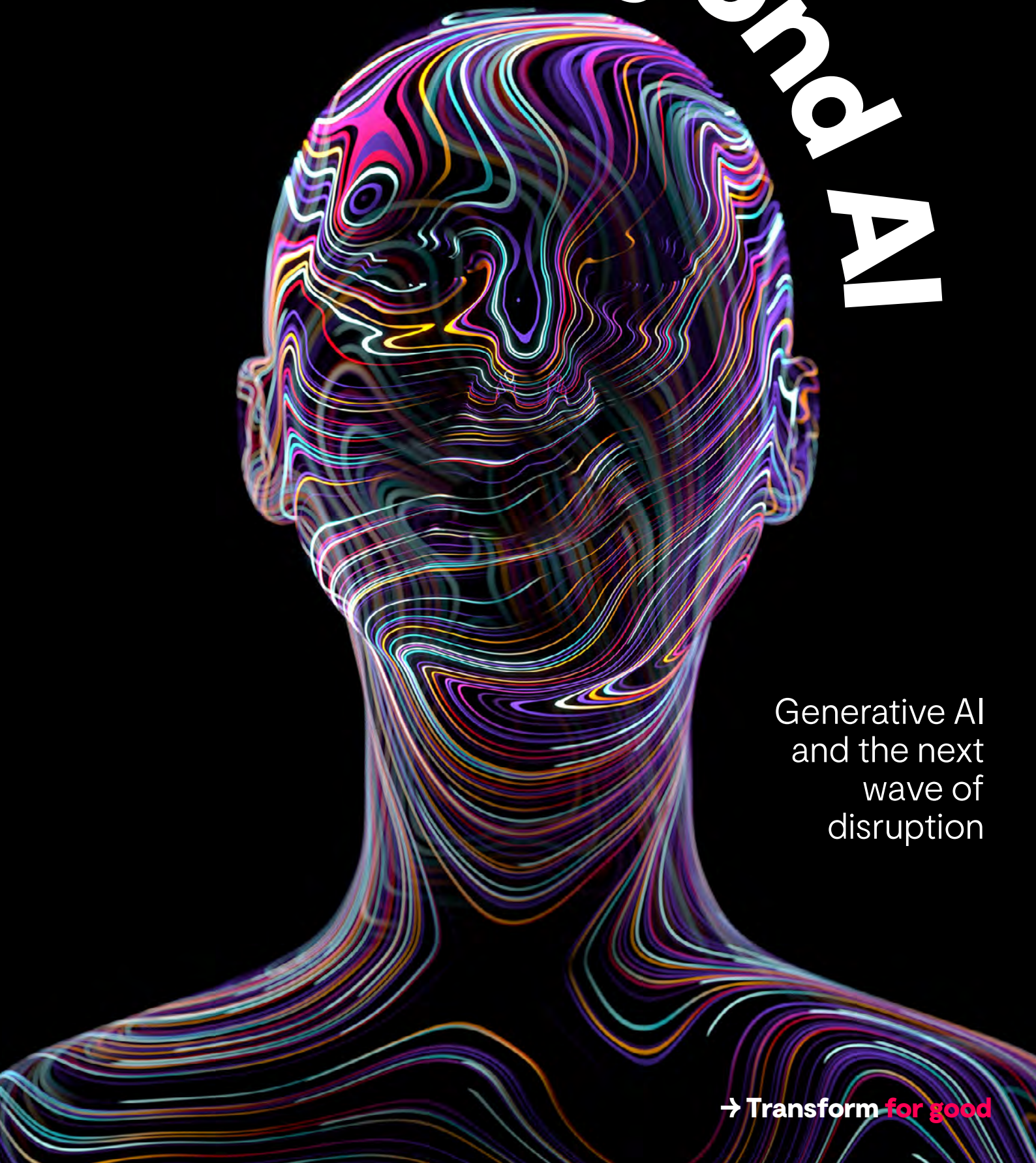
GHD Digital

Beyond AI



Generative AI and the next wave of disruption

→ Transform for good

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Foreword

Welcome to the age of artificial intelligence (AI), a momentous period in human history where AI is revolutionising the way we live, work, and interact with the world.

Over the next three to five years, advancements in AI will create a monumental shift across industries. We are already on the cutting edge of this transformative wave, enabled by the convergence of significant computational power, accessibility to vast datasets, and notable progress in natural language processing (NLP).

In this transformative landscape, one recent advancement stands out for its promise and potential: generative AI. Representing a significant breakthrough in the field of AI, generative AI enables machines to create new content, ranging from text and images to music and entire virtual worlds.

The tangible impact of generative AI is exemplified by the recent release of OpenAI's ChatGPT, which captivated the attention of 100 million users in just two months and revealed countless creative possibilities. Following the release of ChatGPT and competing platforms, including Bard and Bing, there has been a surge in investments from venture capitalists and major technology companies, amounting to billions of dollars.

Amid the technology industry's exciting advancements in generative AI tools and platforms, CEOs and Boards are grappling with essential questions. Some wonder whether this is merely the latest technology hype or a force that can revolutionise their businesses and industries. Their concerns stretch beyond understanding the potential of AI technologies; they need to protect their organisations from the risks and uncertainties of these new tools.

In an environment where regulators and lawmakers are struggling to keep pace, significant ambiguity surrounds the optimal course of action for corporate and government leaders seeking to harness the full potential of AI while effectively managing associated risks. 'Beyond AI' aims to demystify generative AI, identify areas for value creation, and deepen the understanding of the risks involved in adopting these groundbreaking technologies.

This report is the first in a series of insights that delve into the opportunities, applications, and considerations organisations across various sectors should address as we venture into this rapidly evolving landscape. We hope this provides you with a deeper level of understanding of its potential and sparks ideas and discussions within your own organisation.

Kumar Parakala
President GHD Digital

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Executive summary

Generative AI is an emerging field within artificial intelligence (AI) that can potentially transform multiple industries and disciplines. Using advanced algorithms that learn patterns from input data, generative AI can generate entirely new and original content, including text, visuals, audio, and complex designs. This ability to create, extrapolate, and innovate accelerates productivity and enables unprecedented scalability.

Generative AI presents an opportunity for organisations to develop superior products and enhance customer service offerings. Its potential applications span all sectors, offering innovative solutions and transforming traditional approaches. As businesses and society embrace generative AI tools, the impact on economic growth and productivity is set to be profound. By 2030, AI is projected to significantly enhance the productivity of knowledge workers through the automation of routine tasks, real-time data analysis, personalised assistance, improved collaboration, customised learning experiences, enhanced decision-making processes, and reduced human errors.

The potential of generative AI extends beyond productivity gains, as it can also play a crucial role in helping companies and governments achieve sustainability and climate change objectives. AI models are already being used to support sustainable design, climate modeling, pollution control, and waste management solutions. Generative AI promises to promote sustainability across various sectors and address environmental challenges.

Despite its vast potential, generative AI introduces ethical and legal challenges. The report identifies and addresses concerns related to job displacements, privacy, bias, misinformation, and hallucinations. Generating realistic deepfakes, fraudulent images, audio, and video, raises concerns about misinformation, privacy, and security. Copyright and ownership of AI-generated content also push the boundaries of intellectual property law. Ensuring the ethical and responsible use of generative AI is crucial, requiring collaboration between governments, regulators, and business leaders to develop robust governance frameworks and ethical guidelines.

GHD Digital estimates that advancements in generative AI have the potential to revolutionise the global economy, potentially **driving a five to six percent increase in global GDP over the next ten years** (see the footnote).

This growth will primarily emanate from the automation of routine tasks, workforce augmentation, productivity improvements, the emergence of new industries through innovative products and services, and increased consumers and business spending due to AI adoption and personalised offerings.

The report provides a roadmap for effectively leveraging generative AI. To capitalise on this transformative technology, businesses must adopt a proactive and informed approach. Understanding limitations and potential biases, implementing safeguards, and balancing benefits with responsible development and deployment are essential to harness generative AI's vast potential while mitigating risks and unintended consequences.

Organisations aiming to leverage generative AI capabilities should invest in skilled talent, identify high-impact use cases, foster an experimentation mindset, and ensure data readiness. Responsible AI usage is paramount as this rapidly evolving field progresses. Active involvement from all stakeholders is crucial.

Based on executive interviews and quantitative analysis, this report explores generative AI's cutting-edge technology and potential applications across various industries. Its goal is to spark discussions about the transformative impact of generative AI, its ethical implications, and how businesses can leverage this technology to drive innovation.

Note: The estimates are based on the projected baseline GDP growth rate for the next ten years, derived from existing economic forecasts of the World Bank and IMF, and key factors such as population growth, labour productivity, technological advancements, and government policies. The estimates also assume that generative AI could result in a 25% reduction in labour costs, a 20% increase in productivity, and a 15% reduction in time-to-market for new products.

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Generative AI explained

Generative AI refers to a branch of AI that focuses on generating new, original content. It involves training models to learn patterns and structures from a given dataset and then using that knowledge to create new content that resembles the training data. Some of the most common uses of generative AI include creating images, writing text, and composing music, but the applications are vast and growing.

Generative AI stands out as a powerful tool, offering many benefits for businesses. This ground-breaking technology enhances operational efficiency by automating routine tasks and allowing companies to allocate resources strategically toward high-value initiatives. Importantly, generative AI complements human capabilities rather than replacing them, opening new avenues for innovation and providing teams more time for strategic problem-solving.

The story of generative AI began with the evolution of machine learning (ML), a branch of AI that gives systems the ability to understand patterns in data and learn from experience. The emergence of generative adversarial networks (GANs) in 2014 led to the ability to create realistic human faces, high-quality synthetic voices and original artwork. Most recently, generative pre-trained transformers (the GPT in ChatGPT) are now pushing the boundaries further by generating human-like text, showcasing the potential of this technology.

Comparisons of AI with humans and human capabilities have historically focused on three key parameters: (i) language - AI's ability to communicate, (ii) sentience - AI's ability to experience feelings and emotions, and (iii) navigation - AI's (or AI-based robots') ability to navigate and move in the physical world. With generative AI, evolution has reached a critical inflection point where machines can communicate coherently with human beings, understand their preferences, biases, strengths, and limitations, and develop empathetic relationships with humans. While this has many benefits for humankind, it also gives AI an unprecedented ability to influence humans socially, professionally and culturally.

In an era of information overload, generative AI can sift through vast amounts of data, find information relevant to a topic, summarise themes, put forward ideas for consideration, fill in gaps, and provide recommendations, freeing humans to focus on tasks requiring more decision-making skills. Whether it's a writer using AI to brainstorm ideas, a researcher leveraging AI to scan through documents and summarise findings, or a designer using AI to generate initial designs or prototypes, the technology acts in partnership with people as a powerful assistant, enhancing human creativity and productivity.

Generative AI disrupts the notion that machines only replace dirty, dull, and dangerous tasks. Instead, it introduces a paradigm shift by expanding its potential to high-end labour, including creative endeavours and complex technical work. Here, AI capabilities can augment and challenge human expertise. In this collaborative interaction, humans set the goals and provide context and oversight, while AI contributes scale, speed and novel insights, unlocking the power of generative AI.

“

Generative AI isn't just a tool for replication, but a catalyst for new kinds of innovation, empowering industries to redefine their boundaries. By leveraging the power of algorithms and deep learning, it revolutionises the creative landscape, sparking a new era of limitless imagination.”

» Aijaz Hussain Shaik, Global Head of Thought Leadership and Research, GHD.

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Exploring the disruptive technology that's transforming multiple industries

Rarely do technologies see such rapid and widespread adoption as observed with OpenAI's ChatGPT, one of the most popular generative AI models since late 2022. In just two months, ChatGPT attracted an estimated base of 100 million users, surpassing the timeframes it took Netflix (ten years), Google Translate (6.5 years), Instagram (approximately 2.5 years), and TikTok (around nine months) to reach the same milestone[1].

While neural networks have been around as an AI technique for some time, generative AI has made significant strides due to four key factors. First, introducing the transformer (the "T" in GPT) neural network model has enabled the capture of a wider context, thereby improving the performance of NLP tasks. Second, graphics processing unit (GPU) computing technology continues to speed up the rate at which models can be trained. Third, the intelligent integration of human input to reinforce positive outcomes has led to more accurate and human-like responses. And fourth, its prompt-based user interface is so simple that it is accessible to kids, grandparents, and everyone in between.

The generative AI market is on the cusp of significant growth in the coming years (Figure 1). At the heart of this growth is its unique ability to automate creative tasks, spawning new possibilities across diverse sectors. An analysis by OpenAI revealed that approximately 80 percent of the American workforce is engaged in an occupation where AI could perform or assist with at least 10 percent of their tasks[2]. For example, in design and manufacturing, generative AI's potential for automated design could speed up prototyping and production. Furthermore, rapid advancements in computational power, deep learning algorithms, and an ever-increasing amount of data will continue to refine and enhance AI's generative capabilities. With sustained investment in research and mounting adoption across sectors, the generative AI market presents immense growth potential.

Whilst generative AI has been an overnight success, it has required a very significant investment to reach this point. To date, Microsoft has invested USD10 billion in OpenAI[3]. Now that it has arrived, it is emerging as a game-changing technology, sparking intense venture capital (VC) activity.

Although generative AI currently has wide-ranging applications (Figure 2), multimodal generative AI, which can process and generate data from multiple sources spanning text, images and audio, is coming next. Expected to grow rapidly, it has the potential to impact many aspects of our lives. This technology has the potential to aid in creating realistic simulations of environments, which can be used to study the effects of climate change, pollution and other environmental factors.

VC firms invested about

USD2B

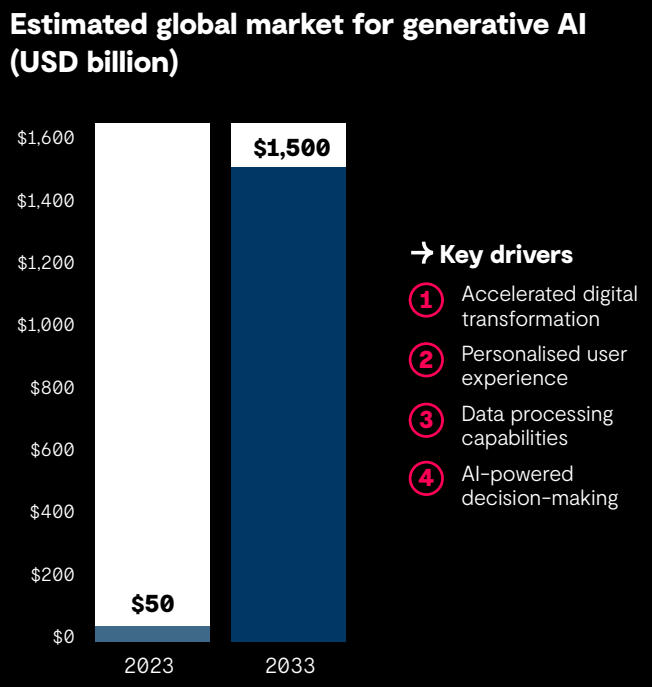
in generative AI in 2022[4], followed by over USD 1.6 billion in Q1 2023 alone[5].

In just 2 months ChatGPT attracted an estimated base of

100M

users

Figure 1: Generative AI market to grow 30x in ten years



Source: GHD Digital analysis based on World Economic Forum, OpenAI, and DeepMind data.

"Generative models allow machines to learn from data and then create new, original content, and they have the potential to revolutionise industries."

» Yann Le Cun, Vice President & Chief AI Scientist, Meta.

“Organisations focused on critical issues such as climate change, water scarcity and sustainability play a pivotal role in understanding and mitigating their impact on communities. Engineers and data analytics specialists must harness their technical expertise and embrace the immense potential of generative AI to tackle these issues with unwavering determination.”

» Dr. Nipa Basu, Global Practice Director, Digital Intelligence, GHD Digital.

Figure 2: The generative AI capability landscape

Text	Code	Image	Speech	Video	Other
General writing	Code generation	Design	Voice synthesis	Video generation	3D models / scenes
Note taking	Code documentation	Media / advertising	Translation	Video editing	Audio
Chat	Code optimisation	Image generation		Transcription	Music
Email	Debugging support			Annotation / analysis	Gaming
Translation					
Content					

Source: GHD Digital analysis

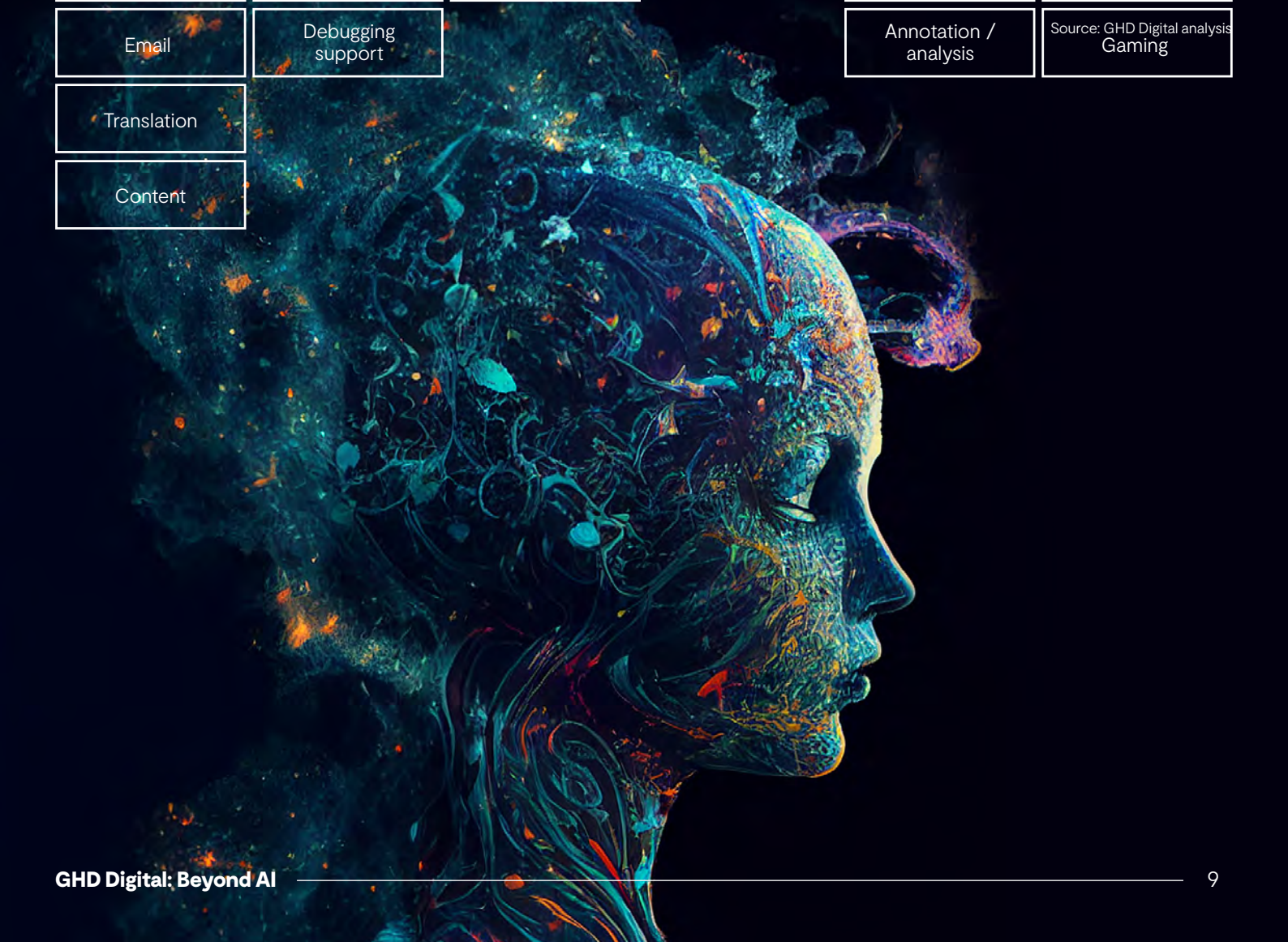


Figure 3: The expected evolution of generative AI through 2030

2032 E*

- Better written final drafts compared to professional writers
- Better final text to product code compared to full time softwares developers
- Better final designs compared to professional artist and designers
- AI generated video games and movies

2027 E*

- Better written final drafts compared to average humans
- Draft text to product code
- Product design and architecture final drafts
- Second draft 3D video files

2025 E*

- Full reports
- Code generated in multiple languages across verticals
- Product design and architecture mock ups
- First draft 3D video files

Today (2023)

- Second drafts
- Long form content
- Longer code generation with better accuracy
- Art
- Logos
- Basic attempt at 3D/video models

2020

- First written drafts
- Basic copywriting
- Multi line code generation

Pre 2020

- Basic Q&A
- Translation
- Spam detection
- Single line autocomplete code

Source: GHD Digital analysis. Note: *E denotes estimates.

In the span of the next decade, generative AI is projected to evolve into an even more advanced tool, capable of autonomously creating highly complex and personalised content across various domains (Figure 3). GHD Digital estimates that by 2030, AI will likely enhance the productivity of knowledge workers by a factor of four to five[6]. This improvement will likely be driven by the automation of routine tasks, the enablement of real-time data analysis, the provision of personalised assistance, improved collaboration, customised learning experiences, enhanced decision-making processes and the reduction of human errors.

AI techniques and generative AI hold potential benefits for every industry. According to the World Economic Forum's Future of Jobs report published in May 2023, which surveyed 803 companies worldwide, over 75 percent of companies expressed their intention to adopt AI technology within the next five years[7]. For instance, Bain & Company has formed a global services alliance with OpenAI, the company responsible for AI systems such as ChatGPT, to bring OpenAI's innovative capabilities to Bain's clients worldwide. The Coca-Cola Company has become the first organisation to collaborate with this new alliance, highlighting its interest in leveraging AI technologies to drive innovation and enhance business operations[8]. Microsoft now offers the OpenAI Large Language models within its Azure store, enabling organisations to license the technology and include it in proprietary products within their private tenancies in the cloud.

Data-intensive sectors, such as banking, or those using data-driven products, like the technology sector, will be quicker to adopt generative AI than those heavily reliant on judgement, such as healthcare. While organisations across various industry sectors find themselves confronted with an overwhelming surge of data that is doubling every year globally, access to high-quality data remains the crucial factor in successfully harnessing the power of AI. Below, we highlight some key applications of generative AI in sustainability and business (Figure 4).

“Many organisations may need a variety of foundation models, or at least many customised variants of a core model, to accommodate the variety of AI use cases likely to develop in coming years accross their teams and operations .”

» Michael Endler, AI Editor, Google Cloud.

Unlock the potential of Beyond AI

Download the full report here

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