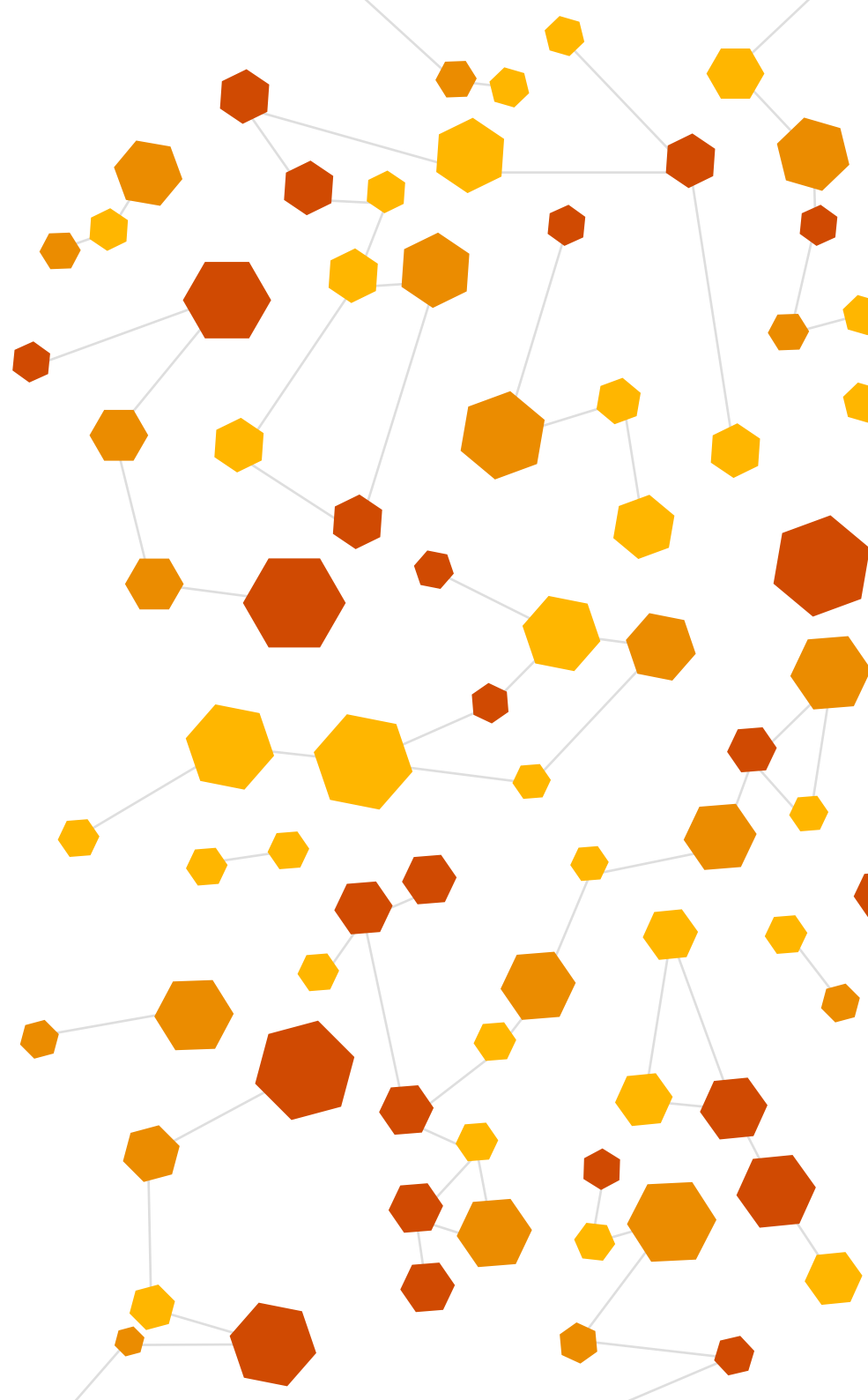




The leader's guide to generative AI

September 2023

Artificial Intelligence
Accelerate responsibly.





Before you head into a crucial board meeting

Imagine tasking your generative AI application of choice with any of the following requests: before I bother our pricing desk, estimate what we'd quote for a five-year American option on a thinly traded security we don't often trade.

- 1 Print for me the balance sheet, profit and loss, and cash-flow statements for my business, for the 12 months ending yesterday, and highlight differences between those statements when characterised according to International Financial Reporting Standards versus International Accounting Standards.
- 2 Compose for me a draft letter to my shareholders summarising the year in review.
- 3 Provide translations of our updated product disclosure information in the official languages of every market we serve.
- 4 Summarise for me the differences among European, Australian, and Japanese privacy regulations, and highlight deviations between them and policies in my organisation.
- 5 Describe for me the ten most significant customer behaviour trends for my industry.

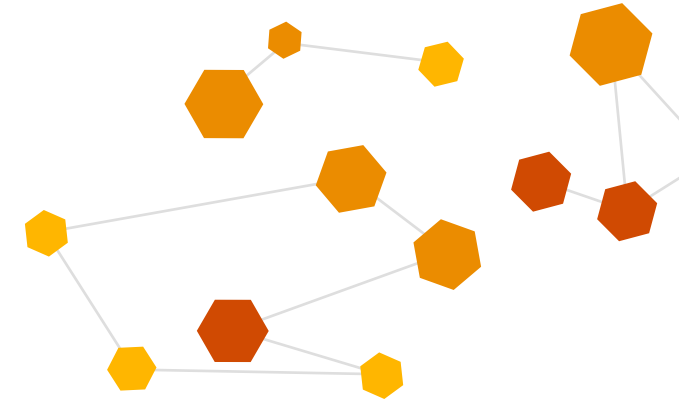
This isn't science fiction. Tools leveraging generative AI, which is AI that generates text, sound, images, or any other output, can already execute two of these tasks (can you tell which?). And the ability to carry out more of them is not that far away. The speed of progress recalls an aphorism about economics by Rudi Dornbusch: "Things take longer to happen than you think, and then happen faster than you thought they could."

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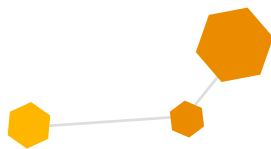
Rudi Dornbusch

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Clearly, we've reached a tipping point. It's hard to open a website, listen to an earnings call, watch a segment on CNBC, or have a conversation at a professional conference without hearing breathless discourse surrounding a technology that has been around for some time. The forecasts are coming fast and furious. A recent study by economists at the University of Pennsylvania and OpenAI concluded that LLM (large language model) technology as it exists today (i.e., without consideration of future development and integration) leaves one in five jobs materially exposed—meaning 50% or more of required tasks could be taken over by AI. In a less recent but more broad-based study, PwC estimated a global impact of AI in excess of US\$15 trillion.

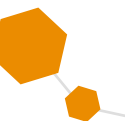
Bill Gates recently compared the development of LLMs to the graphical user interface (GUI), personal computer, or mobile phone—advances that made the use of technology intuitive and democratic. Another historical analogy can be found in the steam engine, which was invented in 1717 but whose power wasn't fully harnessed to human ingenuity until more than 100 years later. Generative AI, which is AI that generates text, sound, images, or any other output, is a similar step change. It will enable many more people to do many more activities (write, code, create images) in minutes that would previously have required years of training and experience.



In these early days, filled as they are with hype, cynicism, and the occasional hint of apocalyptic possibilities, it can be challenging for leaders to understand the practical implications of the rapid advances in generative AI, and its potential applications for business. But several implications are becoming clear for leaders of organisations and business strategists.

First, this time is different. AI has turned a corner. It is an exponential technology whose power improves with use, and whose use improves with power. So it will continue to develop at a rapid pace, and will be distributed through-out businesses as much on a bottom-up basis as on a top-down basis. Generative AI's faster, ever-evolving methods of analysing information and devising solutions can, in combination with other technologies, lead to radically new ways of operating. Second, as a result, the imperatives CEOs face in this moment are new. Beyond bringing generative AI capabilities into the organisation, leaders must personally invest time and effort to manage risk, focus effort on creating value, and strategically position their organisations to benefit from the coming disruption. Third, leaders need to start acting now. Don't wait until the future is clear.

This is a technology that has arrived at just the right moment for many industries in the throes of transformation. Those businesses that are already gaining experience by harnessing AI responsibly are building capabilities that will pay dividends for years to come.

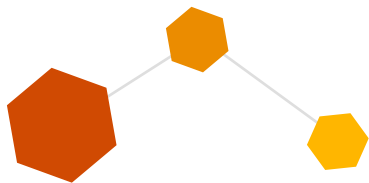




This time is different

Of course, AI has been having an impact for years. It is everywhere around us. Social media and streaming entertainment are such compelling experiences because predictive analytics (a form of AI) are so incredibly good at anticipating what we will like. From the search bar that completes your query about a product you want to buy, to the distribution centre that handles your order, to the optimisation of your delivery, in so many seemingly quotidian yet revolutionary ways, AI in all its forms machine learning, “deep” learning, text processing, speech recognition, image recognition, robotics, and real-time control has transformed our lives.

Through it all, we continue to enjoy its benefits while relying on specialists to bring them to us. For most of us, thinking about the uses, risks, implications, and imperatives of AI has been somebody else’s job. That’s not true anymore. The reason is language.



Language makes this different

Generative AI is different from other forms of AI. This is especially true for that subset of gen AI that processes and generates language (so-called large language models, or LLMs). Why? Because everyone uses language. Office workers use language. Children use language. Service-centre workers use language. Computer programmers use language. All your customers use language.

What’s more, language may be one of the most important manifestations of general human intelligence. Neurologists have long recognised that speaking and writing activates broader regions of the brain than most other activities, and many believe that the evolution of what linguists call the language instinct may be critically related to the evolution of general human intelligence itself. The boundary, in other words, between simulated, prediction-based speech and genuine intelligence is a fuzzy one in the eyes of a typical observer. As a result, LLMs today are doing things that most people would have difficulty distinguishing from real intelligence. The latest iteration of AI has earned top marks in exams such as the LSAT (the assessment taken by applicants to American law schools). In a recent study, a panel of 32 academic reviewers deemed its output worthy of publication in reputable journals.

Acceleration is underway

One example of gen AI that has captured the world's attention is GPT (generative pre-trained transformer) and its web-based chatbot interface, known as ChatGPT. Available free in basic form or by subscription to tap into advanced capabilities, it is the product of OpenAI (now a partner with Microsoft, which is investing billions). (Disclosure: PwC has a relationship with Microsoft aimed at creating scalable offerings using ChatGPT to help the firm and its clients harness the power of generative AI). OpenAI also has generative models that produce images of surprising originality: DALL-E is based on the GPT architecture but trained on image elements rather than text fragments. And, of course, GPT has plenty of company and competition.

Google has its own suite of text and image-generating AI models, along with a deep bench of engineering talent (the T in GPT is based on research first published by Google), as do Facebook, Amazon, and many other players. These models, and the competitive landscape surrounding them, are wide open and evolving quickly. Adoption rates have been extraordinary, even by the standards of other, recent digital innovations and services.

The growth of capability has been similarly exponential. The first open, public version of ChatGPT, based on GPT-3.5, was released November 30, 2022; just three and a half months later, in mid-March 2023, an upgraded version with drastically advanced capabilities, based on GPT-4, became available, via subscription.

As the data set for pretraining grows, so does its power. As its power grows, so does its use, and as its use grows, so does the volume and relevance of data it has available for training. This feedback loop, creating a dynamic of ever-accelerating performance improvement, is impressive enough by itself. And the sheer speed at which this technology is being democratized literally in front of our eyes is a strong signal for leaders to take it seriously.

Scaling faster than ever before

Time to reach 100 million customers



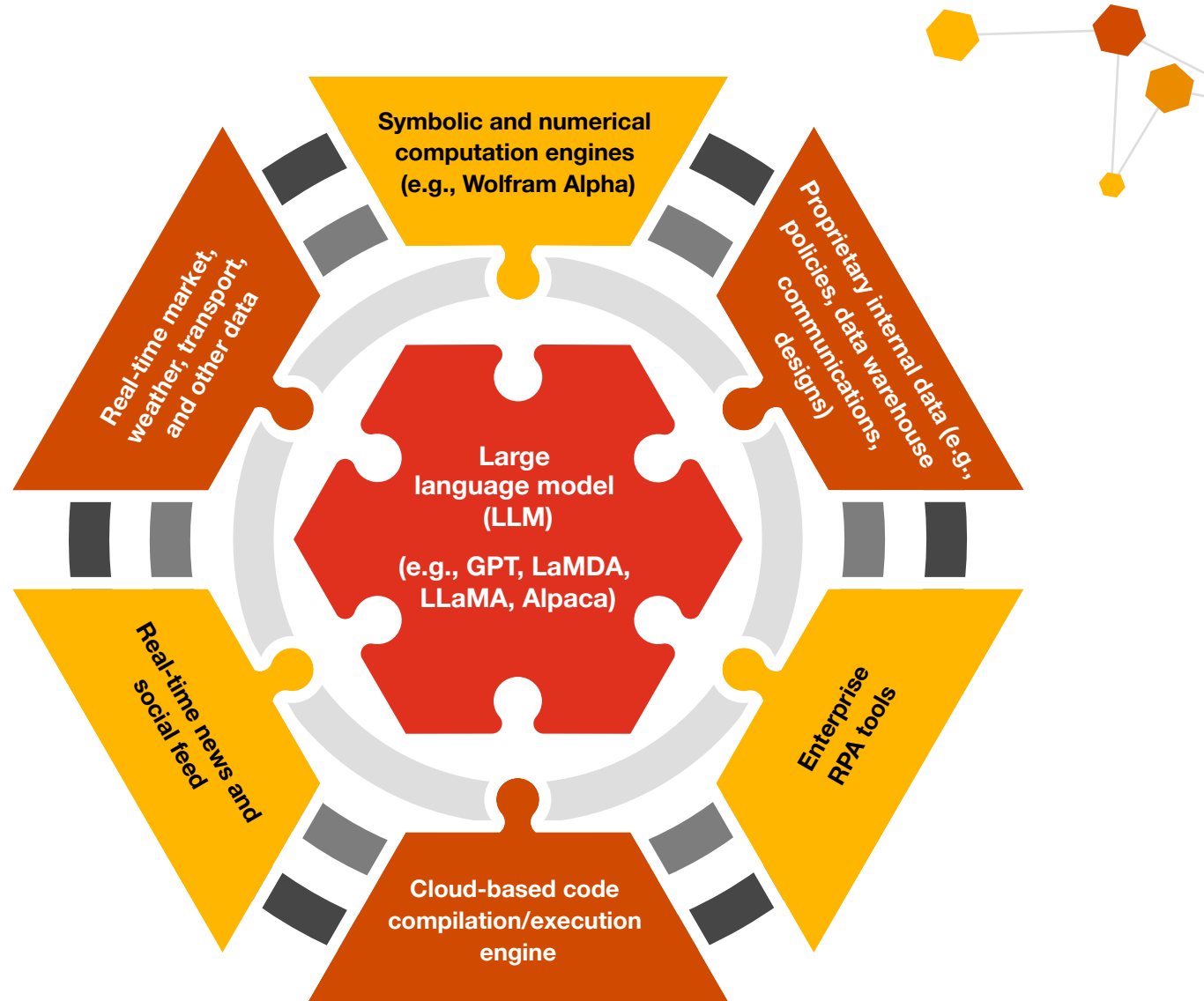
Source: PwC analysis

Brace for impact

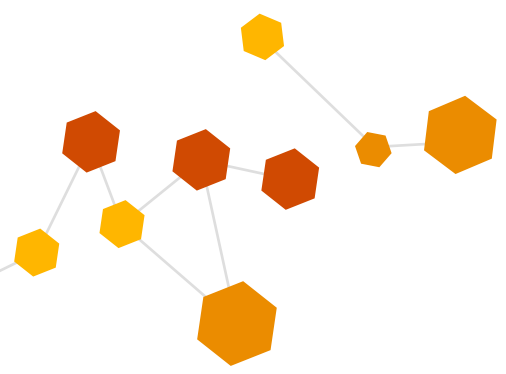
There's much more to come. An LLM today can write code, but can't necessarily compile and execute it. Now, consider what happens once we begin interconnecting the models with other systems as illustrated on the next page. Although it's early days, it's not too soon to grasp the scope of changes upon us and the imperatives they'll impose on leaders. In our view, generative AI will impact organisations in three significant ways.

In the short term, the impact will be incremental. We expect to see use cases targeting efficiency, acceleration, and improvement of existing activities (e.g., augmenting research, facilitating internal reporting, or collecting and summarising information). In the medium-term, as AI becomes more connected (as shown in the graphic above), we expect it to begin to encroach on and transform specific knowledge-based domains of work. These will be more transformative, as AI will be able to perform such work in ways not possible today. Finally, in the longer term, disruptive use cases will change the way entire value chains work, with gen AI ubiquitous across every aspect of professional work. Another way of understanding generative AI's growing importance is to envision its impact progressing from tasks to processes to business models.

Examples of input and output tools waiting to be connected



Source: PwC analysis



New leadership imperatives

Confronted with these disruptions, what should leaders do? First, recognise that it's here. Many of your critical suppliers are already embedding gen AI into their own products, and several of your own people have begun experimenting with it. And this is just the beginning. For this reason, the priority isn't just about bringing this new technology and capability into the organisation; it's also about managing and directing what is already coming, and preparing for what's next. Leaders must manage risk and grasp the immediate changes to the way their employees work. They must focus efforts on use cases and direct efforts toward areas of maximum value creation. And they must strategically position themselves to benefit from the disruption on the way.

Manage risk

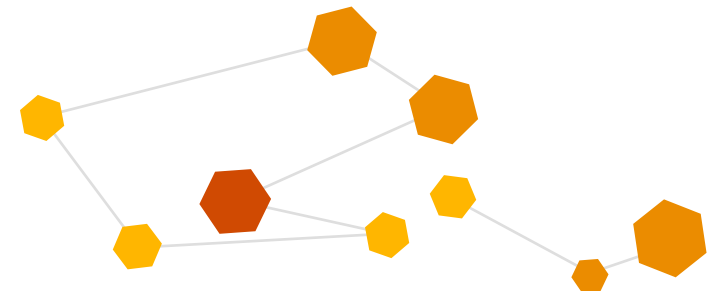
It's important to recognise that gen AI, like all AI, can be unreliable. Like a college sophomore, it has just enough knowledge to sound confident and compelling, but not enough wisdom to know how it can be terribly wrong. When it provides a convincing answer to your question, it does so without any understanding of what AI researchers and linguists call the ontology of its words their essential meaning. Its job is to predict what string of words (actually, what strings of word fragments) are most likely to be associated with a sample of input text, and then assemble them in such a way as to maximise the “scoring function” pre-trained (that's where the P in GPT comes from) on its learning corpus. It's no different than the social media recommendation engine that maximises users' engagement and clicks. It's just math, in other words. Gen AI has no framework to care about things such as justice, safety, inclusion, or truth—unless and until those concepts are explicitly incorporated into its scorecard.

Now, just because an intelligence works differently from our own doesn't mean it can't accomplish its goals as well as ours can, or better. However, it does mean that users need training on how AI works, starting with its objectives, strengths, and limitations. And just as with any executive managing a team of smart and curious analysts, it is the human who is ultimately accountable for the quality, accuracy, and rigour of the work.

It also means that extra care must be taken before it's given authority to act autonomously, whether that means speaking directly to customers (which, in principle, it could do today) or acting on specialist recommendations like making credit decisions, onboarding customers, or filing submissions.



Leaders must set guardrails and guidelines for their teams. (For more on how to do this, see “[Managing the risks of generative AI.](#)”) Employees need to know what they can and cannot do in order to keep exploration safe and responsible, to protect customer data and sensitive information, and to refrain from perpetuating bias. That means that adopting a set of rules of conduct for using generative AI is both good practice and a requirement. Principles such as fairness, accountability, and transparency—along with clear processes, governance, and oversight for the use of generative AI tools—are all key pieces of the responsible AI puzzle.



Focus effort

It isn't just imagining and understanding the risks of AI that's hard. Figuring out how to best harness generative AI for maximum value also poses big challenges. When a model can potentially do almost anything (at least, with appropriate connectivity), it's difficult to decide what to ask it to do. Don't delegate responsibility or try to solve this in a top-down fashion. Your next step should be to dig in, engage your people, and encourage them to work in new ways.



Invest your time

This latest technological wave is too important to outsource or delegate, even to a chief technology officer. CEOs must carve out personal and organisational time to create the space to immerse themselves in these tools, understand their capabilities, and stretch their imagination about the kind of value that could be unleashed. You must understand that this is going to be a process, not a project. And it is one that should involve your senior leadership team as well. Create an account with a gen AI provider, and ask it the hardest questions you can: questions that a team might need hours or days to answer. Ask it about something you wish you had the time to explore yourself. Ask it to do something you'd think a machine could never do, like tell an obscure joke, solve a mathematical proof, or create an outline for a personal performance assessment written in the style of your favourite author.

Top leaders' abilities to identify patterns and cross-functional opportunities mean that diving in, personally, can rapidly accelerate organisational progress. When one leader we know subscribed to a high-capability generative AI system and began experimenting, it took her just 48 hours to recognise large, disruptive possibilities for core areas of her operation, and to write a memo (partly leveraging gen AI) spelling these out and suggesting an action plan for her organisation and her peers on the company's leadership team.



Engage the whole organisation

Gen AI provides a mechanism for encoding the judgment of experts into models. The extent to which that encoding is possible, along with the dimensions of the corpus on which the LLM is trained and the degree to which it can be adapted or augmented by proprietary models built on top, all shape its performance.

Work with talent teams to ensure people have or acquire the necessary training, skills, and awareness of risks. And engage risk teams to ensure that AI risk, and the imperative for responsible AI, are understood. Some companies have set up an AI council—a centralised board to collect use cases from multiple groups—while others have created pods for experimentation in which business users are paired with gen AI experts. In our own firm, in just the first month in which the latest GPT version was available, we ran internal hackathons, involving some of our most junior employees, that identified opportunities to create value using LLMs in specific regions that amounted to roughly 1 to 2% of revenue.

This is part of an effort to modernise internal platforms, engage external partners, and upskill tens of thousands of employees on AI. Many companies, in our experience, can benefit from catalysing collaboration between technical and functional or business experts; in our case, such mash-ups have helped identify several thousand industry and function specific use cases.



Engage with critical stakeholders outside the organisation

Communicate to contractors, vendors, and advisers that you expect your collaborators to be partners in this process, and that they should be prepared to demonstrate that they too are confronting the implications for their own businesses. Ask how you might work together to harness the power of gen AI across your combined supply chains. If they are suppliers, service providers, or advisers, ask about their plans to leverage this technology to improve their service proposition to you, and their ideas about how they intend to share the benefit from increased productivity with you. Seek opportunities to work with broader stakeholders—governments, industry organisations, and communities to mitigate the risks of gen AI, and ensure that benefits are equitably distributed.



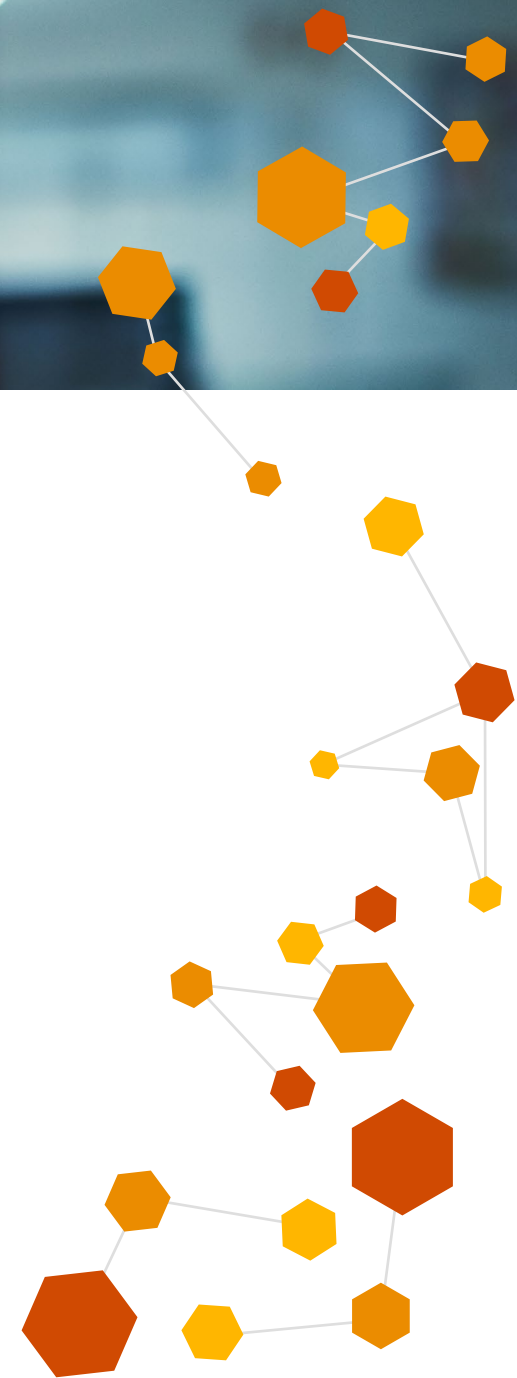
Start acting

We live in an age of reimagination: operating models, value chains, business models, and business ecosystems are being reorganised and restructured faster than ever before. According to PwC's most recent CEO Survey, four in ten CEOs believe their business model will no longer be viable in ten years. Customer expectations for convenience, ease of use, speed, and relevance are rising. Cost pressures and elevated demands surround trust and regulation. The war for talent is intense. Many leaders are caught in the jaws of several tough dilemmas. They must cut costs while investing in improved services and grow while (in many cases) paring back risk.

Target the value

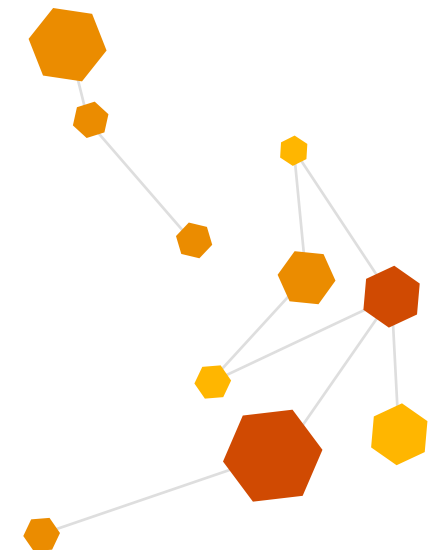
The current version of gen AI has great potential to help organisations resolve these dilemmas. With its speed, it offers users the ability to act quickly. With its accessibility, it increases the decision-making power of workers at all levels. With its flexibility, it makes it easier to build new applications for specific purposes. With the right training, tools, and frameworks, we believe CEOs will be amazed at the ways their own organisation put these tools to use deep inside supply chains, operations centres, customer service centres, and corporate functions. In short, the disruptive power of AI is arriving at just the right time. Whether the industry is banking or mobility, government or healthcare, media or energy, innovation and technology are the only ways to resolve fundamental strategic dilemmas. In today's winner-takes-most environment, they are crucial.

We don't pretend to have definitive answers about what the future will look like for our clients, or for ourselves, or how to win with AI. The potential opportunities are too many to enumerate here, and the highest impact possibilities are probably ones no one has yet thought about. However, in general, we see organisations deriving value in five areas, as shown in the table on the next page.



Potential generative AI opportunities in five key dimensions

Dimension	Illustrative examples of what AI can do
Efficiency and scale	<ul style="list-style-type: none"> Automated generation of summaries and reports of client conversations Truly useful chatbots or voice response for simple queries, funnelling complex questions to the right person, first time, every time Augmenting robotics process automation by providing more flexible oversight and coordination capabilities Automated error correction and generation of standard regulatory and statutory filings and reports Automated generation of standardised customer and market copy, including brochureware, disclosures and other communications
Quality and compliance	<ul style="list-style-type: none"> Guaranteed registration of all client interactions, with automated auditability and information retrieval Customer service augmentation, with “in-call” assistant for questions and real-time flagging of potentially incorrect information Automated “customer suitability” filter applied before origination of every product or service
Risk management and fraud	<ul style="list-style-type: none"> “Always on” monitoring of internal email, chat, and message systems for potentially risky communication or behaviour Real-time counterparty credit reporting, factoring live data feeds from Bloomberg, Reuters, Twitter, and other media Automated, event-driven suspicious activity reports
Business insights	<ul style="list-style-type: none"> On-demand analytical reporting and business insights, summarising input from CRM, ERP, communications, and other systems On-demand market scanning and opportunity analysis, incorporating feeds from financial and news sources, trained on the corpus, including relevant business law, economic statistics, and information supply chain, market, and regulatory requirements
Customer and employee experience	<ul style="list-style-type: none"> “Always on” client adviser to handle simple queries and requests, with a “warm handoff” to specialists as necessary On-demand year-in-review summary for employees, synthesising email, calendar, and docs for performance assessment





Get inspired

The saying “This time is different” is so often wrong that it’s become a reliable marker of naivete, used only in irony; some of our PwC colleagues, in fact, have reacted to the strength of this assertion. But having watched the development of AI over many decades, we cannot help looking at what we are witnessing today and conclude that this is such a time. Although employees, stakeholders, and vendors will play a vital role in applying AI to business operations and strategy, CEOs retain the primary responsibility for making it work. The advent of more powerful AI means we cannot yet outsource the vital tasks of understanding risk management, focusing and directing effort, and reimagining strategy so organisations can be resilient to the coming changes.

Now is the time for leaders to align their organisation and build commitments for the delivery of tangible benefits in the next 12, 18, and 24 months. Of course, new technologies can inspire equal measures of optimism and fear, anxiety and hope. They always have. We’re confident that leaders who dig in to grasp the potential of this new set of powerful technologies will be inspired by the opportunities at hand.





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