatory requirements. There are essentially three main benefits of establishing this kind of unit:

1. Strategic alignment

A central unit ensures alignment with corporate strategy and fosters a cohesive approach to AI deployment. By centralizing AI efforts, organizations can streamline resources, minimize redundancies and maximize the impact of their AI investments. To optimize overall value creation, the strategic unit for AI should report directly to a C-level executive – ideally the CEO. Direct reporting again ensures that AI initiatives stay strategically on track with the organization's goals and receive the necessary top

I There are 3 archetypes that can be applied to institutionalize and scale up AI

Al org structure - Overview



Source: Roland Berger

management support in terms of prioritization and resource allocation. $\blacktriangleright I$

Navigating complexities in any large organization is inherently challenging, and this is especially true when integrating and managing GenAI. Maintaining organization-wide transparency is nearly impossible without a centralized coordination function, which, in this case, would be the strategic AI unit. Without it, letting each business unit form its own AI team would inevitably lead to inefficiencies, friction and financial losses for the overall organization. And a fragmented landscape of non-aligned

use cases each with their own data supply, would in the worst case lead to complete organizational fragmentation. Resource deployment would be wastefully duplicated, almost certainly leading to technological variations that cannot be readily aligned – a serious obstacle when it comes to scaling up those applications that work well. The result? Squandered potential and non-alignment throughout the organization.

Another compelling reason for a centrally steered strategic AI unit is the current scarcity of critical AI talent: Any resource that is both valuable and limited always requires careful strategic management. By creating a centralized unit early on, scarce talent is pooled efficiently, enabling significant impact from the outset. Nonetheless, ultimately everyone in the organization needs to be AI-savvy to a certain extent in the long run.

Likewise, it must always be remembered that AI is a multidisciplinary phenomenon to which many different departments contribute. While legal, data protection, IT, compliance and other corporate units must therefore have their say, actual use case development and the discussion of productive solutions always requires close cooperation with the business units. Here again, central management is needed to reconcile these potentially conflicting but necessary inputs.

2. Development, standardization and scaling

A strategic AI unit that genuinely represents and is backed by the business functions ensures that stakeholders have a vested interest in its success. This collaborative approach fosters a sense of ownership and commitment to AI initiatives across the organization. By involving representatives of both business functions and IT, the unit can stay relevant and ensure comprehensive governance, addressing both technical and business needs. Building, standardizing and scaling complex AI processes is another critical function of the strategic unit. Leveraging technical expertise and business insights, the unit should shoulder some of the responsibility for developing and harmonizing robust AI solutions – as well as the associated processes and methodologies - that address the organization's most pressing challenges. This involves collaborating with business units to identify opportunities for AI integration, develop proof-of-concept projects and scale successful pilots across the organization. By focusing on building, standardizing and scaling complex processes, the strategic unit ensures that AI initiatives are sustainable and deliver long-term value. A well-defined process for running and changing AI operations within business units is essential.

CASE TUDY I

A strategic Al unit in the automotive supply industry

In a proactive move, a global leader in the automotive supply industry has set a commendable example in embracing GenAI. The company's top executives, including the CEO and CIO, have prioritized AI as the cornerstone of their strategy for the foreseeable future.

Understanding the strategic implications of AI beyond its technological aspects, the company set up a multidisciplinary team and a Center of AI Excellence to foster close collaboration between business leaders, GenAI experts and technology specialists. This entity served as a strategic coordination hub and was tasked with developing a detailed AI roadmap in line with overall company strategy. The roadmap it plotted focused on identifying and prioritizing AI use cases for seamless integration in daily operations. Emphasis was placed on scouring the market for viable solutions that can be adapted to the existing IT framework.

Beyond technological implementation, the Center of Excellence is pivotal in promoting responsible AI usage among all employees. It works in tandem with legal and compliance teams to formulate guidelines and policies for the ethical management of GenAI technologies. This strategic approach has enabled the company to develop and deploy multiple GenAI applications in a matter of months. Although still working through its AI transformation, establishing this strategic unit has positioned the company to effectively capitalize on the benefits of GenAI.

Clear guidelines, best practices and sound governance mechanisms should be put in place to ensure consistency and quality across all AI deployments. By standardizing AI operations, the central unit therefore ensures that AI solutions are reliable, scalable and aligned with the organization's strategic objectives. Ensuring that business units can effectively work with AI solutions and reducing dependency relationships is also crucial for post-build/buy operations. This level of autonomy, within the guidelines staked out by the strategic unit, enables business units to continuously improve and adapt AI solutions without becoming over-reliant on – and potentially frustrated by – the central instance.

3. Employee enablement and culture change

The strategic unit must act as an enabler. It must empower business functions to independently manage smaller AI solutions. By providing business units with the tools, frameworks and support they need to develop and deploy AI solutions tailored to their specific needs, the strategic unit will foster innovation and agility. Business units are then free to experiment with AI applications, iterate their solutions and drive localized improvements, all while benefiting from the strategic oversight and support of the central unit – the best of both worlds, in many ways.

ASSEMBLING THE RIGHT TEAMS IN THE STRATEGIC AI UNIT

Once a strategic unit has been established to drive a coordinated AI transformation, a multidisciplinary team of experts is needed to make this work. This team must include individuals with strong business acumen – the "transformation team" – whose main objective is to identify areas within different business functions or overarching processes where GenAI can be put to good use to increase efficiencies. To do their job properly, the transformation team must stay in constant dialogue with the business

functions to identify improvement opportunities. They will also have to be flanked by a well-trained tech team specializing in GenAI. The size of this tech team will vary depending on whether the organization sees itself primarily as a builder or a consumer of AI. Builders will need a larger tech team made up of data engineers, GenAI-focused data scientists, data architects, user experience designers, product managers and more besides. On the other hand, organizations that primarily consume AI solutions require experts who can screen the market, identify relevant third-party solutions, prioritize them and slot them seamlessly into the company's operations. Most organizations will likely fall somewhere in between, building their own solutions while also purchasing and integrating existing solutions.

To successfully integrate GenAI in existing systems, close collaboration between the tech team and the IT department (which provides the underlying IT architecture) is crucial. Additionally, experts in legal compliance and data protection/privacy must be involved to ensure that all company-wide AI initiatives are in line with legal regulations (such as the EU AI Act) and internal guidelines (such as corporate AI policy).

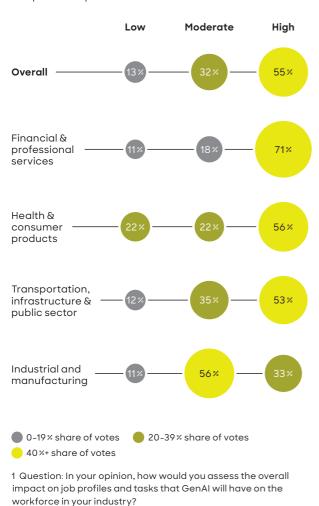
"Top people with really good AI skills are very few and very far between. So, pooling your talent in a strategic unit lets the whole organization reap the benefits – and makes it easier to keep all your GenAI projects in sync."

Dr. Manuel SchielerPartner, Head of Analytics GSA

J How GenAI will impact the workforce

Expected changes to job profiles and task descriptions as GenAl filters down through whole organizations

Deep dive - Impact on workforce¹



Source: Roland Berger GenAl expert survey (N = 100+)

Principle #3: People and talents UPSKILLING AND CHANGE MANAGEMENT ARE

UPSKILLING AND CHANGE MANAGEMENT ARE THE ORDER OF THE DAY!

One aspect that is often overlooked when discussing the impact of GenAI is the profound effect it has on the "regular" workforce. As GenAI is gradually integrated in different processes throughout a company, the nature of these processes will inevitably change significantly over time. Especially in light of the chronic dearth of available talent, it is critical for management to anticipate and sensitively provide the (re)training that is necessary so that good staff are enabled to efficiently (and happily) fulfill their changing roles within the company. The figure below vividly illustrates the extent to which GenAI is expected to alter job profiles across different industries.

The above chart highlights one finding of our survey, in which 55% of respondents stated that the impact of GenAI on job profiles and the tasks of employees will be high. Conversely, only 13% expect the impact to be low. A similar pattern is observable across all four industries: There is not a single industry in which more than 22% of managers said they expect the impact on their workforce to be low.

CHANGING ROLES DEMAND NEW SKILL SETS

With the advent of GenAI, employee roles evolve from administrative and support functions to more supervisory and strategic responsibilities. GenAI systems' excellent knowledge storage and retrieval capabilities will diminish reliance on experiential knowledge. While this evolution may ultimately make some tasks and job profiles redundant, it certainly does not negate the need for a motivated workforce. On the contrary, employees' capacity and willingness to learn and adapt to new technologies and processes will become increasingly critical. It follows that organizations must prioritize upskilling their workforce in GenAI to maintain their relevance and efficiency in the new work environment.

CASE TUDY II

Putting people first and focusing on upskilling at a public savings bank

The financial services sector in general, and commercial banks and insurance companies in particular, rely heavily on extensive customer interactions, unstructured data and repetitive tasks – and expect GenAI to deliver substantial efficiency gains in these areas.

One financial services enterprise wanted to educate its workforce to harness GenAI effectively across its operations. The primary goal was to enhance efficiency – "doing more with the same number of staff" – without reducing the workforce. Quickly recognizing that GenAI would profoundly affect administrative roles in backoffice and customer support functions, the bank set up a central AI coordination office reporting directly to top management. This team, comprising IT and AI specialists plus representatives of member banks, was tasked with overseeing all GenAI initiatives throughout the organization.

The coordination office developed and rolled out a comprehensive upskilling and education initiative to train all group employees on GenAI within six months. A lot of time was spent familiarizing staff with the organization's proprietary GenAI chatbot, which operates securely on the bank's servers and has been made available to all group employees.

Leadership played a pivotal role in this change management effort, actively promoting the use of approved GenAl tools. It encouraged the formation of peer groups, such as channels where back-office staff could share best practices on prompt engineering and other relevant topics. Initial evaluations of the initiative are decidedly positive: Integrating GenAl in daily operations has markedly boosted employee efficiency and productivity, while strong leadership backing is perceived as a key factor contributing to improved employee satisfaction scores.

Leadership is key to this upskilling initiative. Leaders must proactively identify essential skills and competencies for the GenAI-driven transformation and provide appropriate training and development opportunities. By promoting a culture of continuous learning and investing in employee development, organizations can ensure that GenAI is embraced by most, if not all employees. Doing so will then naturally support the successful expansion and integration of GenAI across the organization, boosting productivity and competitiveness in the process.

A MULTI-LAYERED UPSKILLING STRATEGY

To integrate GenAI effectively in organizational processes and ensure a smooth transformation, it is essential to tailor learning content to specific needs and roles within the entity. To put it bluntly: The right people need to have the right skills to do their job, so not everyone needs the same training. However, everyone throughout all levels should have a basic understanding of how GenAI works to deliver results.

For C-level executives, the focus should be on understanding the strategic implications of GenAI and how it can drive competitive advantages and innovation. Top management must be well versed in the potential business outcomes and risks associated with GenAI deployments. Training for this group should cover the management of GenAI projects, the oversight of compliance and ethical considerations and the integration of GenAI. It should be delivered in a combined mode of structured practical sessions aimed at explaining the impact of this technology for the respective industry, as well as coaching sessions in small groups.

Middle management should be equipped with the knowledge they need to manage and direct GenAI projects within their specific business functions. Their training should focus on operationalizing GenAI strategies, translating these strategies into actionable tasks and managing the implementation of GenAI solutions by crossfunctional teams. It is crucial for them to understand the specific impact and applications of GenAI in their areas of expertise: how GenAI can enhance efficiency in R&D or optimize supply chain logistics, for example. Additionally, they should be skilled in change management to handle the transition processes smoothly and maintain team morale, while also redefining their own role.

Line personnel, who are directly involved in the operational aspects of GenAI, require hands-on training that is specific to their daily tasks. This includes understanding how GenAI tools and systems work, how to interact with these systems effectively and how to troubleshoot common issues. The training should also cover data handling, privacy concerns and basic ethical considerations to ensure that each individual can operate GenAI tools responsibly and safely. Conducting GenAI masterclasses and bootcamps or even setting up a corporate AI academy are considered to be best-practice examples.

Principle #4: Managing data in a changing world

ROBUST PRACTICES MUST COMBINE WITH FLEXIBLE ARCHITECTURES

Pressured by the hype surrounding GenAI, many companies feel compelled to launch their first GenAI use case with undue haste. They are essentially afraid of "missing out". Like every new house, however, a GenAI transformation will only succeed if it is built on a solid foundation. This preparatory phase can be referred to as setting the stage for GenAI.

SETTING THE STAGE FOR GENAI

A critical aspect often overlooked in discussions about AI is the importance of laying a solid data foundation. Precisely because this is so important, best practices from data management, data governance and data strategy should never be neglected. Yet many companies struggle to properly structure and maintain their data and keep it accessible – and that is only for structured data in many cases. With the advent of GenAI, the ability to manage unstructured data becomes equally crucial, and this only adds to the significance of internal knowledge management.

"All intelligence needs context,
so does AI. Integrating data with
its context and ensuring domainspecific grounding of models
reduces hallucinations and generates
better output."

Dr. Edeltraud LeibrockSenior Partner, Global Managing Director

The principle of "garbage in, garbage out" is as true for GenAI as it is for so many areas: The quality of the input data directly affects the quality of the output.

As a general rule, organizations are well advised to ensure that their data is properly structured and stored, and to focus on several best practices in order to do so. These include:

- **Data cleaning:** Regularly clean data to remove inaccuracies, duplicates and irrelevant information. This improves the quality of data fed into AI systems and leads to more accurate outcomes.
- Data integration: Integrate data from various sources to create a comprehensive view. This involves combining data from different departments and external sources, ensuring that GenAI systems can analyze text, images and other forms of data to provide richer context and open up wider opportunities to apply knowledge more precisely.
- **Data annotation:** Unstructured data in particular needs to be properly annotated to make it understandable and usable by AI systems. This includes labeling images, categorizing text and tagging other data types, all of which is crucial to train AI models accurately.
- Data governance: Establish strong data governance frameworks to manage the accessibility, quality and security of data. This includes defining clear policies and procedures for data usage, privacy and ethical considerations.
- Scalable infrastructure: Ensure that the infrastructure can handle large volumes of data and is sufficiently scalable to meet future needs. This involves investing in robust storage solutions and computing power to process and analyze data efficiently.
- Monitoring and auditing: Regularly monitor and audit data handling practices to ensure compliance with data protection regulations and internal standards. This helps identify and mitigate risks relating to data security and privacy.

INSIGHT

The curse of data and system complexity when scaling GenAI in the FMCG industry

At first glance, the wealth of sales data, marketing materials and customer insights that the fast-moving consumer goods (FMCG) sector has collected over the years make it a prime candidate for the effective development and scaling of GenAI solutions. Yet while some major players (especially in food and beverages) have made significant strides toward AI adoption, many organizations still have a hard time scaling GenAI effectively. It is a fact that around 90% of all GenAI proofs of concept (PoCs) never make it to productive deployment.

The diversity of data sources and structures across different markets and regions complicates the task of scaling AI solutions and integrating them in legacy systems, which in turn hinders broad experimentation and the deployment of AI applications beyond isolated solutions. The lesson is clear: A robust technological and data management foundation must be put in place before GenAI can yield transformative results. Consequently, it is imperative for the FMCG sector - and indeed any industry looking to harness the power of GenAI - to prioritize data management, data governance and strategic data practices before GenAl can be scaled effectively. Grounding of the models could also help to overcome some of the industry-specific characteristics and serve as a catalyst.

Ensuring high-quality data inputs is vital to the success of any AI system, as poor data can lead to inaccurate or biased outputs, potentially causing significant operational and reputational damage. In addition to quality, the security aspect of data should not be overlooked and cannot be overstated. The risk of accidentally leaking information is high. In several cases, employees or customers have, for example, inadvertently or deliberately accessed confidential company data because the documents accessible to the GenAI solution contained sensitive information.

BUILDING A FLEXIBLE ARCHITECTURE

Once a solid data foundation has been laid and data access concepts are in place, GenAI can truly become a game changer for corporate efficiency. Regarding the necessary GenAI data architecture, the direction of travel is clear: It must be as flexible as possible. Rapid developments in the field of GenAI have demonstrated that relying on a specific technology provider or AI model will not suffice. In other words, a flexible and modular setup is essential. The tech architecture must be designed to easily integrate new models from various major providers (e.g., OpenAI, Google or Anthropic) or even from fine-tuned proprietary to opensource models. It should also facilitate connection to different cloud services (such as Azure, AWS or GCP). This flexibility ensures that organizations can quickly adapt to new advances in AI technology and integrate the best tools available to enhance their GenAI capabilities.

In light of these factors and the likely need to integrate numerous third-party solutions, it becomes evident that effectively orchestrating GenAI architectures is absolutely crucial. Companies that put all their GenAI investments in one basket and only use a single provider of models or platforms could face painful financial losses if the chosen solution becomes obsolete or fails to stay abreast of evolving needs. A diversified approach not only mitigates these risks but also enhances the ability to innovate and respond to changes in the technology landscape.

CASE STUDY III

A flexible cloud-first approach to scaling GenAl in the energy sector

One large European energy company had been using advanced analytics for years to forecast demand and supply. It had also long since transitioned to a cloud-first approach. Having spent a lot of time and money developing advanced data and knowledge management, it was well placed to launch a GenAl initiative in 2023.

After a strong start driven by a central AI unit, the leadership soon recognized the risk of falling into a "maintenance trap" by concentrating all GenAl developments within the company's dedicated AI hub. To avoid this, they decided to delegate the development of smaller GenAI applications (like an HR chatbot) to individual business units. As these units gain experience and the technology matures, ownership of GenAl projects can gradually be transferred to decentralized teams across the organization. The Al expert team and the IT department together then created a self-service portal giving business units direct cloud access to popular large language models (LLMs), as well as effective control over their own GenAl projects. The flexible architecture of the portal made it easy to switch between LLMs and upgrade to new versions without having to overhaul the underlying IT infrastructure every time. The result? Faster implementation of GenAI in different parts of the company, but also sufficient scalability and adaptability to future technological advancements.

Practical recommendations – It is time to act now!



This chapter summarizes the key takeaways from this study, providing hands-on advice on how to begin your GenAl journey.

The transformation ahead is as inevitable as it is tricky. So, to help organizations navigate the steps before them, we have outlined some tangible steps that we believe are crucial if they want to rank among the winners from GenAI. The key messages on how to do so are summarized below. The only thing we would add, however, is perhaps the most important takeaway of all: The time to act is now. GenAI is not a passing fad that companies can sit out, wait until it is over and get back to business as usual. Business as usual will be business with GenAI in the very near future, and that in every industry, every function and every region. No company can knowingly let this astonishing productivity booster go to waste.

1. Align your vision for GenAI with your overall company strategy

Not every organization will use GenAI to the same extent. Moreover, a company's vision and aspirations for GenAI must dovetail seamlessly with the overall direction and strategy of the organization. For example, if a company's strategy is targeted at reducing costs, the main focus of GenAI should be on bottom-line improvements. Alternatively, if a company wants to expand into new segments and markets, GenAI initiatives must be centered around initiatives that help the top line (such as new product development). GenAI is a powerful and versatile technology, but it should not determine the direction of travel: It should accompany you on your corporate journey.

2. Build a strategic AI unit that reports to the C-level

Establish a centralized strategic unit for AI that reports directly to a C-level executive, ideally the CEO. This unit will orchestrate all AI initiatives, ensuring alignment with corporate strategies and maximizing the impact of AI investments. The central unit should also be responsible for the development, standardization, governance and scaling of AI processes across the organization.

3. Identify high-potential business functions/areas

Assess various business functions to identify areas with high potential for GenAI applications. Focus on those areas that can generate quick wins and/or significant strategic value. This could include customer service (to enhance customer experience) or supply chain management (to optimize logistics), for instance.

4. Develop and scale GenAI solutions

Start by developing high-value pilot projects in the high-potential areas you have identified. These pilots should aim to demonstrate the effectiveness of GenAI in improving efficiency, reducing costs or driving revenue. Based on the outcomes of these pilot projects, optimize the solutions. Prepare to scale the successful pilots across other business units or geographies. Iteration and scaling are crucial tools to leverage the full potential of GenAI across your organization.

5. Make change management a priority and set up a transformation management office (TMO)

Implementing AI tools is about more than "just" effecting a technological transformation: It entails a far-reaching cultural shift within organizations. Successfully incorporating AI in business operations demands the unreserved commitment and support of all employees. And given that they will all have differing motives and concerns, proficient change management is a must. The full potential of GenAI can only be realized if suitable training and upskilling enables employees to fully understand and embrace the technology and slot it efficiently into their daily work routines. One proven and powerful way to do this is to establish a central transformation management office (TMO), which, as the name suggests, oversees and coordinates transformation throughout the organization.

A well-designed TMO will adapt to changing circumstances but still keep every unit on track to reap its own benefits from GenAI while also staying aligned with the goals of the enterprise as a whole.

To help our clients harness the full capabilities of GenAI, Roland Berger's AI Readiness Radar evaluates every link in a company's value chain. It measures how extensively AI's potential is currently being used or squandered. The insights gained are then benchmarked against competitors' AI integration status and broader industry trends. We also introduce the "rAIse" framework, an end-to-end AI strategy designed to optimize the value of AI across three fundamental dimensions: strategy & value proposition, people, processes & skills, and technology & execution. These valuable instruments are complemented by the Roland Berger Data Management Maturity Assessment, which helps business leaders identify where their organization stands on eight key dimensions - from data acquisition to technical design, analytics strategy and business transformation - and see what gaps may need to be plugged to get the most out of GenAI and other powerful digital tools.

INSIGHT

A solid data and digital foundation is an indispensable prerequisite

On a very fundamental level, organizations must ensure that they build a solid data and digital foundation before going ahead with GenAI. As with any technology, GenAI can only yield tangible results if the underlying data is of high quality. Organizations must therefore have solid data quality, data management and data storage mechanisms in place before they even start using GenAI solutions. Where no data strategy has been defined, it is very unlikely that deploying GenAI will deliver a significant ROI.

GLOSSARY

Al agents

Al agents are (semi-)autonomous software programs that use artificial intelligence, especially LLMs, to perform tasks or achieve goals. They can interact with their surroundings, make decisions and take actions without needing constant human guidance.

Agent graphs

Al graphs give a clear structure to the workflow of Al agents. They map out how different parts of an Al system interact and pass information or commands between these parts. This arrangement helps build complex Al systems, especially those that involve multiple agents, decision-making and continuous improvement of results.

Large language models (LLMs)

These are advanced artificial intelligence models that, based on the input they receive, use deep learning techniques to understand and generate human-like text voices, videos and images. LLMs are capable of supporting tasks such as translation, summarization and providing answers to questions.

Tokens

A token is a fundamental unit of data that represents a specific element in a sequence, such as a word, character or punctuation mark. One million tokens roughly equate to about one hour of video, eleven hours of audio, over 30,000 lines of code or more than 700,000 words.

Grounding

Grounding links the abstract knowledge possessed by AI models to real-world use cases that are not necessarily part of their training data. The aim is for a model to generate outputs (predictions and responses) that are more precise and more contextually relevant.

Credits

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