



ai&us

Part 3: Software Development

A series of deep dives covering the impact of Gen-AI across key sectors



"AI helping a human write software"

ai&us

The largest platform shift since cloud and mobile, generative AI is taking over the world by storm. In 'ai & us', we highlight specific use cases & industries being disrupted by generative AI

Artificial Intelligence has come a long way since the field was given its name in a Dartmouth University Paper in 1955. The streets may not be full of self-driving cars and delivery robots yet but the smartphones in our pockets and the laptops we use are increasingly changing the way we live our lives.

The day is not far for science fiction to become a reality. Today, enterprises, small and big, across sectors and geographies are increasingly crystal balling the future and preparing for the unprecedented shifts in innovation and automation unleashed by AI. Preparing for this future, is perhaps the single biggest mandate for boards and management leaders across the world.

India's workforce grew up in an internet/cloud-first world. Its ability to assemble solutions from combinations of legacy, cloud, and SaaS components is world-class. Today, we are home to more than 500K+ AI engineers, accounting for 16% of the AI talent in the world, which places us among the top three contributors. Our contribution is only expected to grow further with support from National Education Policy, which has committed to holistically include AI and ML across every stage of education in India.

Like everyone else, we are in the business of future of unknowns and young entrepreneurs are the best placed shape this future sooner for the better. We seek to partner with those bold and daring souls that are attempting this endeavour. If you are a founder, shoot us a note at ai@kalaari.com.



\$1.4T

Global Economic Impact of AI by '30

\$1.3B+

Total VC Funding in Gen-AI platforms and startups

600+

Number of Global AI first-startup



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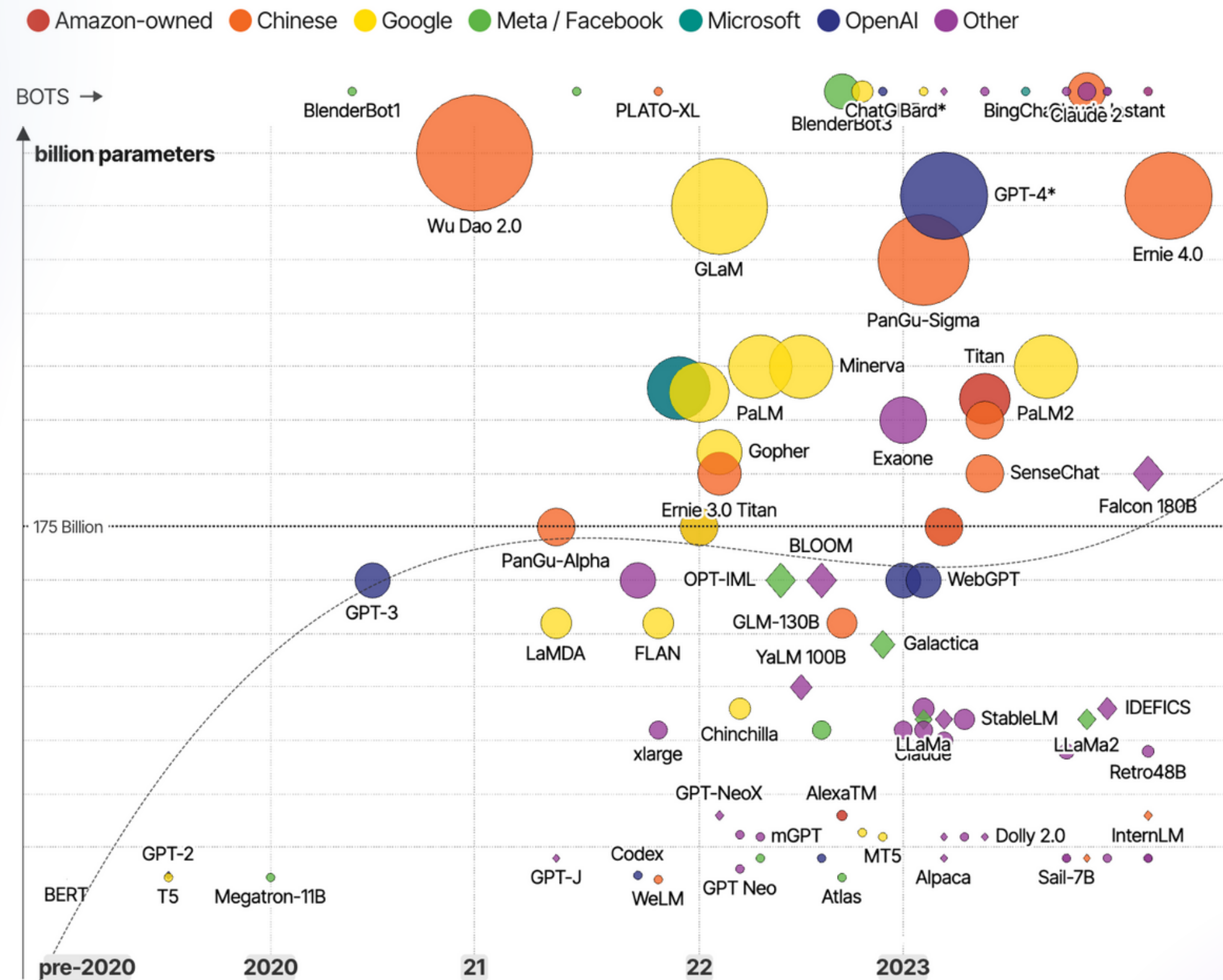
Additional Resources & Suggested Readings



Section A

Setting the context

✦ It's been a complete year since ChatGPT's initial launch in November 2022, and, the world of Generative AI has been evolving rapidly.



David McCandless, Tom Evans, Paul Barton
 Information is Beautiful // UPDATED 2nd Nov 23

source: news reports, [LifeArchitect.ai](https://lifeaiarchitect.ai)
 * = parameters undisclosed // see [the data](#)

❖ Generative AI has garnered significant attention from some of the world's largest organizations, who have recently made substantial investments in the field. ✨

Models

10+

Organisations have built LLM models from scratch



Datasets

5+

Organizations have built integrated datasets



Applications

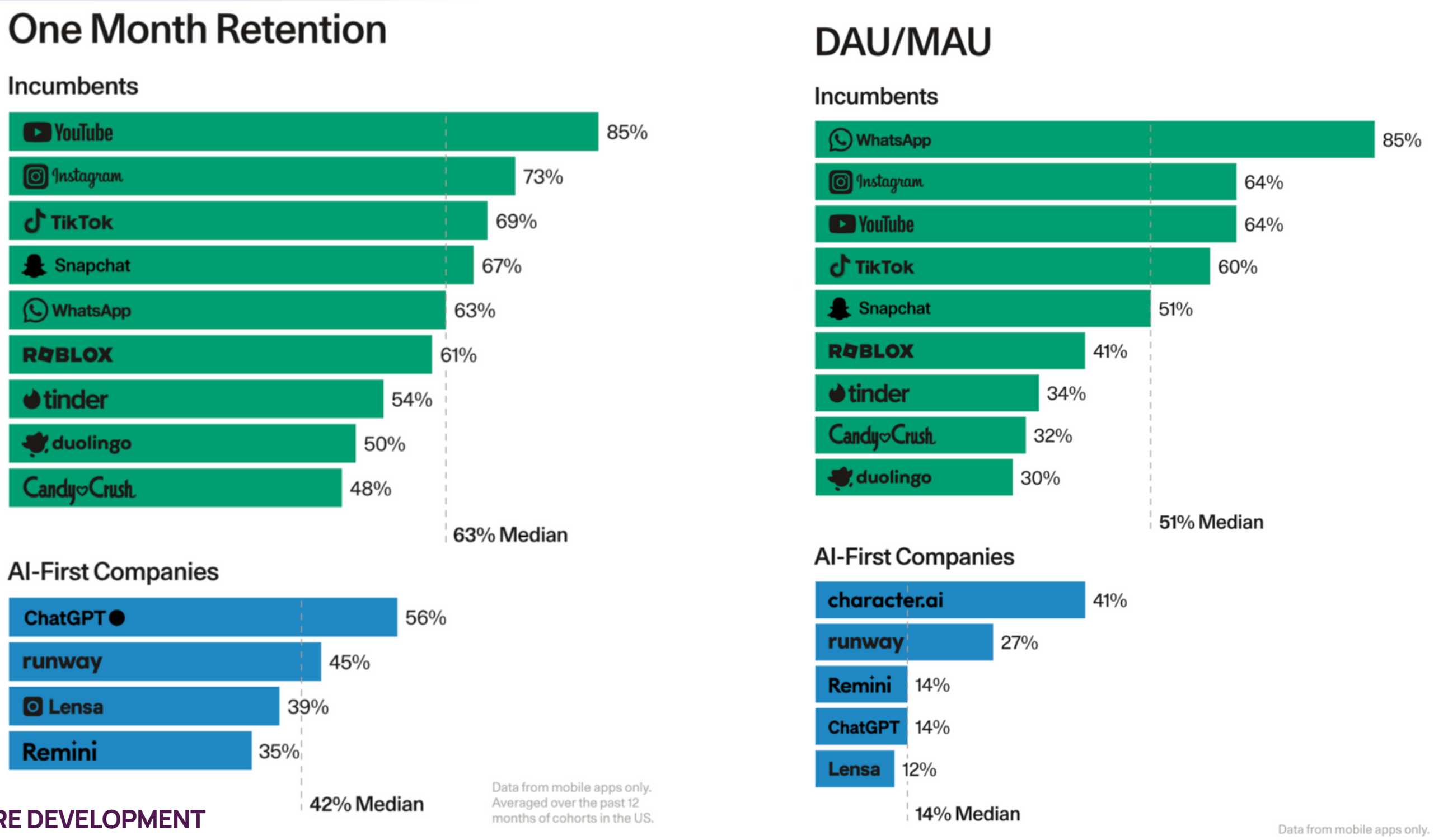
20+

Organizations have generative AI powered applications



duolingo

✦ Although consumer-facing Gen-AI tools lag behind incumbents on retention & engagement..



❖ Software Dev Gen-AI tools have received enormous enterprise adoption, and seem capable of solving real-world business problems right away...



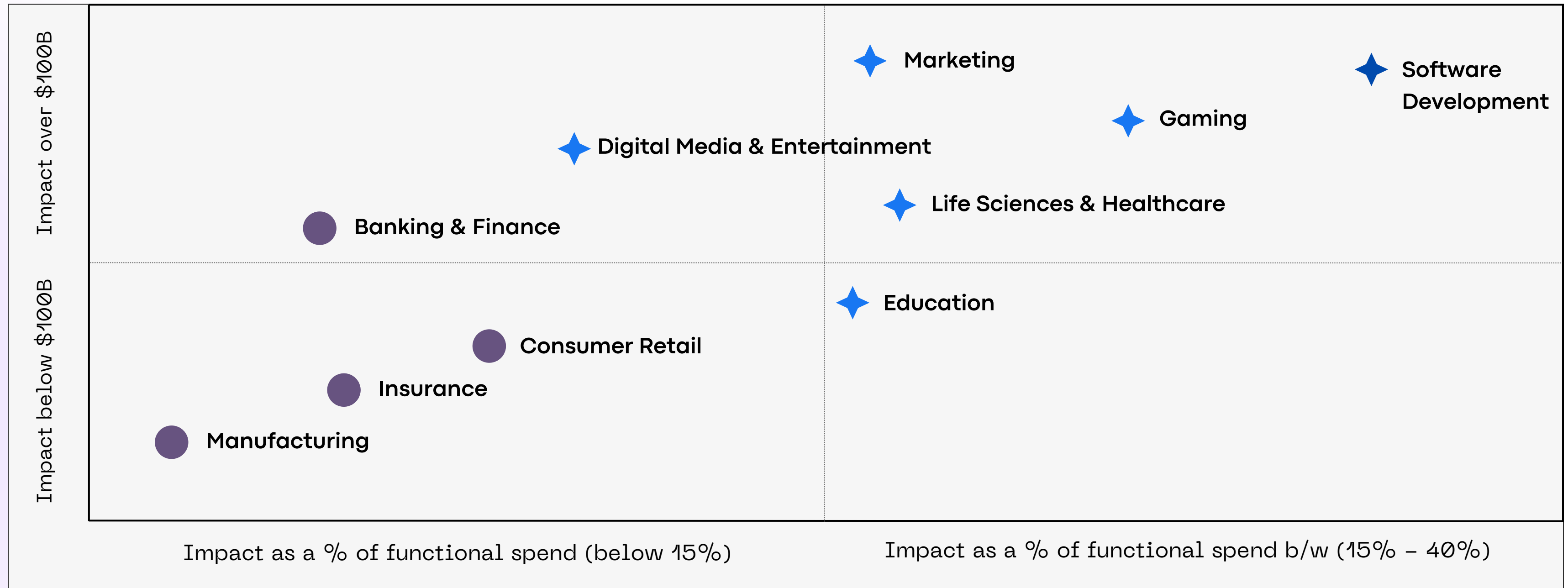
```
TS arrays.ts 2
TS arrays.ts > testFlattenedDepth
1 // Utility functions for working with arrays
2
3 function flatten(arr: any[]) {
4   return arr.reduce((flat, toFlatten) => {
5     return flat.concat(Array.isArray(toFlatten) ? flatten(toFlatten) : toFlatten);
6   }, []);
7 }
8
9 function arrayDepth(arr: any[]) {
10  return arr.reduce((depth, toCheck) => {
11    return Math.max(depth, Array.isArray(toCheck) ? arrayDepth(toCheck) + 1 : 0);
12  }, 0);
13 }
14
15 // Take an array, flatten it, and check that the depth is zero
16 function testFlattenedDepth(arr: any[]) {
17   const flattened = flatten(arr);
18   expect(arrayDepth(flattened)).toBe(0);
19 }

```

Microsoft's GitHub Copilot coding program, built with generative artificial intelligence from ChatGPT maker OpenAI, suggests code for developers, who have the option to accept the suggestion, as shown above.

In contrast to ChatGPT, whose usefulness in the enterprise some **technology leaders have questioned**, AI coding tools like Copilot, which was first launched for public use last summer by Microsoft-owned coding-collaboration platform GitHub Inc., seem to be capable of solving some real-world business problems right away. **The AI model behind Copilot is trained on data from GitHub, which houses a popular open-source community where developers contribute and share code.**

✦✦ Of all functional areas, software development will be one of the most impacted by generative ai



Level of activity - Funding, Startups



Low to Moderately active



Highly active

❖ Innovation in Software Dev & how Gen-AI is different



Automation	Rules-based logic	Machine learning	Generative AI
You know what needs to be done, and you know of a reliable way to get there every time.	You know the end goal, but there's more than one way to achieve it.	You know the end goal, but the amount of ways to achieve it scales exponentially.	You have big coding dreams, and want the freedom to bring them to life.
Automate code validation using a CI/CD tool like GitHub Actions to ensure that new code follows formatting specifications before merging to the main branch.	Detecting SQL injections in code can be time-consuming, but tools like Code QL automate the process using a system of rules to identify patterns.	Code QL, a coding tool that uses machine learning, can help detect both known and new SQL injection vulnerabilities. It is trained to recognize patterns similar to those of injections, increasing the recognition of confirmed vulnerabilities and predicting new ones.	Generative AI coding tools, like GitHub Copilot, use machine learning to predict coding sequences and generate new answers. These tools can help reduce the need to search for boilerplate code, allowing developers to focus on higher-level strategic decision-making and reflect on the code they want to build rather than how to build it.

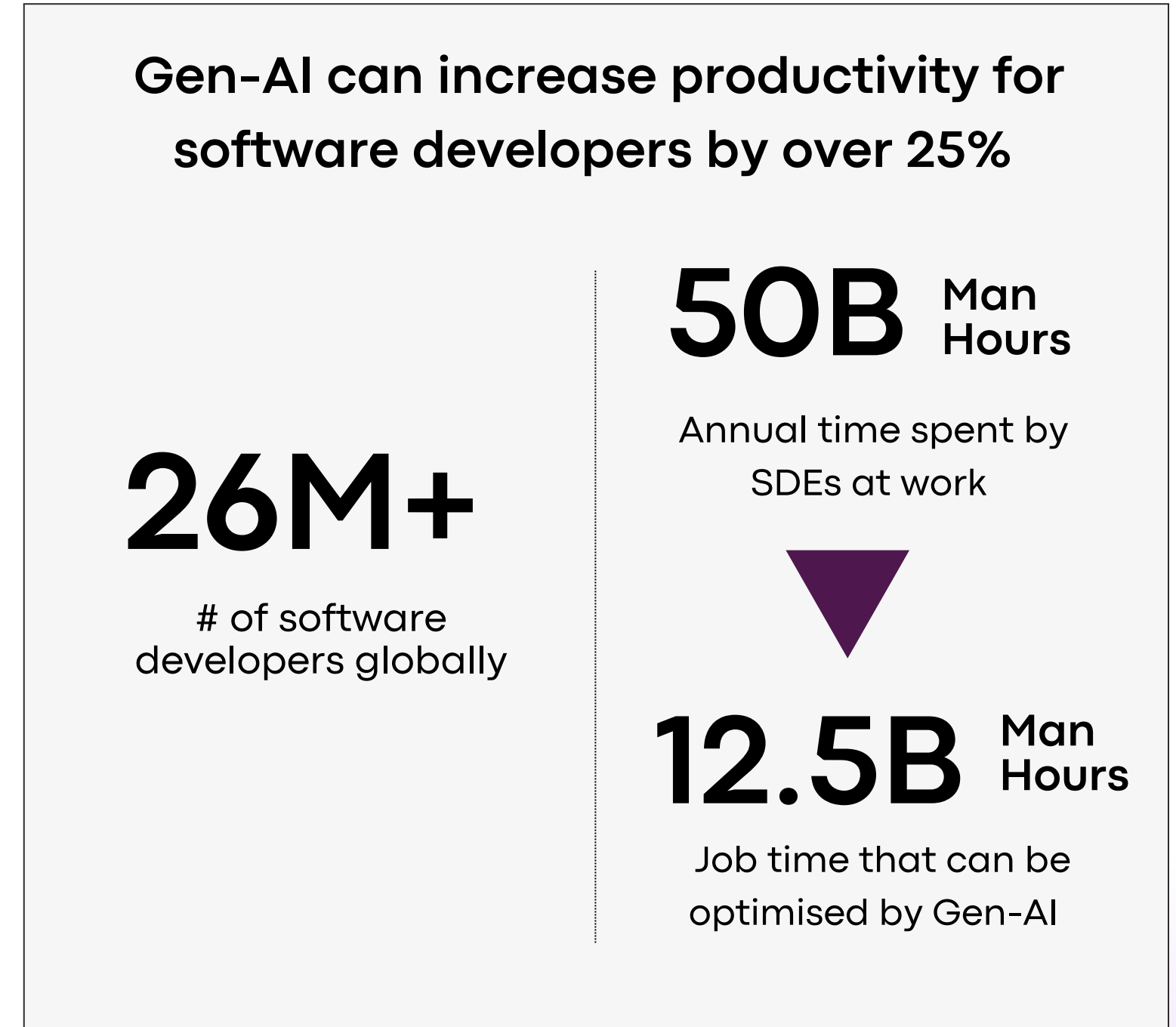
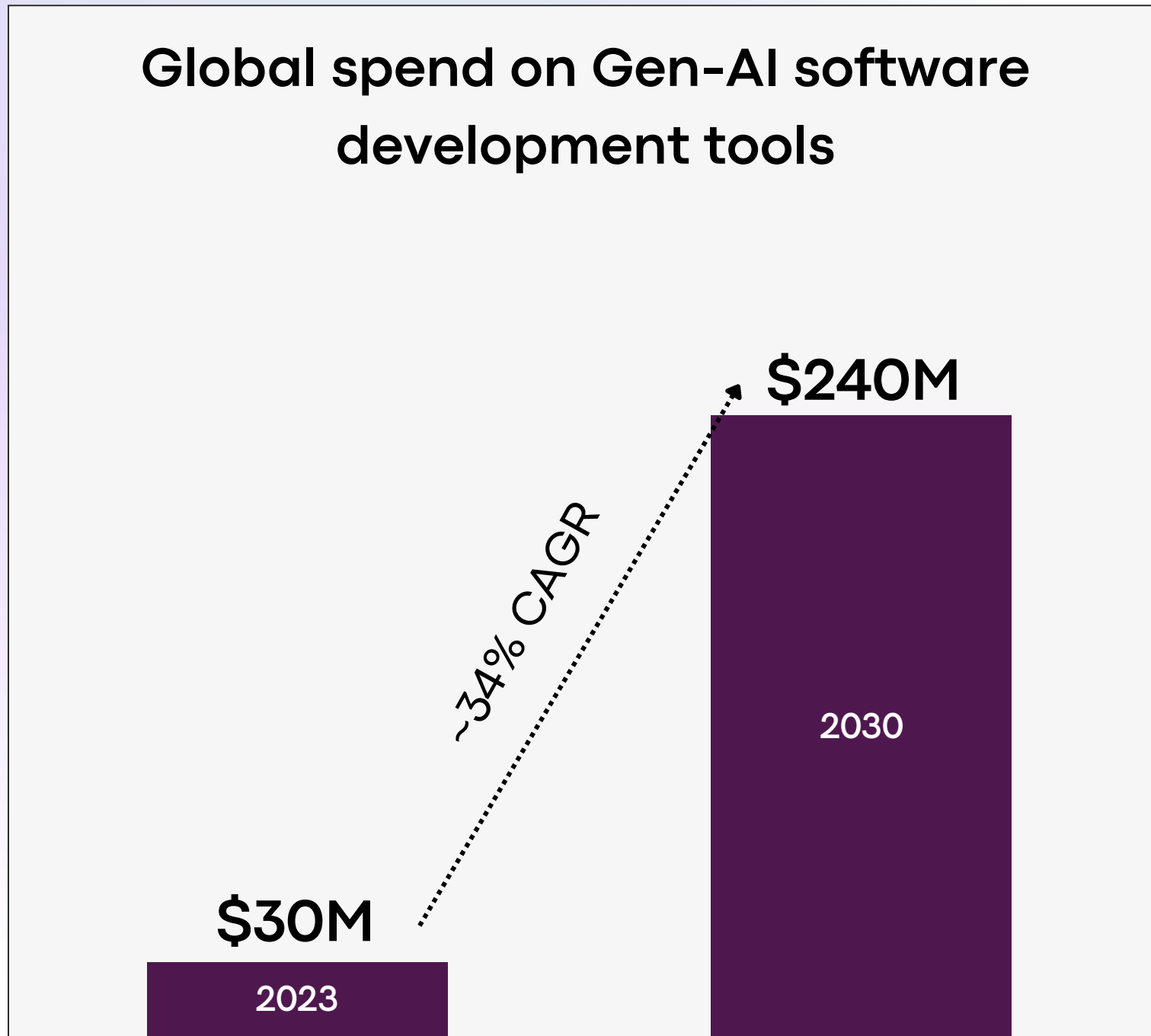


Section B

The Impact of Gen-AI on Software Dev

“In 2023, natural language has emerged as the fastest programming language.”

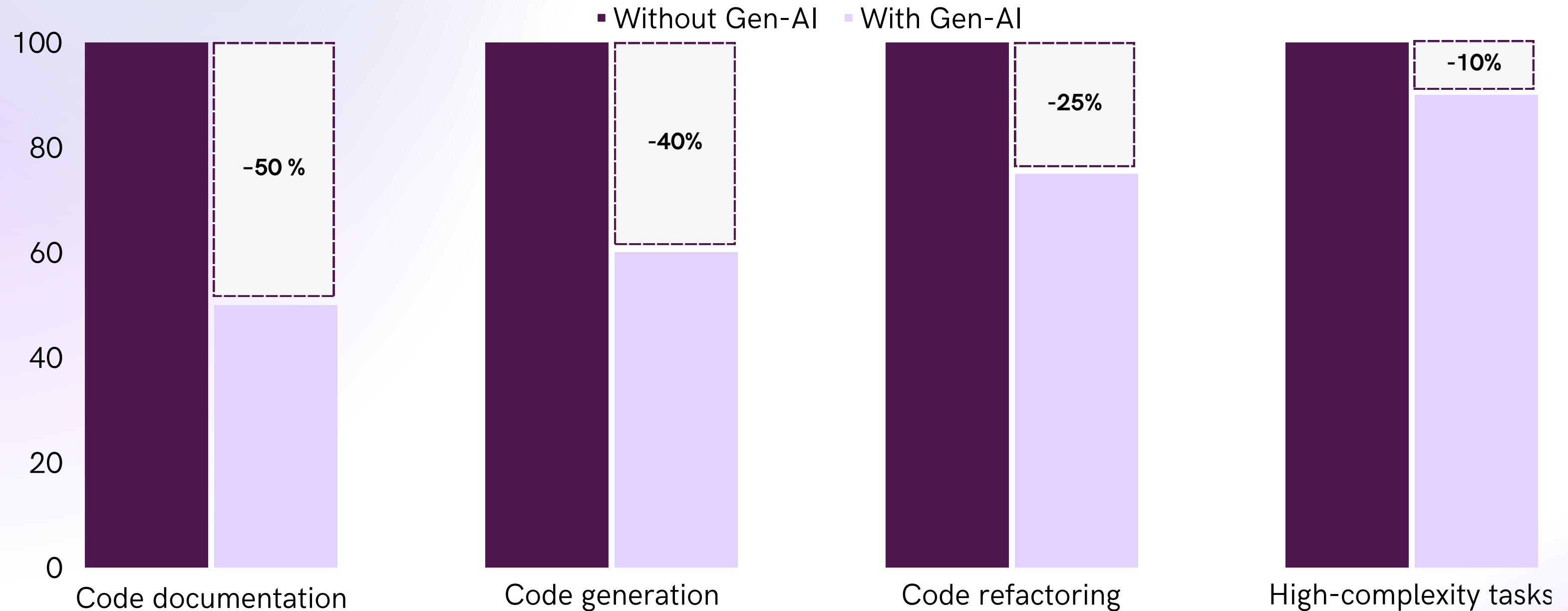
Gen-AI is primed to re-shape the future of Software Dev



✦ Gen-AI is increasing developer speed...



Task completion time using generative AI, %

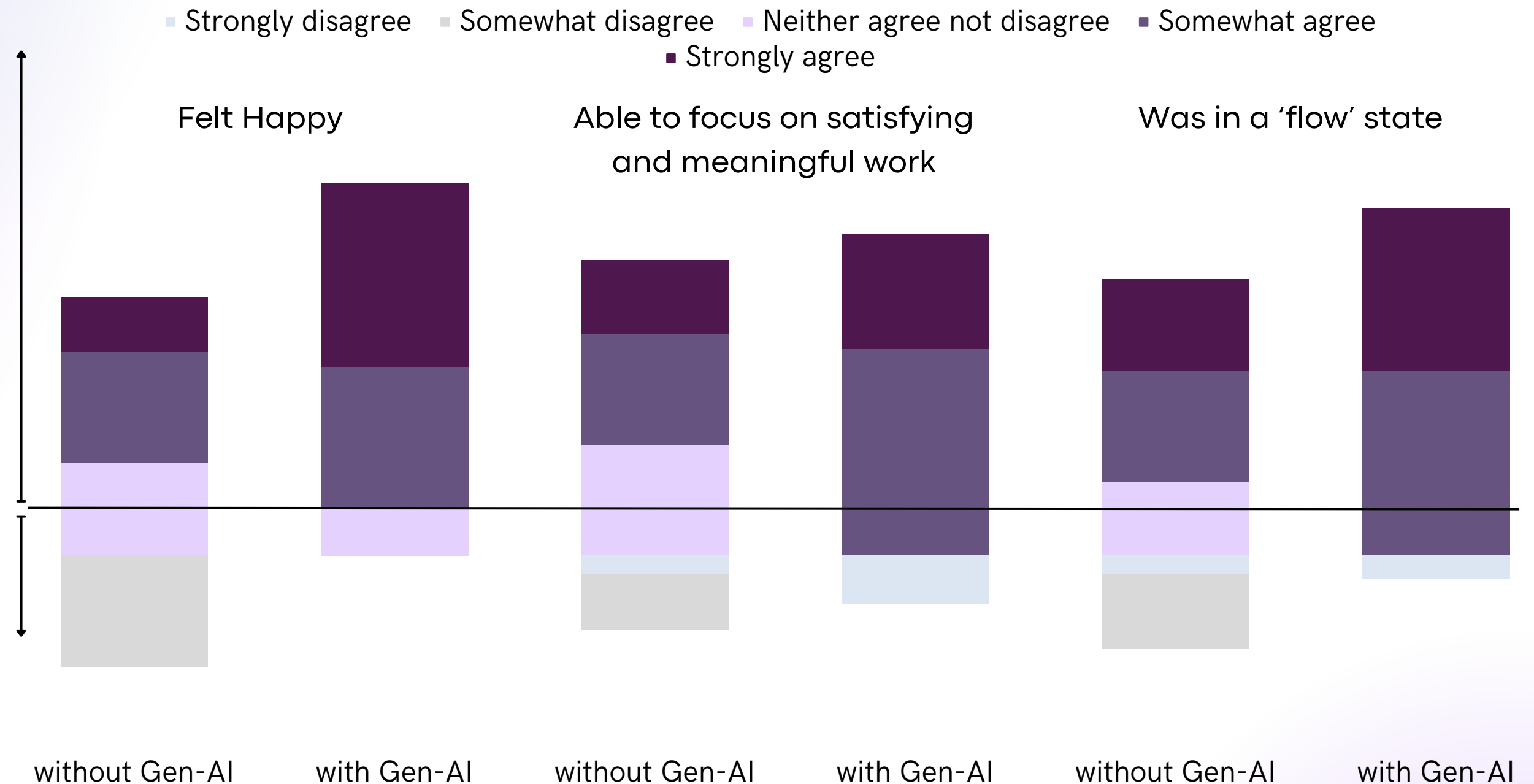


✦ ✦ ✦ ... And improving the developer experience



According to research, providing developers with generative AI-based tools can improve their experience and increase their overall happiness, fulfillment, and productivity. These tools automate tedious tasks and provide faster access to information, allowing developers to focus on more satisfying work.

Developer sentiments, % of respondents

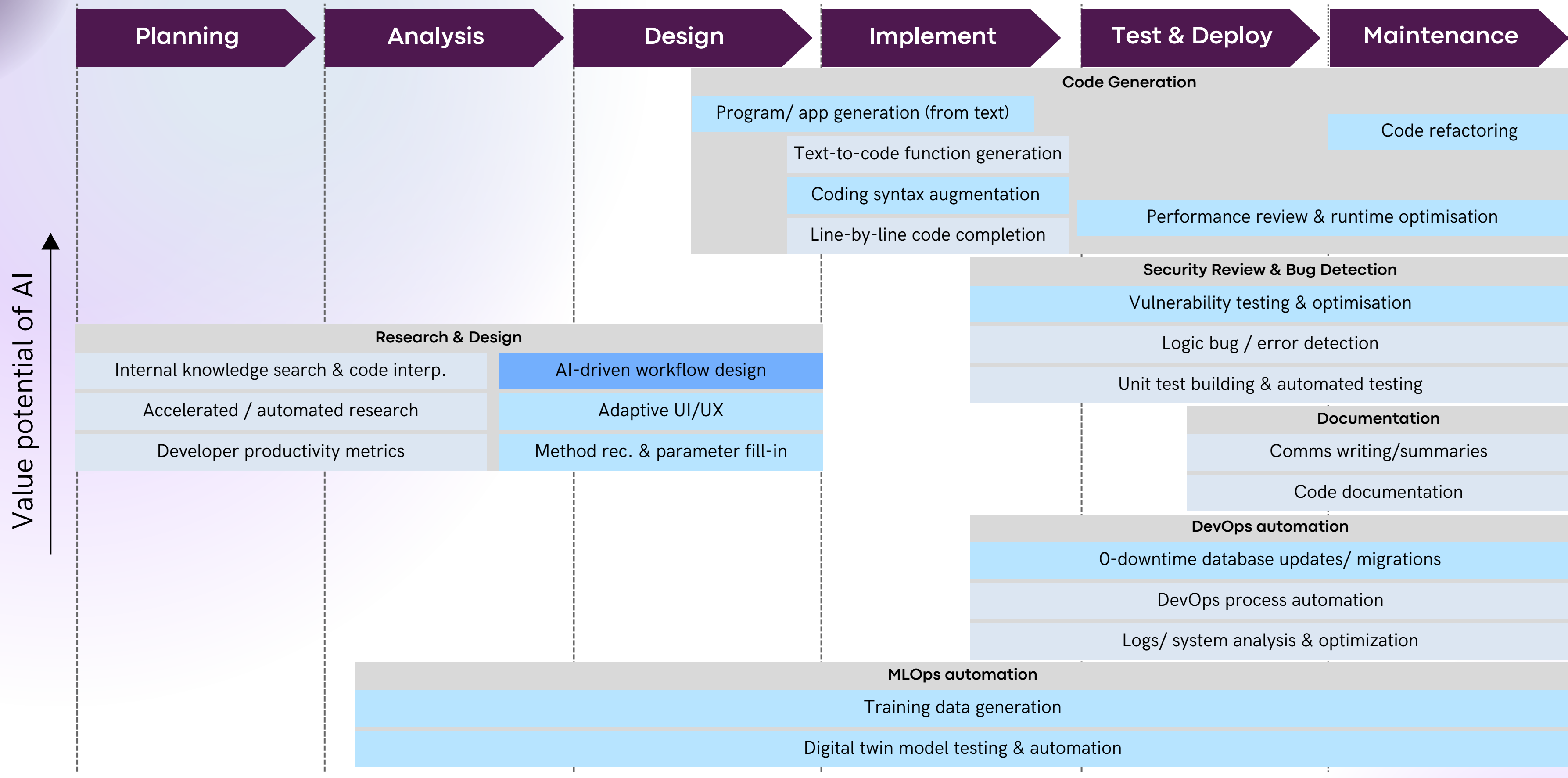


❖ Software Dev teams will be required to evolve



	Current Work	Evolved Work	New Responsibilities
Product Manager	Product ideation & conduction user research & interviews	Evaluate human-AI co-created ideas & test PMF	<p>“Generative AI squad” focused on building use cases & timebound deployment projects</p> <ul style="list-style-type: none"> • Data engineer • Data science • Cloud engineer • AI ethics / security specialist <p>Responsibilities</p> <ul style="list-style-type: none"> • Evaluate gen-ai use-cases • Build solutions for use cases • Build and fine tune models • Enable security guardrails
Architects	Design architecture, ensure software quality, security etc.,	Integrated gen-ai into existing architecture, ensure gen-ai risk policy compliance	
Full Stack Dev	Review & integrate E2E code	Integrate gen-ai models & datasets to build apps over LLP outputs	
Business Analyst	Generate data-backed insights to improve products/ CX	Validate auto-generated insights	
UI/UX Designer	Develop interface wireframes	Design multi-user interface for generative AI apps	
Frontend/Backend Dev	Coding and debugging manual documentation	Review & contextualize auto-generated code and documents	
Quality Eng	Run quality tests, documentation	Focus on edge cases, review for potentially-exploitable code, refine auto-generated docs	
DevOps/ Security Eng	Manage infrastructure & deployment processes	Optimize infrastructure configurations by leveraging gen-ai recommendations	

Gen-AI across the software development lifecycle



■ Maturing tech (existing players beginning to scale)
 ■ Emerging tech (players to grow in the next 5 years)
 ■ Nascent tech (players yet to emerge)



Section C

Market Landscape

"The companies and platforms making breakthroughs and creating waves as early movers"

Emerging Global Software Development Gen-AI companies

\$300M+

Venture Funding till date

~75

Total # of AI Software Development Startups



Code Generation / Completion

Website Generation

From Text From Figma Designs

Code Analysis/ Dev Intelligence

Website Personalization

Documentation Generation

The market map is not exhaustive, reach out to us at ai@kalaari.com if we have missed a company in the space.

Leading Software Development Gen-AI tools



Company	What they do	Funding / Other Metrics
GitHub Copilot	GitHub Copilot is a machine learning-powered tool that generates code for developers based on their comments and commit history. It was introduced by Microsoft and is integrated with Visual Studio and other development tools.	+\$100M Annualized Revenue
Replit	Replit AI enables you to debug, autocomplete, and turn natural language into code with one-click.	+\$100M a16z, Khosla, Coatue, YC
Cody	Cody (by SourceCraft) answers technical questions and writes code directly in your IDE, using your code graph for context and accuracy.	+\$100M Redpoint, Sequoia, a16z
Cursor	Cursor (by Any Sphere) helps build software faster in an editor designed for pair-programming with AI	\$11M OpenAI Startup Fund, Angels
Warp	Warp AI is fully integrated with your terminal so you always know which command to run next	+\$70M Sequoia, Google Ventures
Tabnine	Enterprise privacy-first AI assistant that speeds up delivery and keeps your code safe	\$55M Acquired by Codota

Suggested Readings



- [Leveraging AI for Software Development](#)
- [Unleashing Developer Productivity with Gen-AI](#)
- [How Gen-AI is changing the way devs work](#)
- [Github Copilot capabilities](#)
- [Generative AI: Developer Tools & Infrastructure](#)
- [AI Impact on Software Development with GitLab's David DeSanto](#)
- [An explosion in software engineers using AI coding tools?](#)

PS - Open AI's Dall-E & ChatGPT helped us co-create images and content for this series

Thank you



Kalaari is committed to playing a pivotal role in helping Indian entrepreneurs make a global impact in the field of AI.



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