

A low-angle, upward-looking photograph of several modern skyscrapers against a twilight sky. The buildings are illuminated from within, with many windows glowing with warm yellow light. The perspective creates a sense of height and scale. Two vertical blue bars are positioned on the left side of the image, framing the title text.

The arrival of GenAI: When Convenience Destroys Creativity

A perspective paper

November 2023



GenAI is disrupting operating models in multiple industries and this is reflected in the explosive market growth

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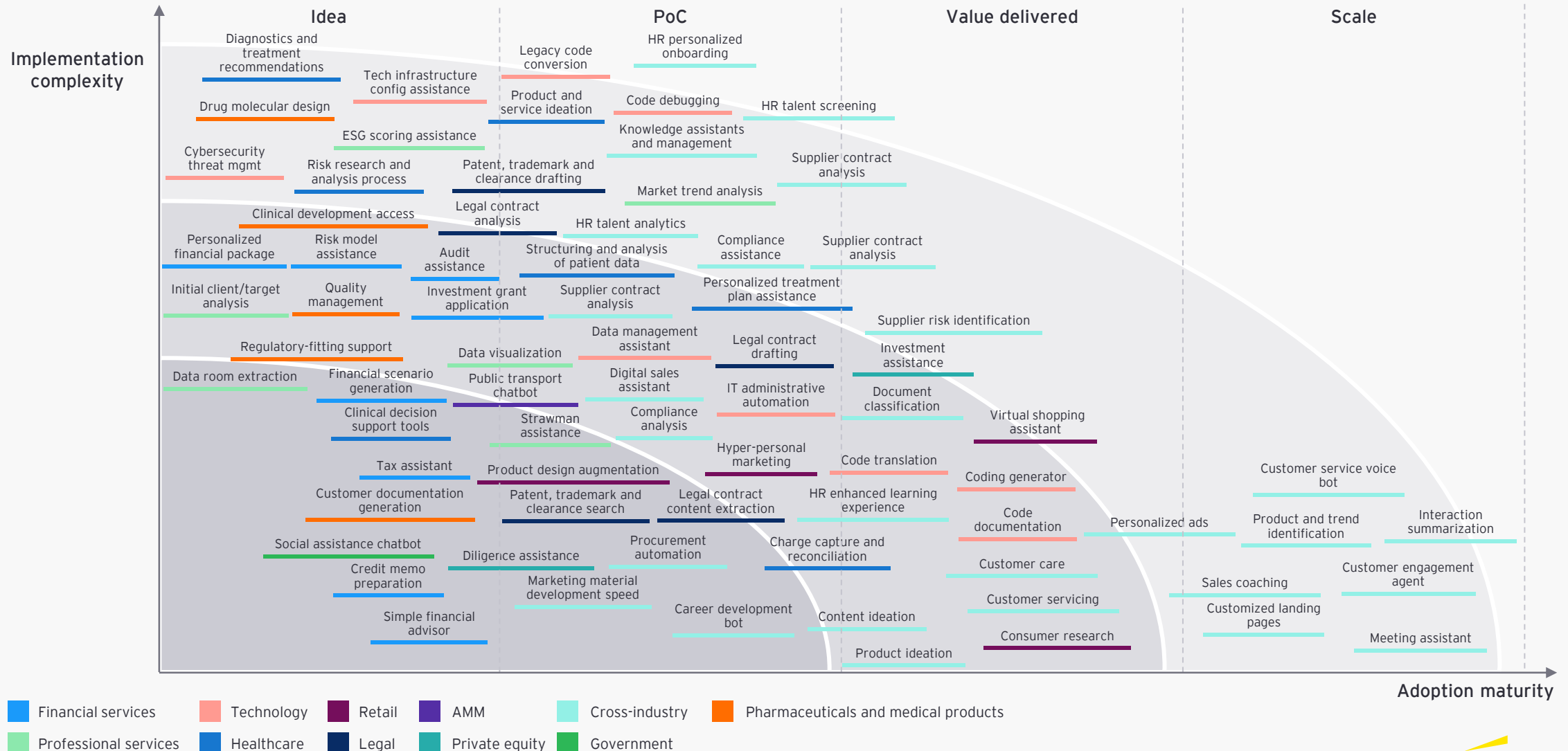
How to strategically apply GenAI

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The new rules of competition and the wealth gap

Over the past year, we saw Generative AI disrupting established operating models and nurturing new business model opportunities in multiple industries

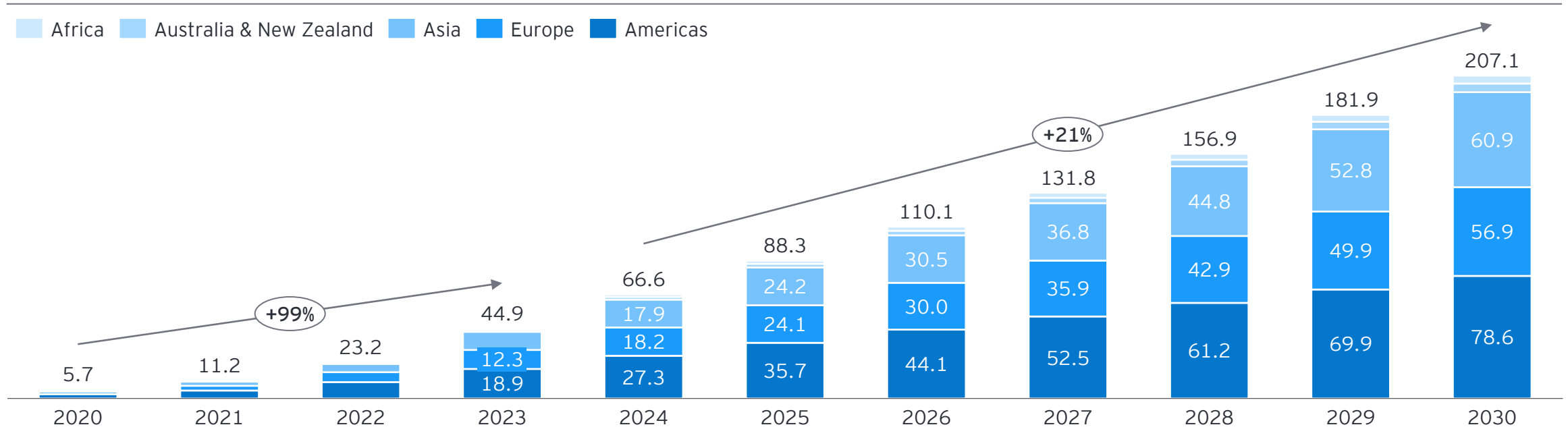
GenAI use-cases disrupting established operating models, not exhaustive



The disruptive impact is evident in the market's growth, showcasing remarkable Compound Annual Growth Rate (CAGR) of 99% over the past three years, transitioning into a CAGR of 21%

Global Generative AI market

Generative AI market size by region 2020-30E (\$b)



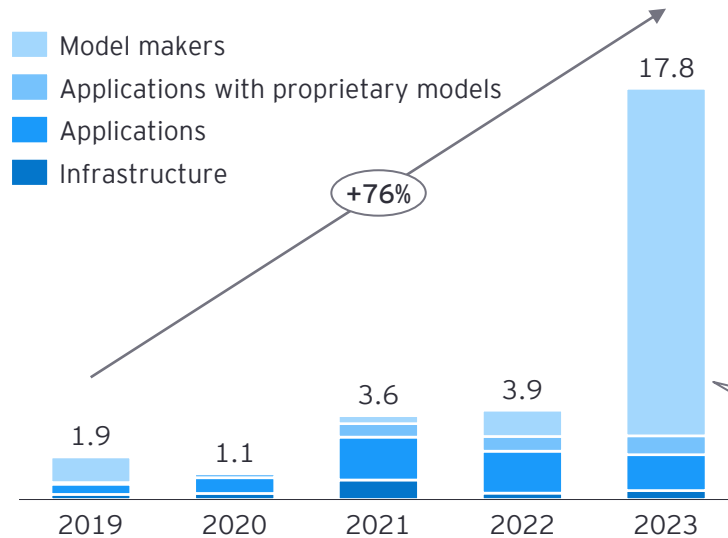
Commentary

- ▶ The CAGR of c. 99% of the past four years has mainly been driven by the hype around the launch of ChatGPT in the end of 2022. Growth for the coming years is still forecasted to be strong but slows down to a 21% CAGR
- ▶ Recent growth is largely attributed to general availability of foundational models (e.g., BERT, GPT). Future growth is not expected to be at similar rates owing to improved realization of capabilities of these models and is potentially linked to the hype cycle of innovation
- ▶ The European market size in the Generative AI market is projected to reach \$12.25b in 2023 and is expected to grow to \$ 56.85b by 2030. Currently, the largest market size exists in the United States at \$16.14b in 2023

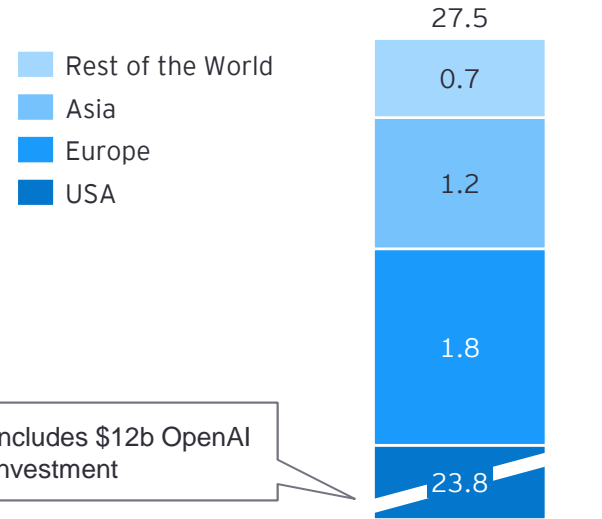
GenAI VC funding grew significantly and is dominated by investments in model makers and applications

Global Generative AI venture capital funding landscape

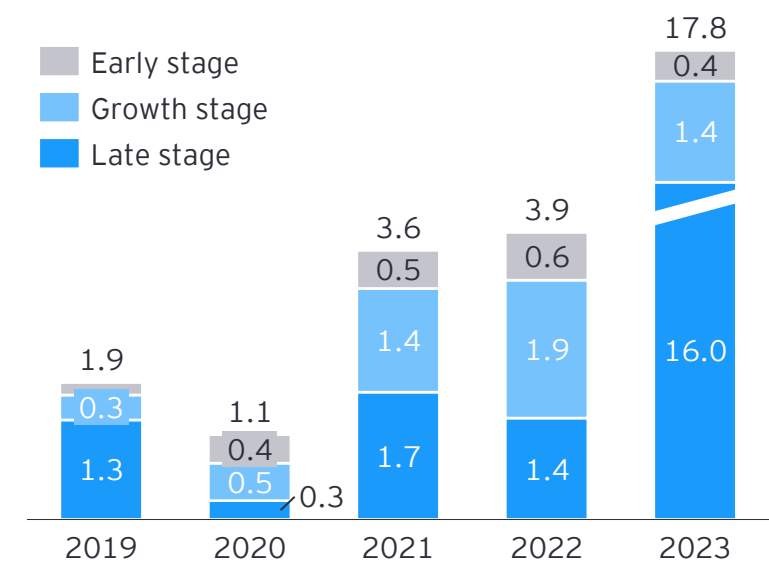
Global GenAI VC investment by segments
2019-23 (\$b)



Cumulative GenAI VC investment by region
2019-23 (\$b)

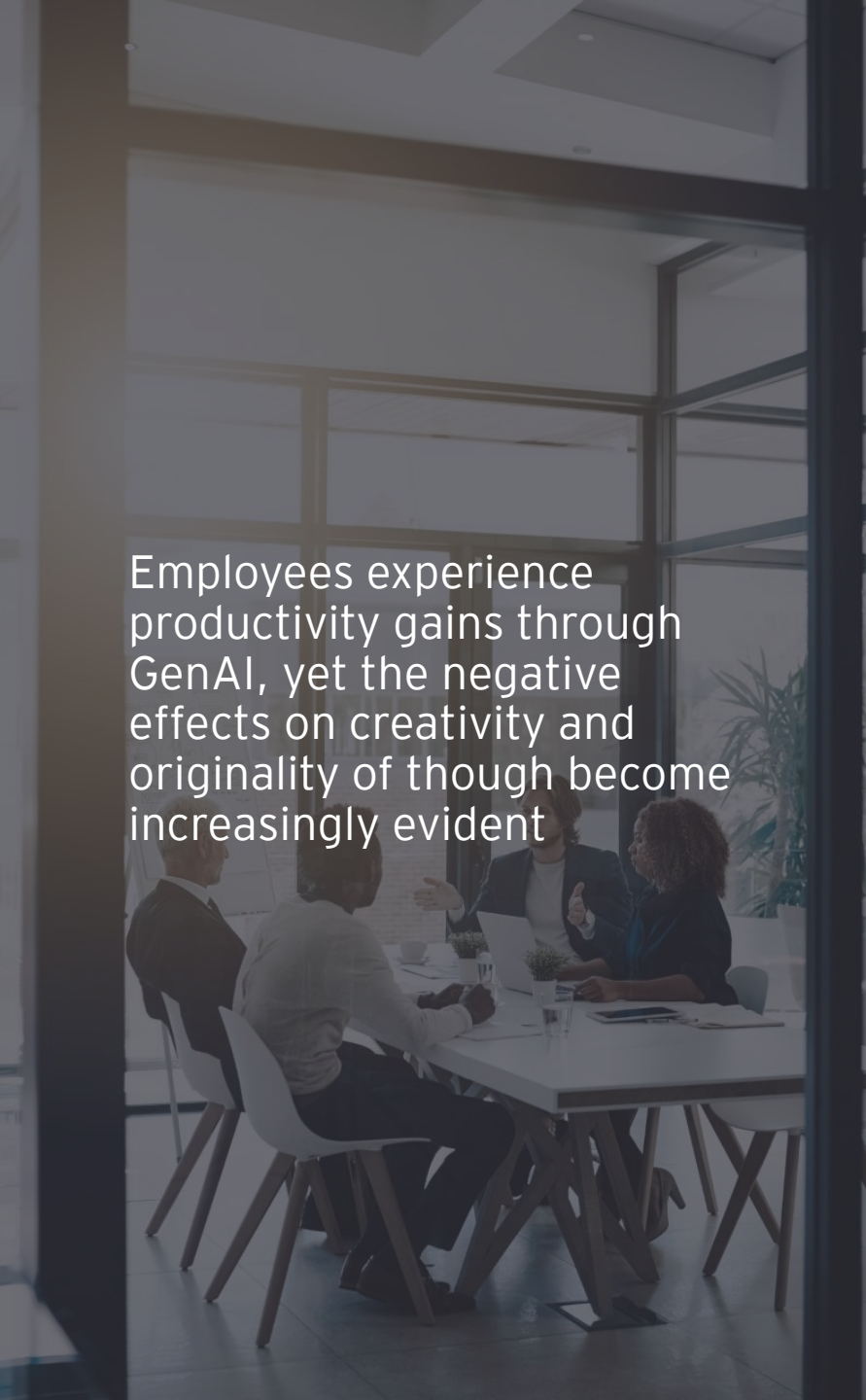


Global GenAI VC investment by stage¹
2019-23 (\$b)



Commentary

- ▶ Global GenAI VC investments rose the past years where the majority of the funding for 2023 (\$12b) is attributed to the OpenAI investment. In terms of cumulative VC investment for the past five years (2019-23), the US leads even without the OpenAI investment. Europe follows the USA with \$1.8b in VC funds ahead of Asia with \$1.2b of funding
- ▶ The majority of the funding is for model makers and applications (built on third-party foundational models). Model makers require considerable funding owing to the high costs associated with training and deployment of the models. There is also verticalized model makers emerging (e.g., Hippocratic.ai which is a health-focused LLM). Applications primarily focus on use-cases covering text (copywriting, chatbots, knowledge management), code generation, image generation and speech generation
- ▶ Early-stage and growth investment into GenAI startups has steadily increased from 2019 potentially indicative of rise of new startups focusing on GenAI. There is some slowdown in 2023, however this could potentially be attributed to reporting delay. Late-stage funding is attributed to a few companies which are mostly model makers (e.g., OpenAI) raising large capital



Employees experience productivity gains through GenAI, yet the negative effects on creativity and originality of thought become increasingly evident

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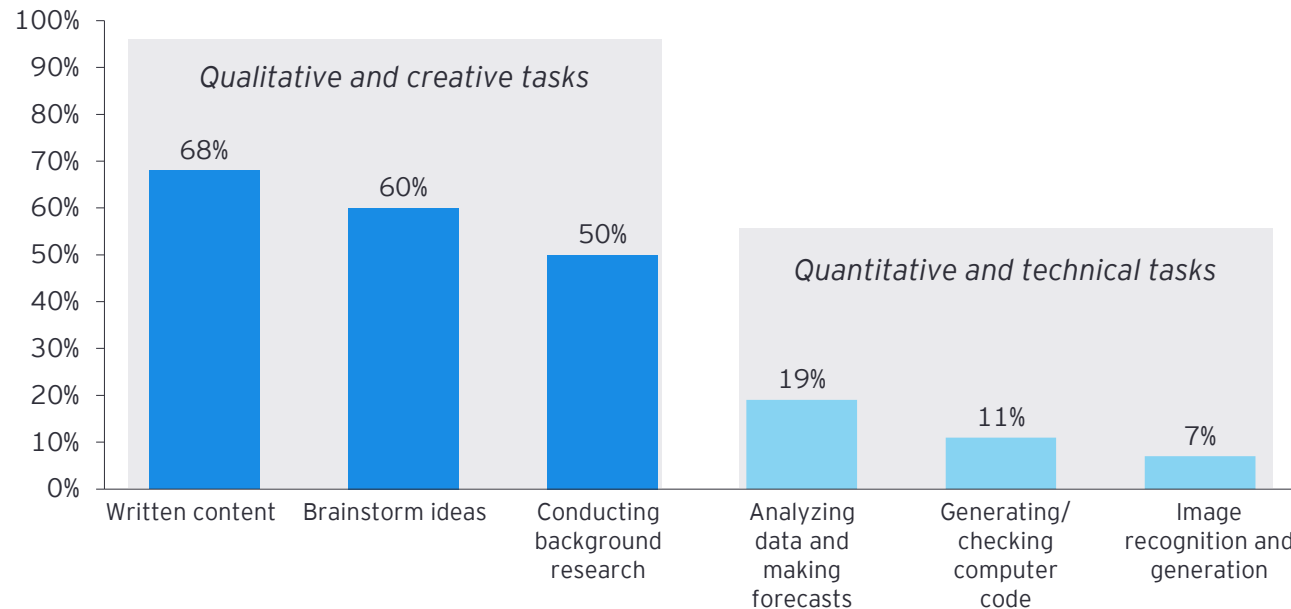
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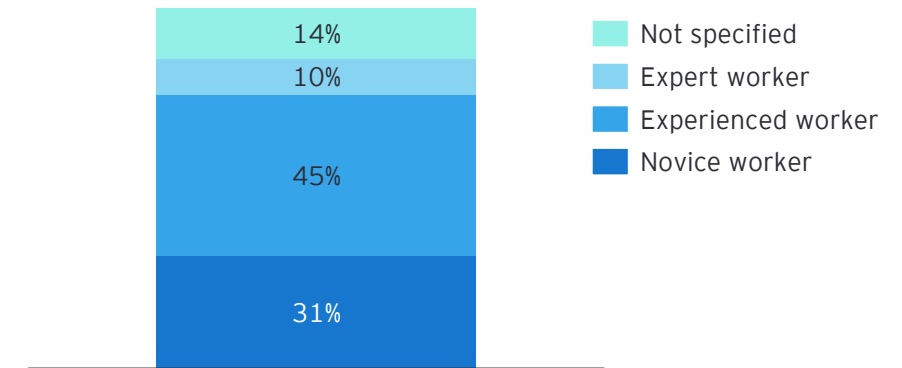
GenAI is predominantly employed for fundamental tasks to support humans, with over 75% of its quality assessed as equivalent to or surpassing that of an experienced worker...

GenAI use-cases and quality of output

Percentage of use on different types of tasks for GenAI tools



Quality of AI output compared to seniority of human workers



“Generative AI is already delivering work product that meets or exceeds the quality of employees with years of experience—at least on specific tasks.

Leader of the Conference Board Human Capital Center

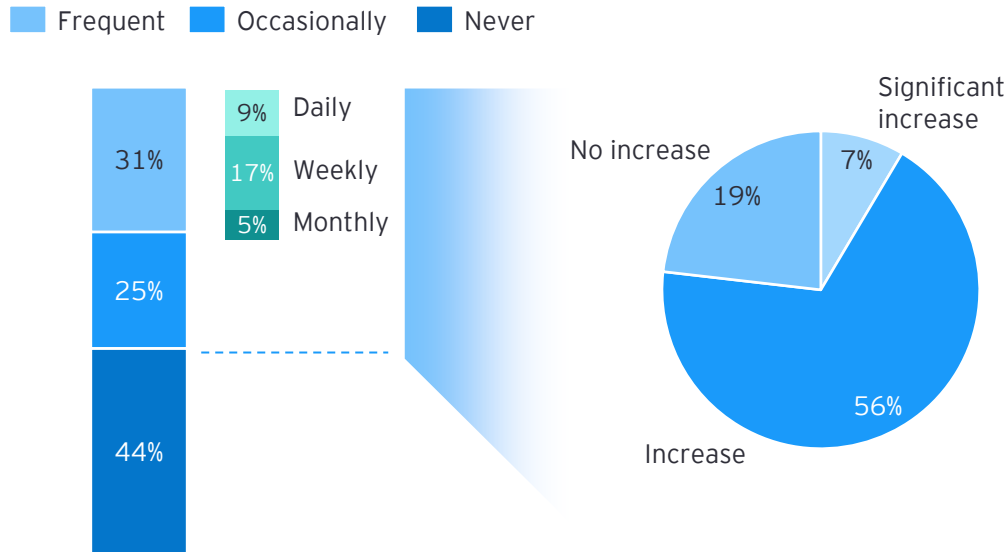
- ▶ GenAI is primarily used for assistance in foundational tasks foremost entailing copywriting, ideation and background research. Trust in the performance of GenAI on quantitative and technical tasks like data analysis, code writing and image recognition seems to lack resulting in less use
- ▶ The reputation of GenAI making up answers even when it does not have the information is weighted more heavily in tasks where it's more difficult to spot errors once the analysis is finalized (quantitative and technical tasks) in contrast to where it's easier to adjust later (foundational tasks)

- ▶ The output produced by GenAI is evaluated to be of significant quality with 45% of the output being of the quality of an experienced worker and 10% being of the quality comparable to an expert worker. This indicates positive future perspective for the use of GenAI on specific tasks of daily business operations

... and generally, most of the surveyed employees experience an increase in productivity

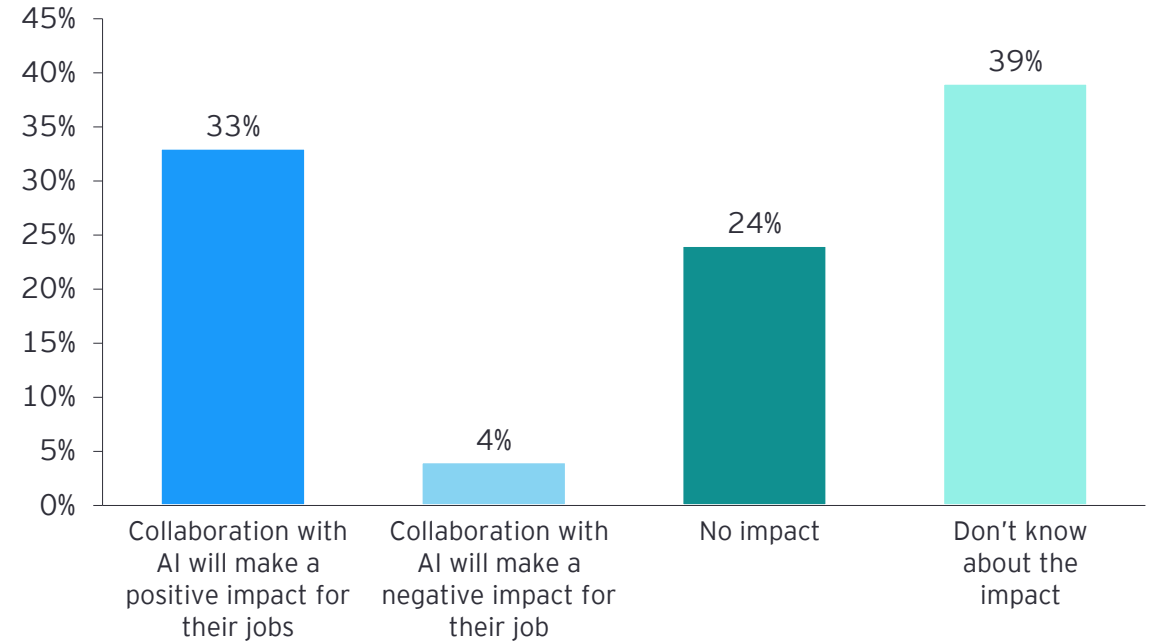
GenAI usage by US organizations and employees

Adoption of GenAI tools for work tasks and productivity increase



- ▶ Understanding where GenAI can increase productivity will be key in extracting most value. As more employees try out the technology, empirically the business value will become more clear

Employee expectations of impact on job tasks

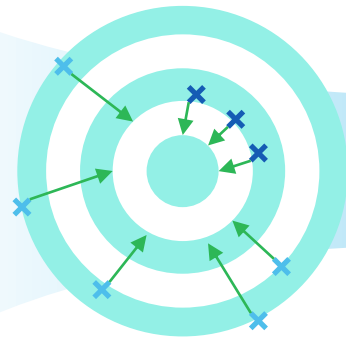


- ▶ The increase in productivity is mostly evaluated positively on replacement of elements of people's jobs. Less time will be spent on repetitive tasks containing little value and more time can be spent on creative and high value-adding tasks

However, while GenAI improves output in some cases and allows the bottom performers to close in on top performers, in other cases it will harm the quality

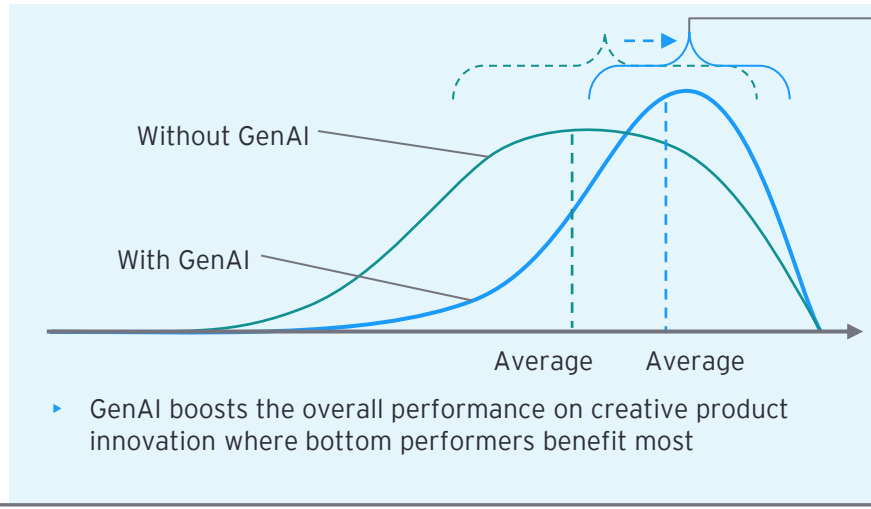
GenAI enhanced performance on simple idea generation versus complex problem solving

✕ Bottom performers ✕ Top performers



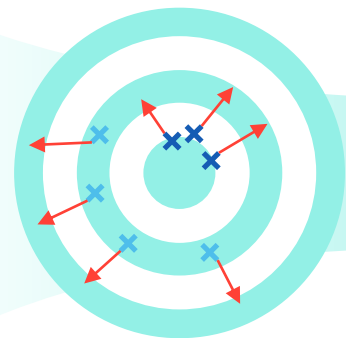
- ▶ Bottom performers improved 43%
- ▶ Top performers improved 17%
- ▶ The average improved 40%

Simple idea generation (existing problem) — *Ideas for new products and go-to-market*



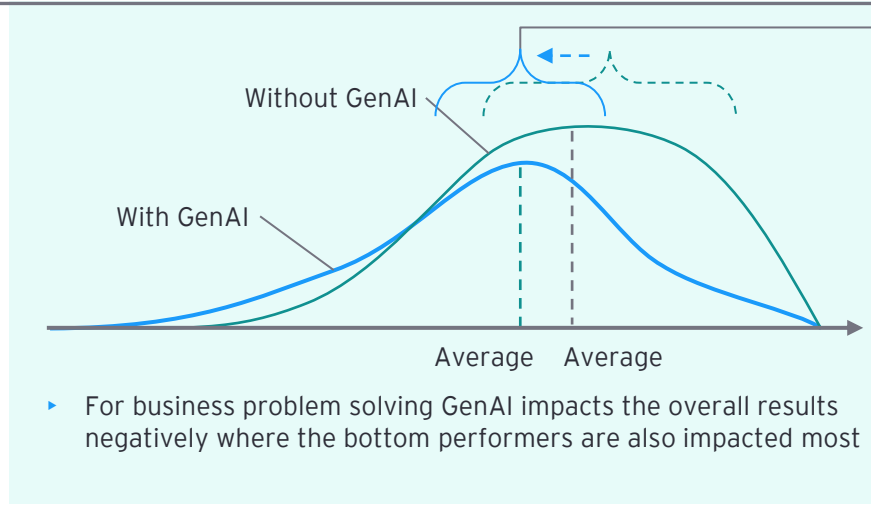
- ▶ GenAI boosts the overall performance on creative product innovation where bottom performers benefit most

GenAI also decreases the variance of the quality of the output of both creative product innovation and business problem solving



- ▶ Bottom performers decreased 26%
- ▶ Top performers decreased 17%
- ▶ The average decreased 23%

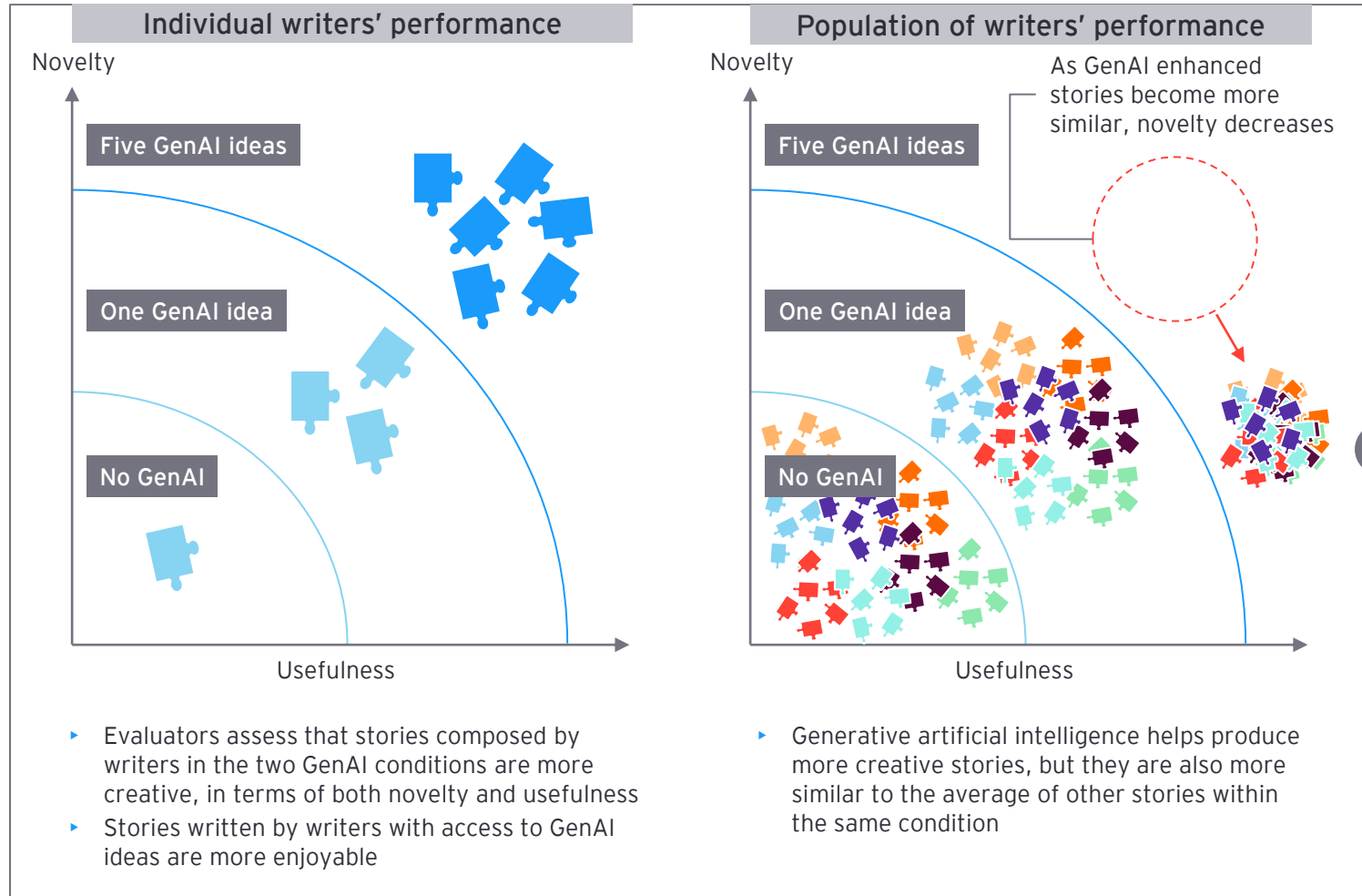
Complex problem solving (new solution) — *Identify the root cause of a company's challenges based on performance data and interviews*



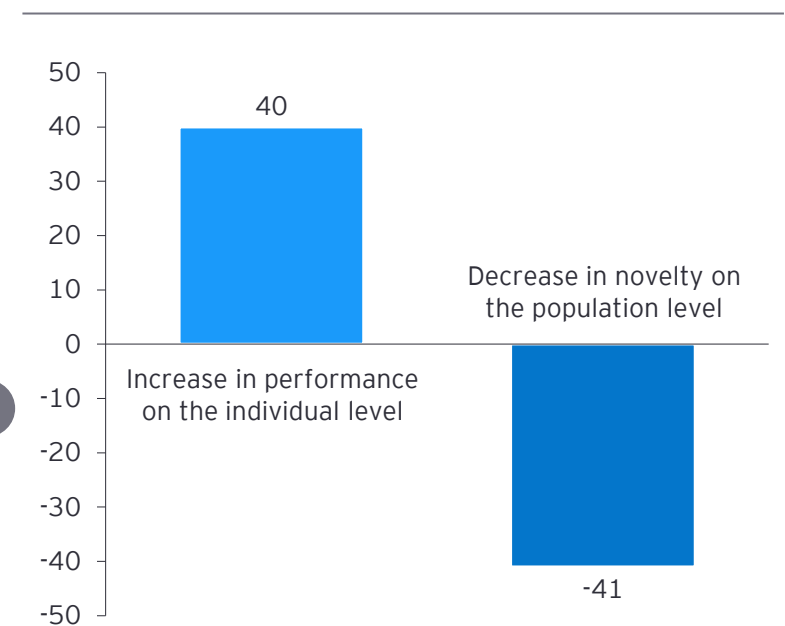
- ▶ For business problem solving GenAI impacts the overall results negatively where the bottom performers are also impacted most

For creative ideation, more exposure to GenAI increases the quality but impairs the diversity of thought, leading to decreased novelty

GenAI enhanced output by individuals vs a population



GenAI's impact on individual performance in connection to the impact on population novelty (%)

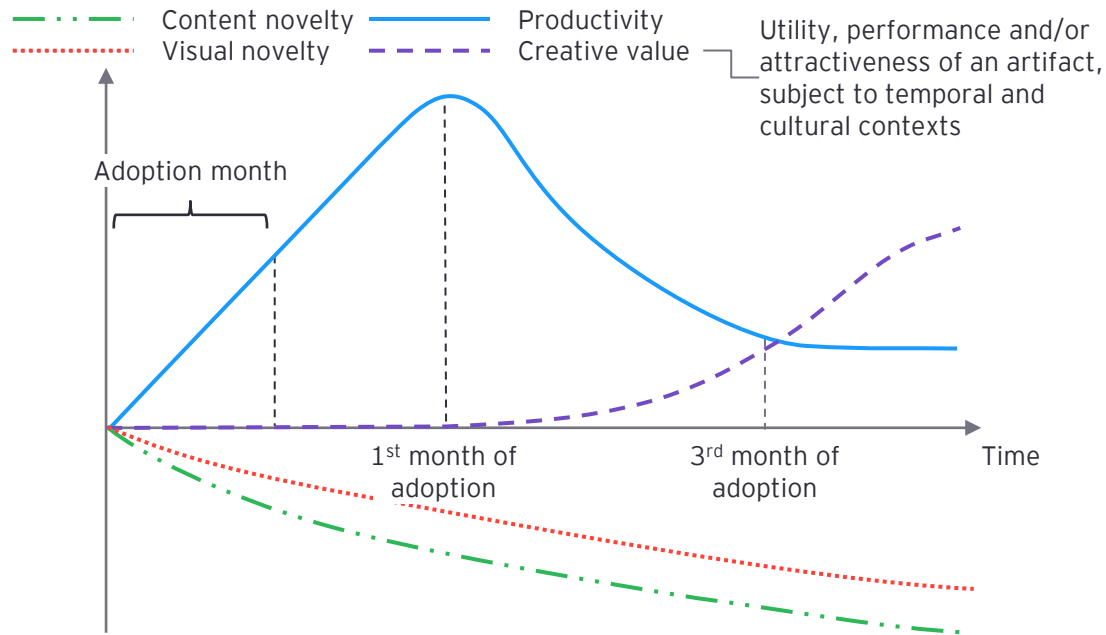


- ▶ GenAI boosts individual performance but may undercut population novelty

Over time, GenAI-enhanced content creation leads to consistently decreasing novelty; the initially positive impact on productivity and utility plateaus

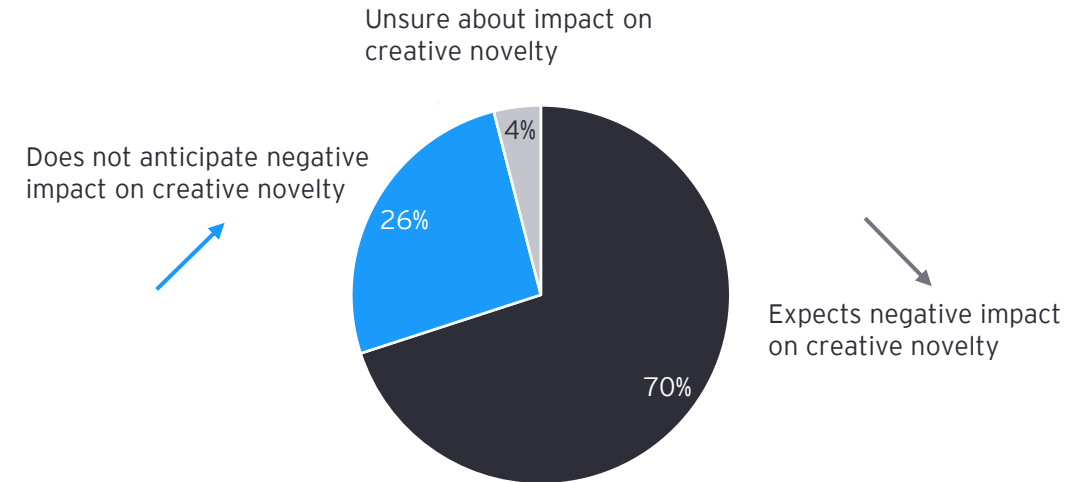
GenAI enhanced output over time

Artists' GenAI tool supported artwork output over time




- ▶ Overall productivity increases 100% during the adoption and first month and drops to 25% increase after three months in contrast to no GenAI enhancement
- ▶ Creative value increase is slow at first but improves after three months of GenAI adoption resulting in a significantly more valuable evaluation
- ▶ Content novelty decreases over time amongst adopters, meaning that the focal objects and themes within new artworks produced by AI adopters are becoming more similar over time when compared to untreated units
- ▶ Visual novelty decreasing over time means adopters converge to a preferred visual style from which they diverge little

Employees' expectations of long term GenAI impact on creative abilities



- ▶ Most employees expect that GenAI will negatively impact their creative abilities over time. This expectation is in line with the outcome of the study on artwork output when we look at content novelty and visual novelty
- ▶ Creative value in the left chart improves over time but individual's performance on creative abilities when GenAI is not used as support is expected by employees to have a negative impact



Understanding for which problems and solutions GenAI is most applicable is crucial for implementation success

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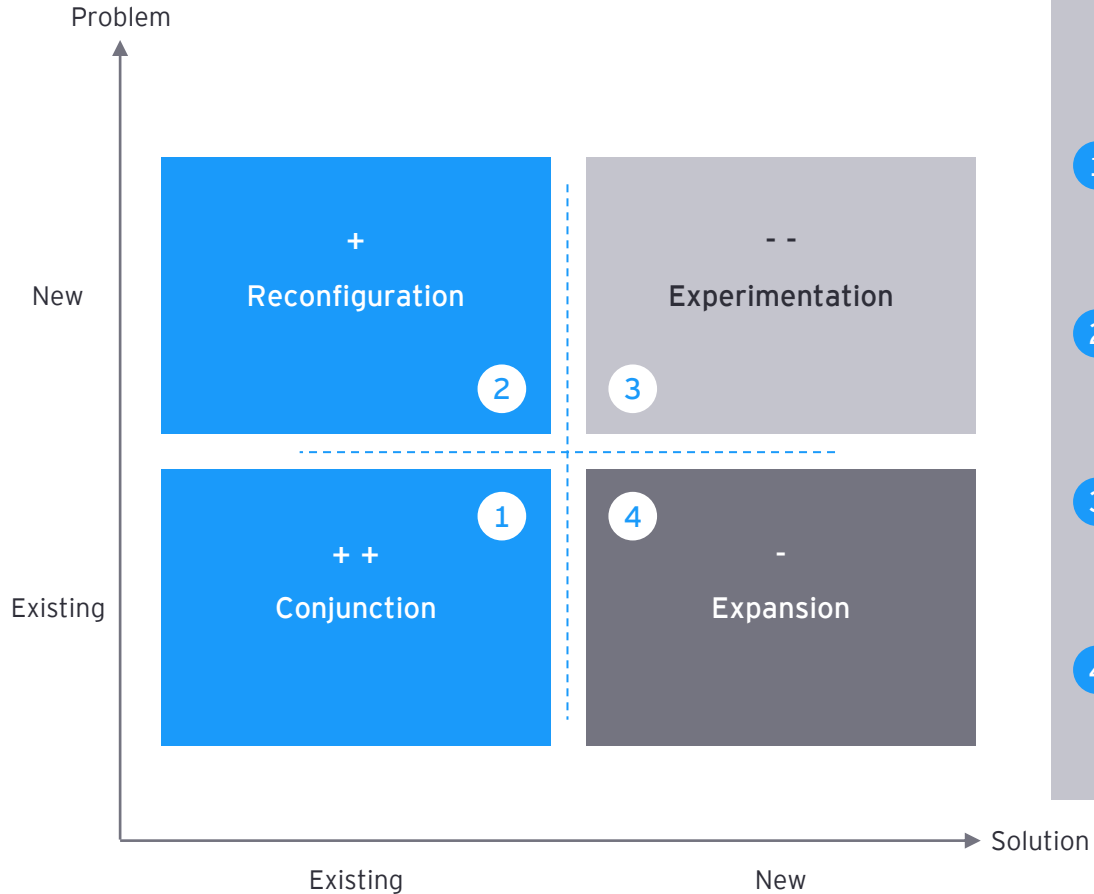
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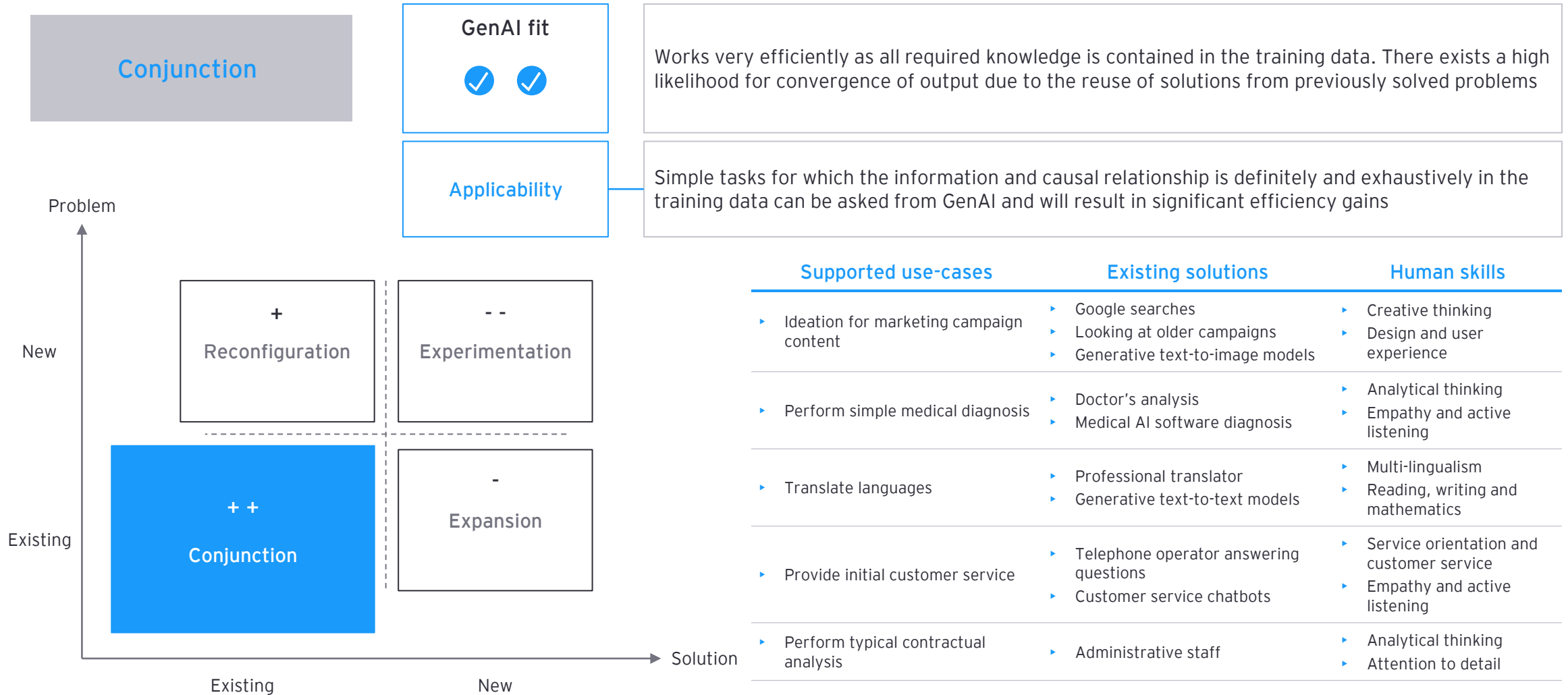
Beware of the hidden trap of convenience: superior results in Conjunction and Reconfiguration do not guarantee comparable output in Experimentation and Expansion



	Examples
<p>1 Conjunction Existing knowledge is applied to existing problems resulting in quicker problem solving, hence causing a decrease in novelty</p>	Retrieving information from a knowledge base in a Q&A style with a conversational look and feel
<p>2 Reconfiguration Existing knowledge for new problems can work by supporting the problem solver to find new solutions</p>	Propose code snippets for building new software products, supporting with best practices pieces of code
<p>3 Experimentation Insufficient understanding of the problem requiring too much novelty, hence an iterative, creative approach required not suited for GenAI</p>	New diseases that require completely new drugs with limited similarities with known diseases or viruses can be found
<p>4 Expansion New solutions for existing problems create unfit solutions that seem clever on first sight but lure convenience to beat creativity</p>	Business problem solving with constrained training data, resulting in generating too many, and too broad recommendations

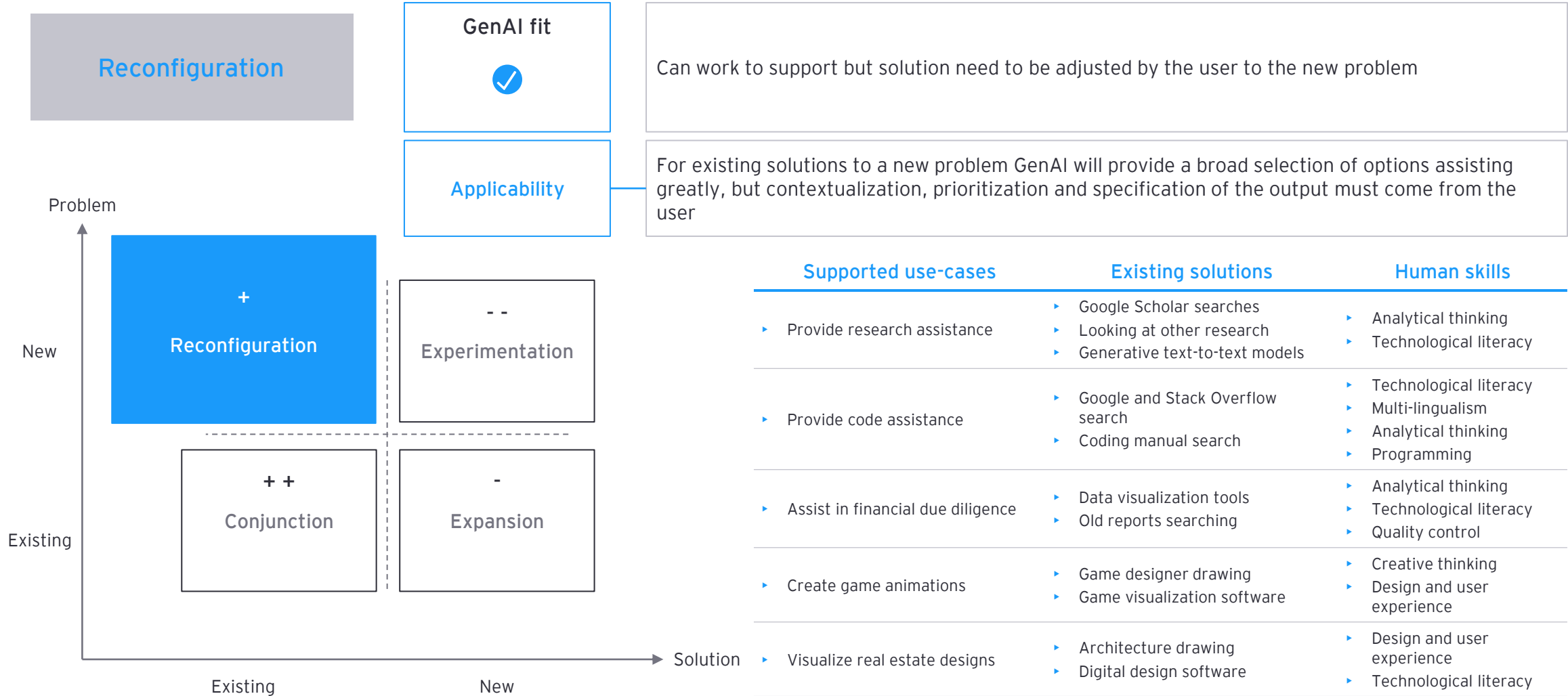
Conjunction is the most suited problem-solution combination for GenAI, offering strong solutions for existing problems; however, also posing a high likelihood of convergence

The conjunction quadrant



Reconfiguration leverages the augmenting capabilities of GenAI, suggesting existing solutions to new problems, which can work if the user adjusts accordingly

The reconfiguration quadrant



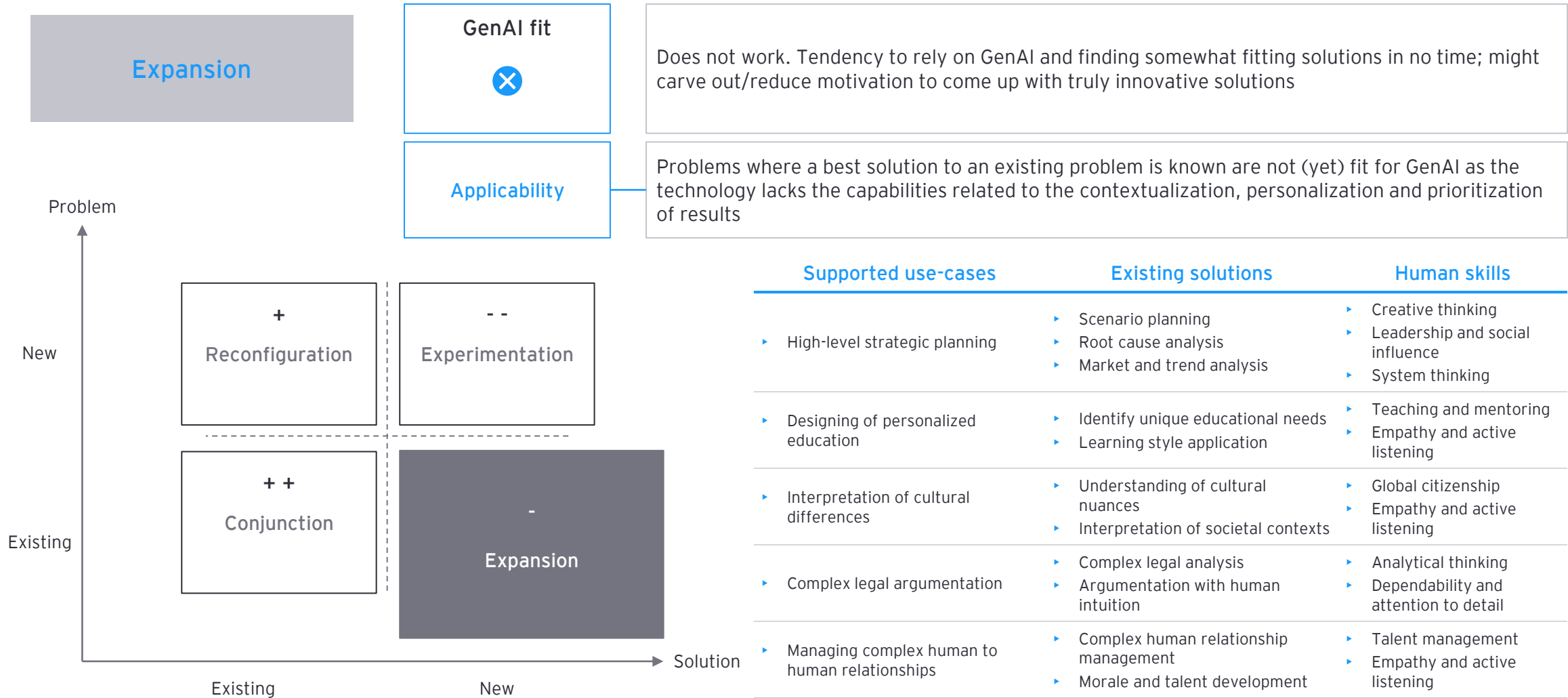
Experimentation use-cases are not well suited for GenAI as the problem is not understood by the model, resulting in an inability to formulate a fitting solution

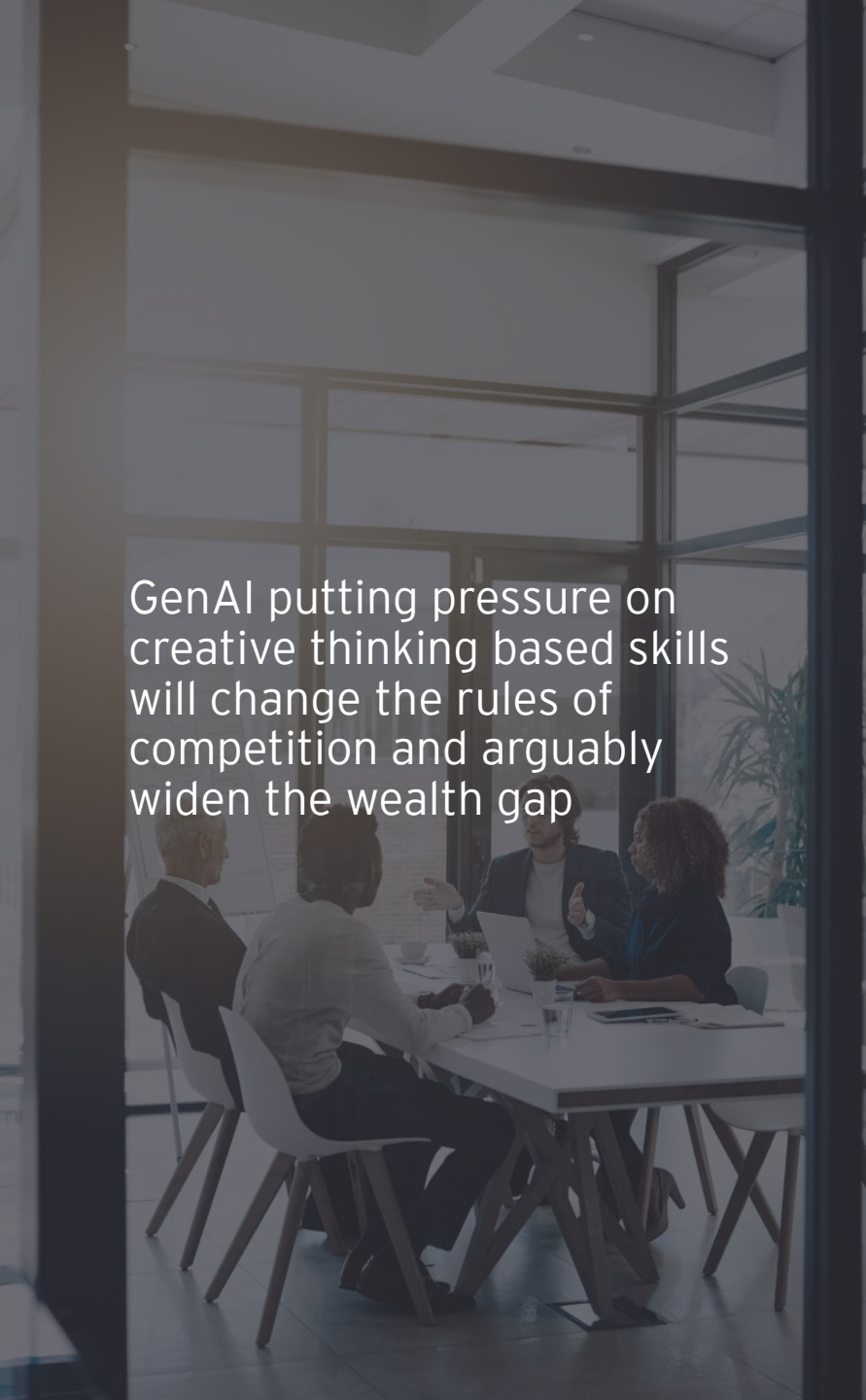
The experimentation quadrant



GenAI applied to Expansion use-cases is arguably harmful as it formulates a supposedly fitting answer while actually being unable to produce it, thus tricking the user into a wrong solution

The expansion quadrant





GenAI putting pressure on creative thinking based skills will change the rules of competition and arguably widen the wealth gap

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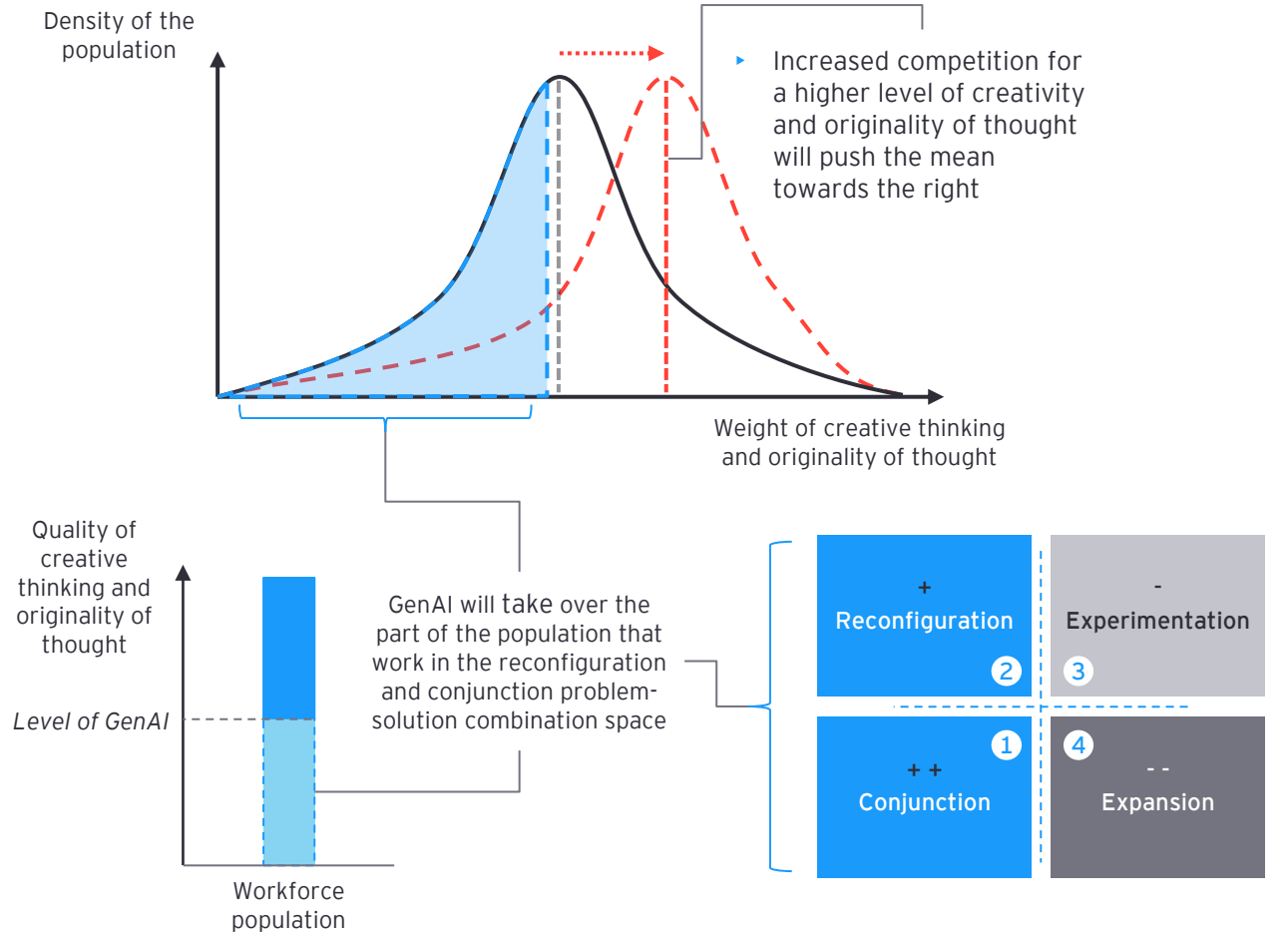
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A significant part of the population's creative thinking and originality of thought will be substituted, shifting organizations' needs, widening the wealth gap and impacting education

The distribution of the workforce population on creative thinking and originality of thought

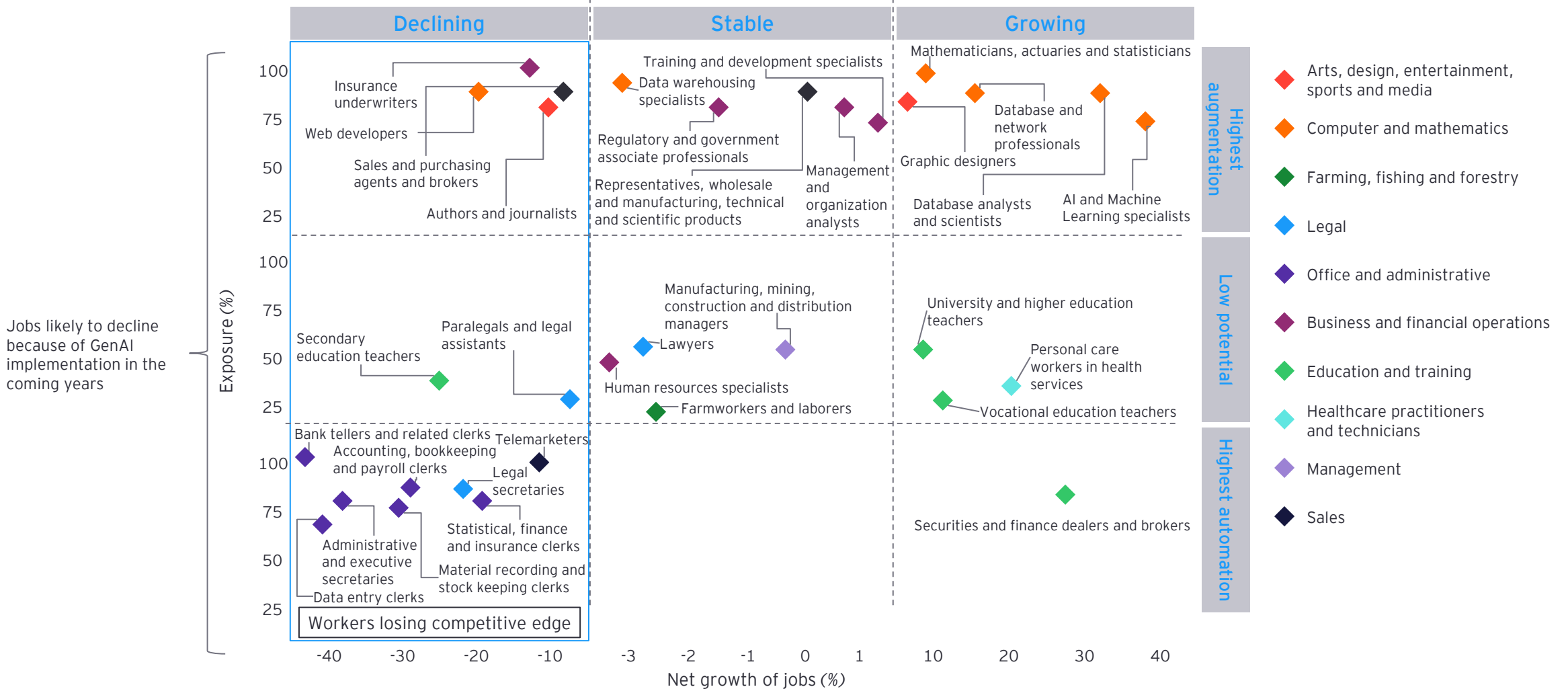


Strategic implications

- ▶ A greater proportion of outcomes will meet higher professional standards, yet converge in terms of novelty. Peak performers that create truly novel solutions and are able to solve complex (business) problems are becoming increasingly scarce
- ▶ Limited availability of exposure to the key environmental factors leading to the development of creative thinking based skills arguably widens the disparity in the capability to outperform GenAI on novelty and hence in the wealth gap
- ▶ Corporate reskilling, training, and creativity mobilization become major priorities to ensure the workforce's core skills remain competitive and synergistic with the new technological advancements

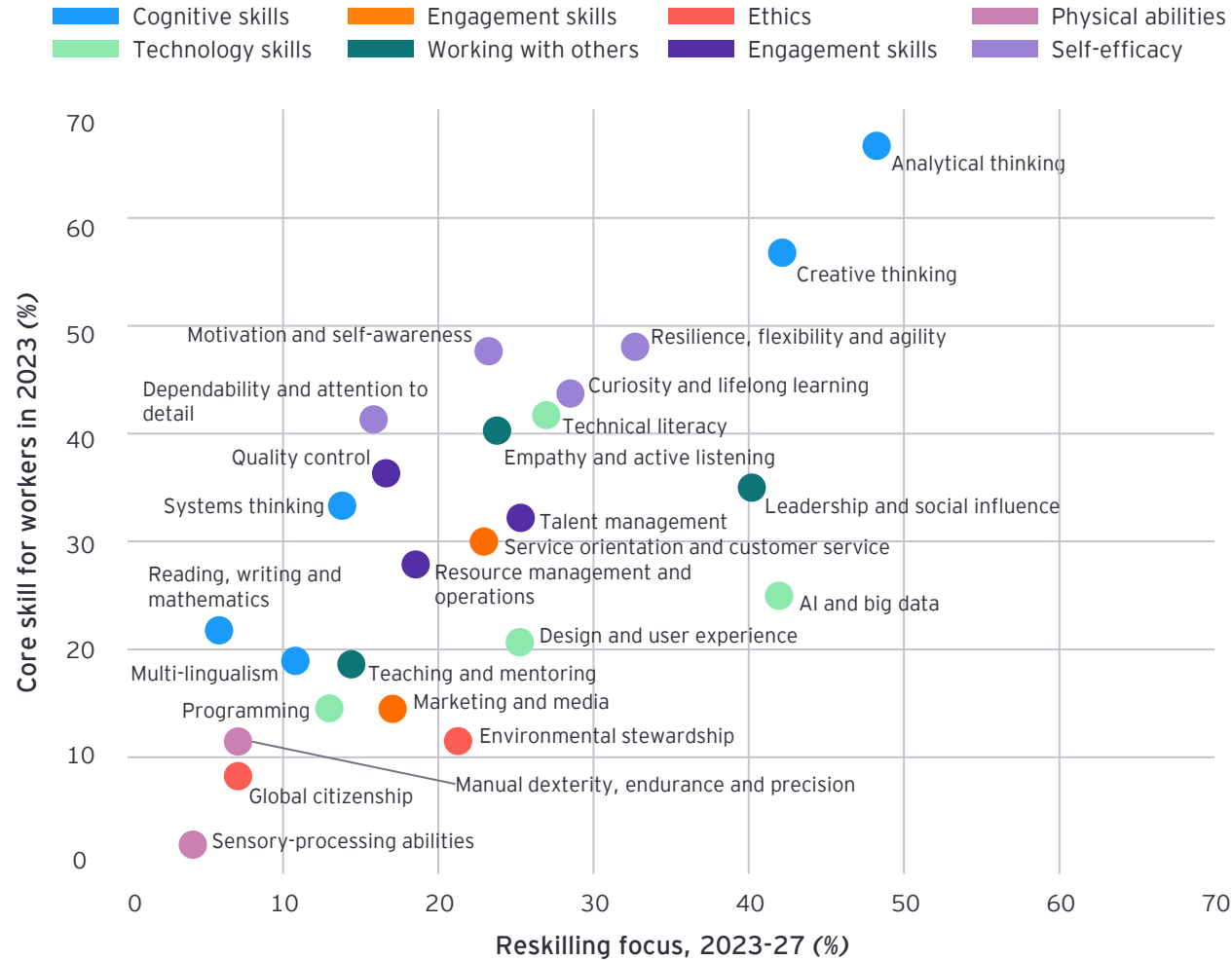
It is plausible that GenAI will push certain jobs out of the market and create opportunities for others, potentially resulting in a wider wealth gap

Job exposure potential vs growth potential in the coming years

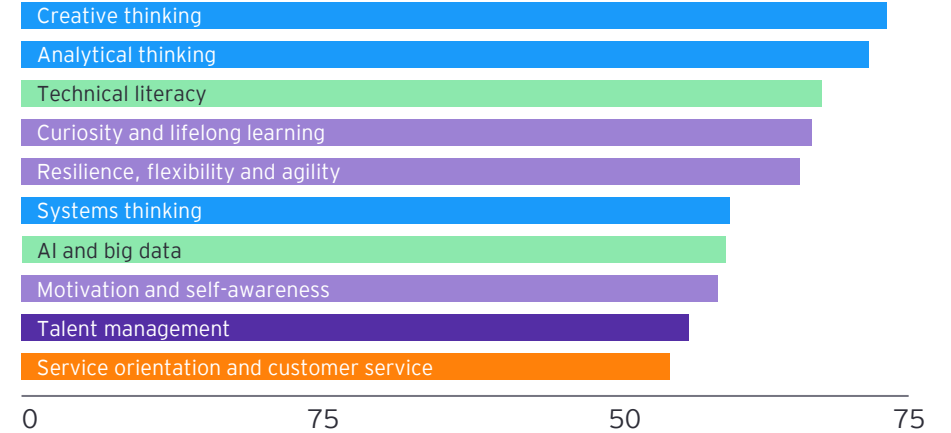


Catalyzed by the arrival of GenAI, companies will need to focus on specific reskilling initiatives in the upcoming years to improve their competitiveness

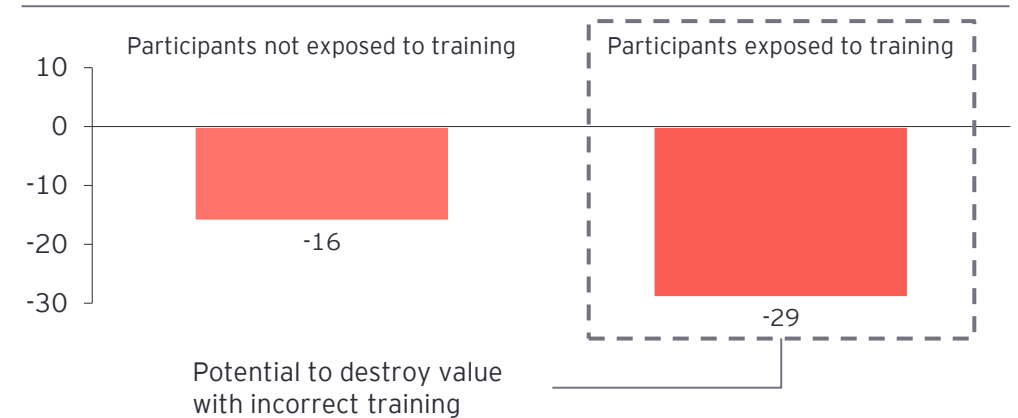
Core skills for the upcoming years



Top 10 skills increasing in importance 2023-27 (net % difference of share of organizations consider an increase or decrease)



Average change in individual performance on business problem solving with and without simple training (%)



Get in touch with us



Igor Mikhalev

Head of Emerging Technologies Strategy
igor.mikhalev@parthenon.ey.com



Mark Reich

Head of EY-Parthenon NL
mark.reich@parthenon.ey.com



Silke van der Burg

Strategy & Transactions
silke.van.der.burg@parthenon.ey.com



Sebastian Kortmann

Professor | Director Amsterdam MBA
s.kortmann@uva.nl

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