Generative AI on cusp of disruption
A Primer

ChatGPT garnered 100+M users in 3 months, propelling Generative AI to mainstream. Adoption and VC investments surged, making GenAI a disruptive force with corporate investments and a need for safeguards.

WHAT'S INSIDE!

1 Generative AI, the market for it and the reasons for the hype

2 Assessing mainstream integration across industries

3 Enterprise use cases its limitations

4 Gen AI requires accountability and design

What, How and Why of Gen AI

What is Generative AI?

Generative AI, a field of Artificial Intelligence, refers to computational models that are trained on massive amounts of input data (300bn words in the case of ChatGPT)[3]. They can synthesize data, draw inferences and create new outputs in the form of text, images, video, audio, new data and even code.

**Two architectures have made GenAI immensely valuable**

1) Generative Adversial Networks (GAN), that became popular in 2014[4] are used for generating images & videos.

 2) Transformer Models, proposed by Google in 2017, is used for generating text.

ChatGPT, for instance, uses the transformer model along with Human Feedback Reinforcement training to generate high quality outputs. Training a model requires intensive computational power (supercomputers were used to train GPT3) and significant investments (OpenAI being a key example). But once a model is trained, it can be optimized for a larger user base.
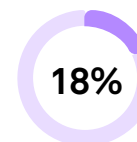
The Market for Generative AI

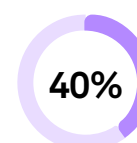Expected to grow from $8B in 2022 to $109B in 2030 at a CAGR of 34.6%[5].
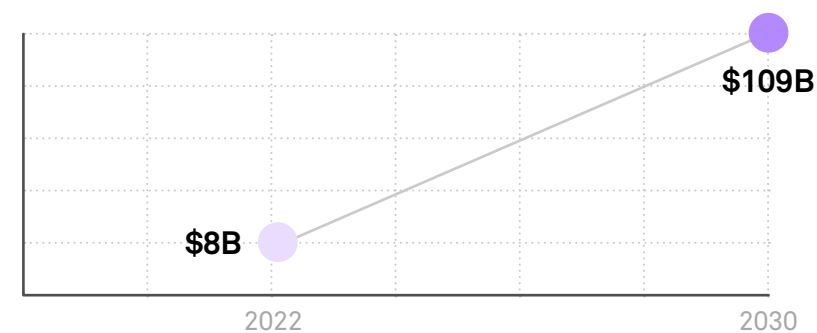
Software segment accounts for 60%, service segment is the fastest growing. **60%**
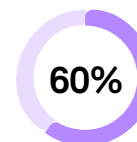
Media & entertainment is the biggest user of Gen AI accounting for 18% of revenue, BFSI is the fastest growing at 36% CAGR. **18%**

North America is the biggest market with 40% share and APAC is the fastest growing region. **40%**

Why GenAI is Here to Stay?

Need for Content Synthesis: We generate ~2.5 quintillion bytes of data every day on internet[6]. This not only makes searching for information tough but also makes inferring tougher, for regular users. GenAI tools can search, synthesize and compose an answer.

Democratization of Content Creation: We are moving from a search and retrieval economy to an infer and compose economy. People used to prompt algorithms to search and retrieve information but now they can prompt algorithms to infer and compose information.

Instant Economy: Digital natives prefer tools that enable instant creation of content e.g. Tik Tok. ChatGPT can generate a word in 350ms after processing database of 300B words[7].

Access to Massive Computational Power: The ability to instantly process and compose information using cloud computing.

Evolution of Deep Learning Neural Networks Large Language Models have become openly available. These models help organize much of the internet's information and develop patterns to mimic human decision-making.

1.   https://www.cbinsights.com
2.   https://techcrunch.com
3.   https://nerdynav.com
4.   https://www.techtarget.com
5.   https://www.prnewswire.com
6.   https://financesonline.com
7.   https://www.tooltester.com

An Early Assessment of Time to Market & Key GenAI Companies

Time it will Take for Industries to Mainstream Gen AI

Industry	Time to Mainstream*	Few Key Use Cases
Consumer packaged goods		Personalized marketing, Customer service, Product development [8]
Chemicals		Product development [9]
Education		Personalized lessons, Personalized evaluations [10]
Electric power, Natural gas, and Utilities		Improve the efficiency of existing energy systems
Financial services		Fraud support, Personalized offer, Virtual assistants, Wealth planning [11]
Information technology and Electronics		Software development, Automation of tasks, Cyber security, Chip design [12]
Aviation, Travel, and Logistics		Itinerary generation, Personalized marketing campaigns, Optimization of routes and delivery schedules [13]
Pharmaceuticals and Medical products		Product development, R&D [14]
Media and Entertainment		Personalized content, Content automation, Content variety [15]
Govt.		Citizen service, Citizen engagement
Retail		Product personalization, Customer engagement, Product design [16]

Short-term   Mid-term   Long-term

Gen AI Companies and their Generative Capabilities

Industry	Valuation	Output Capabilities					
Open AI	$29B	Text	Image	Video		Code	
Anthropic.AI	$5B	Text					
Jasper AI	$1.5B	Text					
Character.al	$1.0B	Text					
Glean	$1.0B	Text					
Stability.ai	$1.0B	Text	Image	Video	3D		
MDClone	$252-378M						Synth Data
Runway ML	$200-300M	Text	Image	Video	3D		
Mem	$110M	Text					
Aleph Alpha	$101-152M	Text					
Mostly AI	$100-150M						Synth Data

Text   Image   Video   3D   Code   Synth Data

Source: Table created using data from Dealroom.com

*Method
- Assessment is qualitative and based on publicly available reading material.
- Time to mainstream is a function of consumer demand, regulatory risk, legacy processes and employee skill base.
- Time to mainstream = Time to full deployment either at consumer end or in internal process.

8. https://risnews.com
9. https://www.theverge.com
10. https://www.researchgate.net
11. https://www.insiderintelligence.com
12. https://www.gartner.com
13. https://www.tmcnet.com
14. https://benchinternational.com
15. https://techstory.in
16. https://www.insiderintelligence.com

Enterprise Use Cases of Generative AI

GenAI will fundamentally change several functions in enterprises leading to improved productivity and performance of employees. Few areas of business where it will have the biggest impact are as follows:

Content Creation

Gen AI will lead to more automation in content creation. It will not only reduce the cost of content creation but also increase the quality & variety of content created. Generative AI based DIY Apps are expected to emerge for marketing and design functions.

Content Personalisation

Marketing touchpoints like newsletter, websites, videos, metaverse etc. will get hyper-personalized. This will improve brand engagement and conversion ratio of the sales funnel.

Drug Discovery

Drug Discovery is a time-consuming process that can extend to 5-12 years. Gen AI can help identify potential drug candidates and test their effectiveness using computer simulations, thus saving time in the process. It has already led to tremendous real-world value, when the first mRNA covid vaccines were developed by programming mRNA molecules to express the specific antigen response. By 2025, more than 30% of new drugs and materials could be systematically discovered using GenAI techniques, up from zero today[8].

Software Development

IT products and services could see the biggest impact. Below are some scenarios that may unfold.

- **Reduced Time on Testing and coding:** Gen AI has the capability to create, test and debug the code in real time. In typical product development cycles, coding and testing takes 30-40% of the time. Gen AI will cut this significantly, thus reducing time to market.

- **Improve Programmer Performance:** Code can now be generated with a simple prompt command. This will allow even less-tech savvy programmers to generate a better code. Gen AI can also translate the code from one programming language to another. However human intervention will still be needed to customize the code for specific vertical / client use.

- **Automate Recurring Tasks:** Manhours will be freed from repetitive tasks, as automation is easier with GenAI. Tasks like report generation, log analysis etc will fall in the domain of automation.

- **More secure and reliable IT infrastructure:** Gen AI can track performance and security of IT infrastructure in real time. It can pre-empt any failures, by generating early warning signals and hence improve reliability of operations.

> After the internet, mobile and cloud, GenAI could become the next platform for the coming decade. It will improve productivity and base line the quality of output.

17. **Gartner. Predicts 2022:** Generative AI is Posed to Revolutionize Digital Product Development. Stewart, Brent; Baker, Van; Herschmann, Joachim. January 2022

Gen AI Deployment needs Accountability and Intentional Design

We provide a framework to explain the ethical considerations of Gen AI

	Society	Planet	Inherent Tech	Consumer	Enterprise
What can Happen?	Malicious use of AI for generating hate content, intentional fake information (like deepfakes), and false Information (that is unintentional incorrect). Politization of AI.	High energy consumption by models used for training and inference. Continued expansion of energy and physical footprint of datacenters.	AI that is "confidently incorrect." Challenge in designing AI models free from bias.	Technologies that can create hyper-personalization. Untested technologies released into mainstream usage.	Enterprises deploy GenAI without taking into account the considerations listed in this table. Enterprises focus on speed to market over accuracy.
What is the Implication?	Potential erosion of trust of society towards the technology and potentially, increase in divisiveness among people	Increase in greenhouse emissions and biodiversity loss.	Enterprises releasing technology into mainstream society that spreads bias or inaccuracy.	Social Engineering, which was limited in the past to social media, politics and marketing, could become a more widespread problem due to the improper use of AI as it finds its way into other enterprise functions.	Workforce unable to reskill fast enough. Lawsuits. Regulation unable to evolve in sync with technology.
What can be done to Mitigate Risks?	Ethical AI, that mitigates societal risks. Causal AI – AI that explains its reasons.	Sustainable AI and computing practices, Carbon offsets.	Enterprise guardrails - Reinforcement Learning with Human Feedback (RLHF), explainable AI, interpretable AI.	Human-centered AI (AI that mitigates Consumer Risks).	Enterprises need to put guardrails like ethics committee, governance models before launching Gen AI services internally or externally. Enterprises should proactively collaborate with policy makers to develop regulatory guidelines.

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