



ai&us

Part 2: Gaming

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



"Super Mario riding a bike in an Indian Street"
(Created by inmobi_deisgn via Midjourney)



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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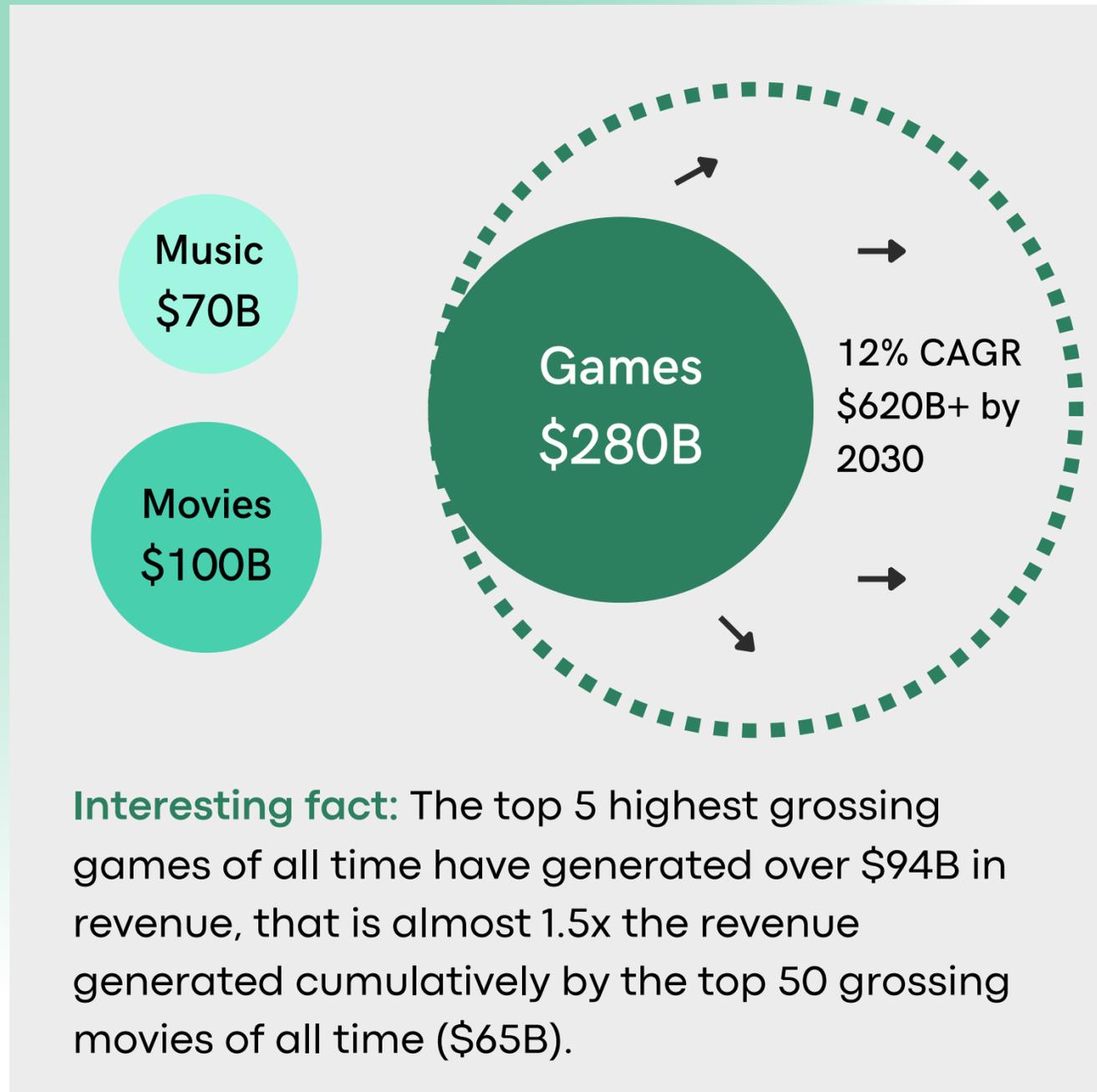


Section A

Setting the context

"Games sure are fun to play, but they sure aren't as much fun to develop"

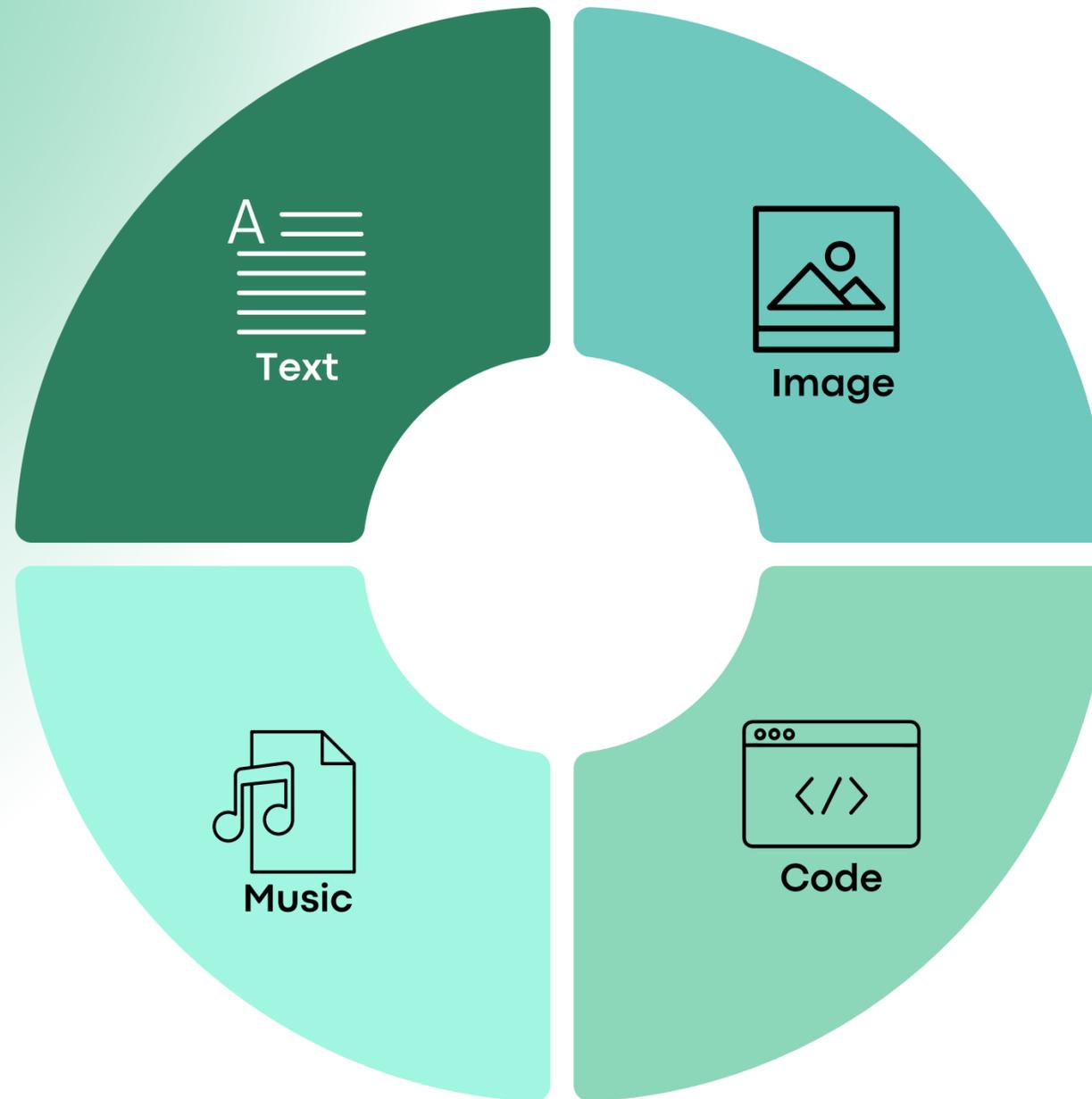
✦ The Gaming industry is bigger than movies & music



Top 10 highest grossing games of all time	Year Platform	Gross
Dungeon Fighter Online	2005 Multi	\$22.1B
Pac-Man	1980 Multi	\$19.3B
Space Invaders	1978 Multi	\$19.2B
Street Fighter 2	1991 Multi	\$18.7B
Honour of Kings	2015 Mobile	\$15.6B
Lineage	1998 Multi	\$15.4B
League of Legends	2009 Multi	\$15.2B
PUBG	2017 Multi	\$14.8B
Crossfire	2007 PC	\$13.1B
World of Warcraft	2004 PC	\$11.3B

✦ Today, we can produce and enjoy near-life like gaming experiences ✦

"A game is nothing but a conscious meshing of multiple data types stitched together to produce an immersive, interactive and engaging experience that responds to a player's commands in real-time"



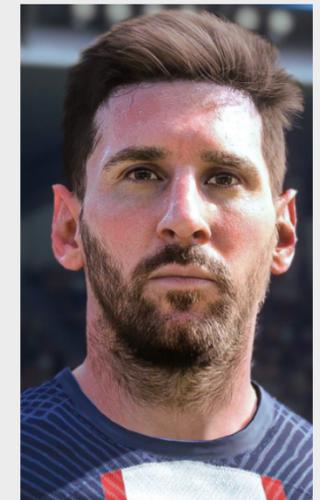
The evolution of Messi in EA Sports marquee FIFA game series



2006



2023



❖❖ But, building games is a complex, multi-step process...



The level of complexity depends upon the type of game being developed

Platform

Mobile AR/VR Headset PC Console

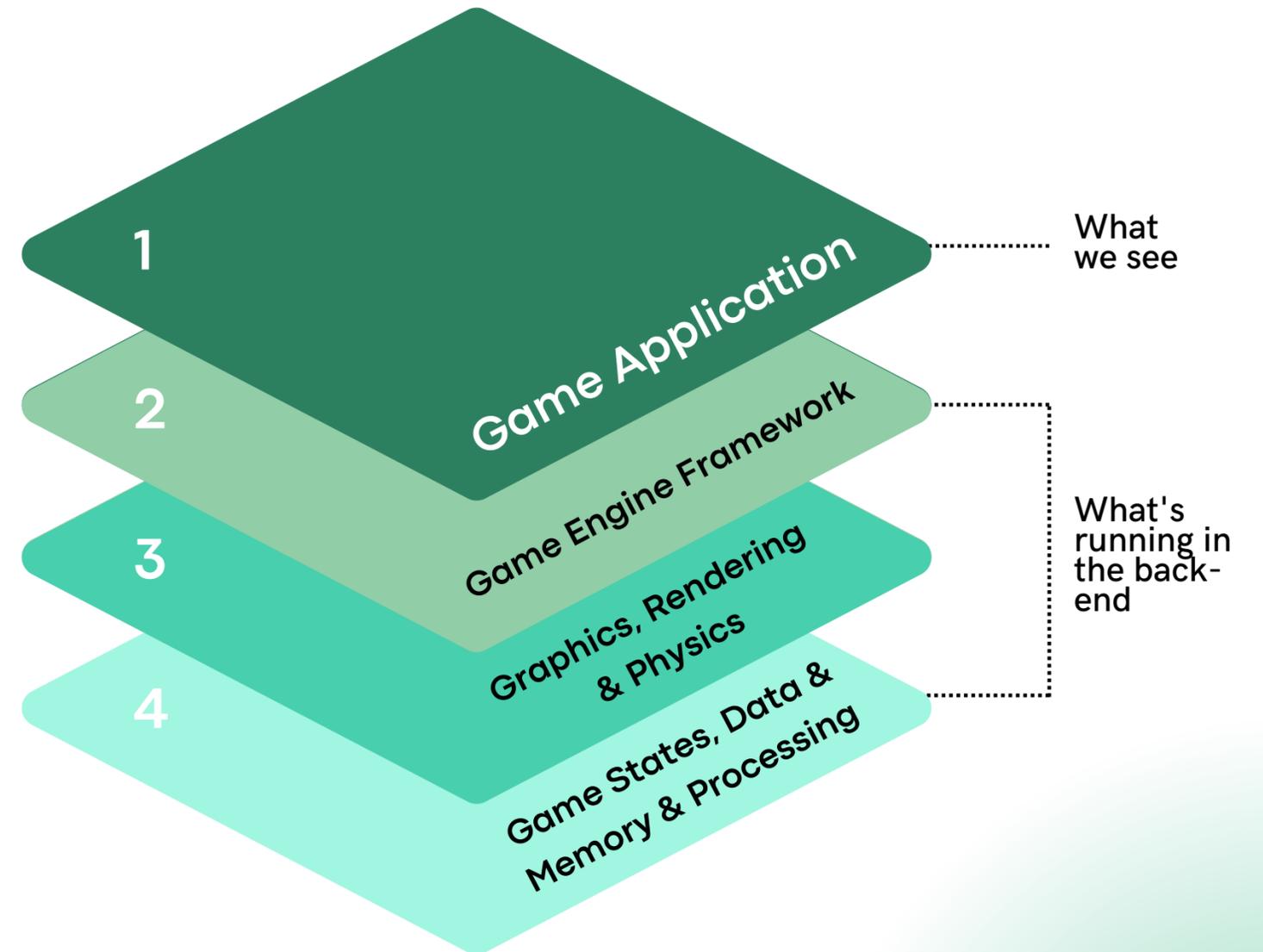
Level of complexity →

Game type

Casual RMG Midcore Hardcore

Level of complexity →

The Architectural Layers of a Video Game



✦ ✦ ✦ ...that requires a significant volume of time and money



Cyberpunk 2077

💰 \$316M

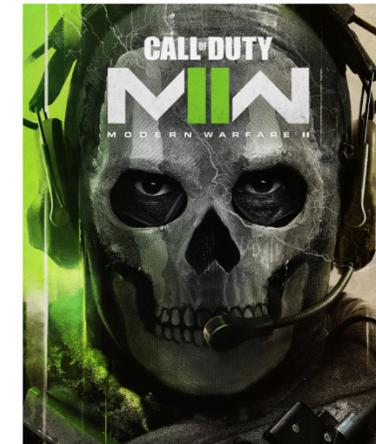
🕒 9 years



GTA - 5

💰 \$265M

🕒 3 years



Call of Duty: Modern Warfare 2

💰 \$250M

🕒 3 years



Read Dead Redemption 2

💰 \$225M

🕒 8 years



Elden Ring

💰 \$215M

🕒 4 years



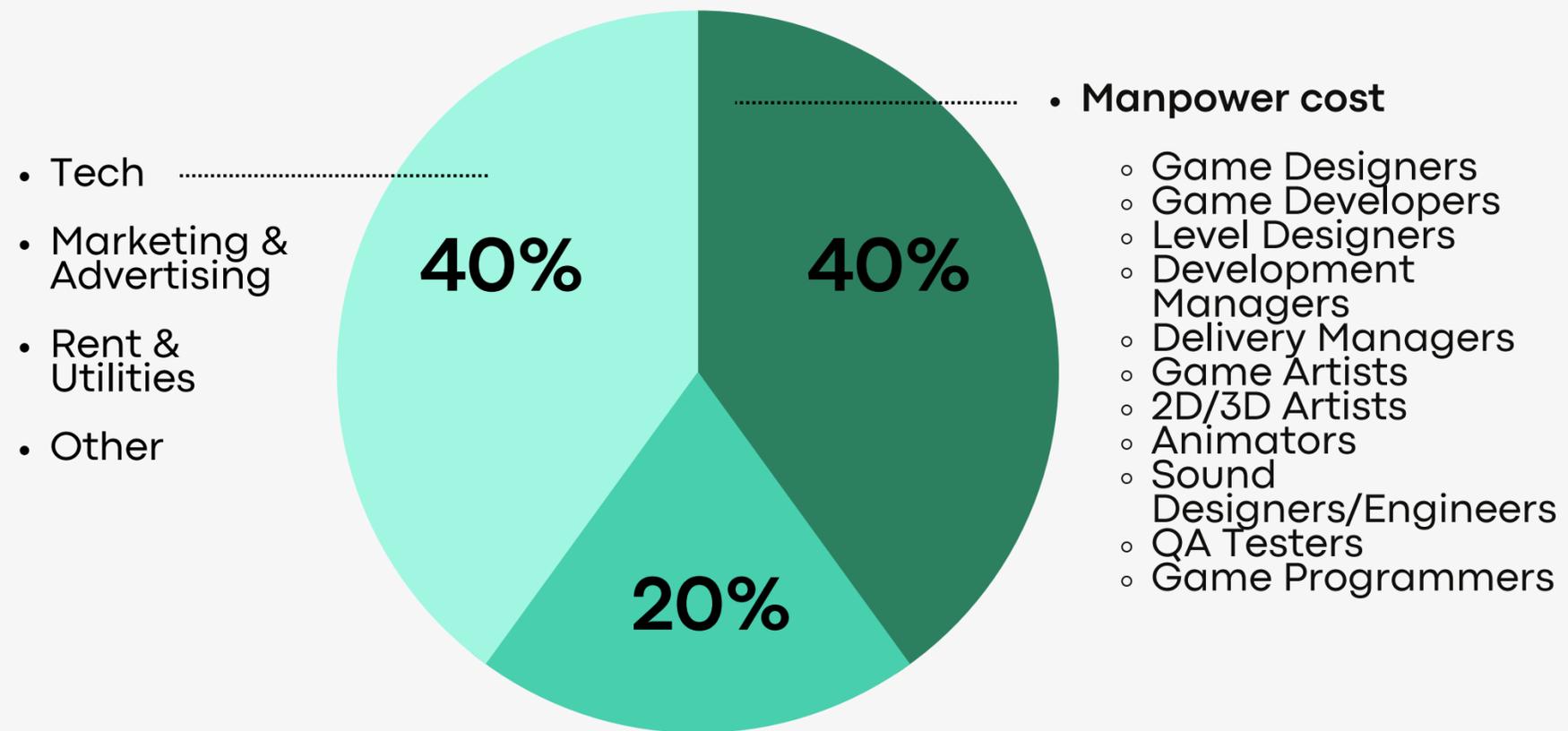
Battlefield 4

💰 \$100M

🕒 2 years

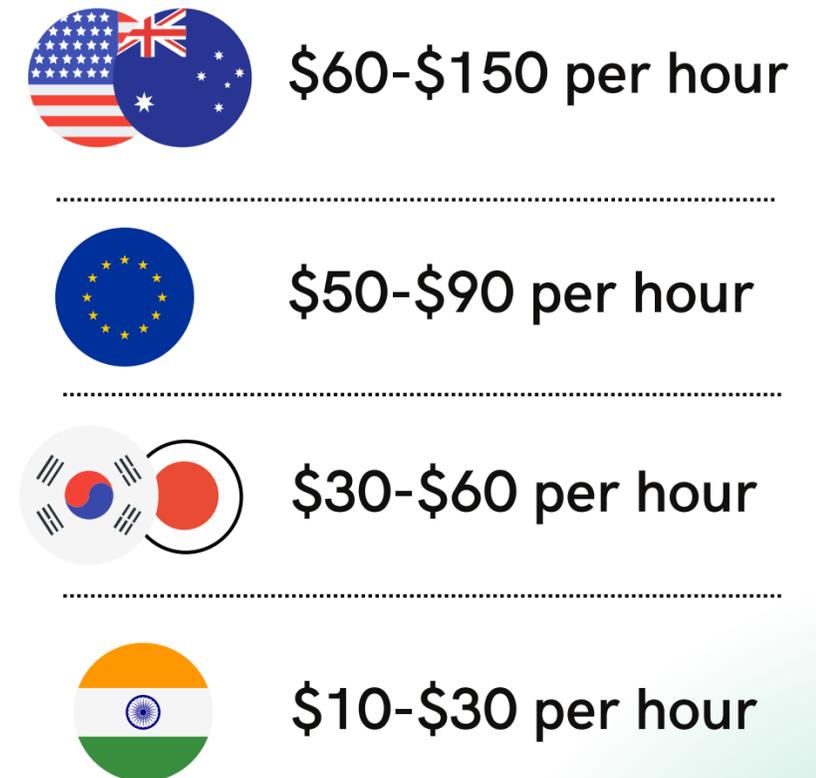
❖❖❖ **Manpower costs account for the highest proportion of a studio's budget** ✨

Manpower costs typically account for 40-60% of a studio's total budget

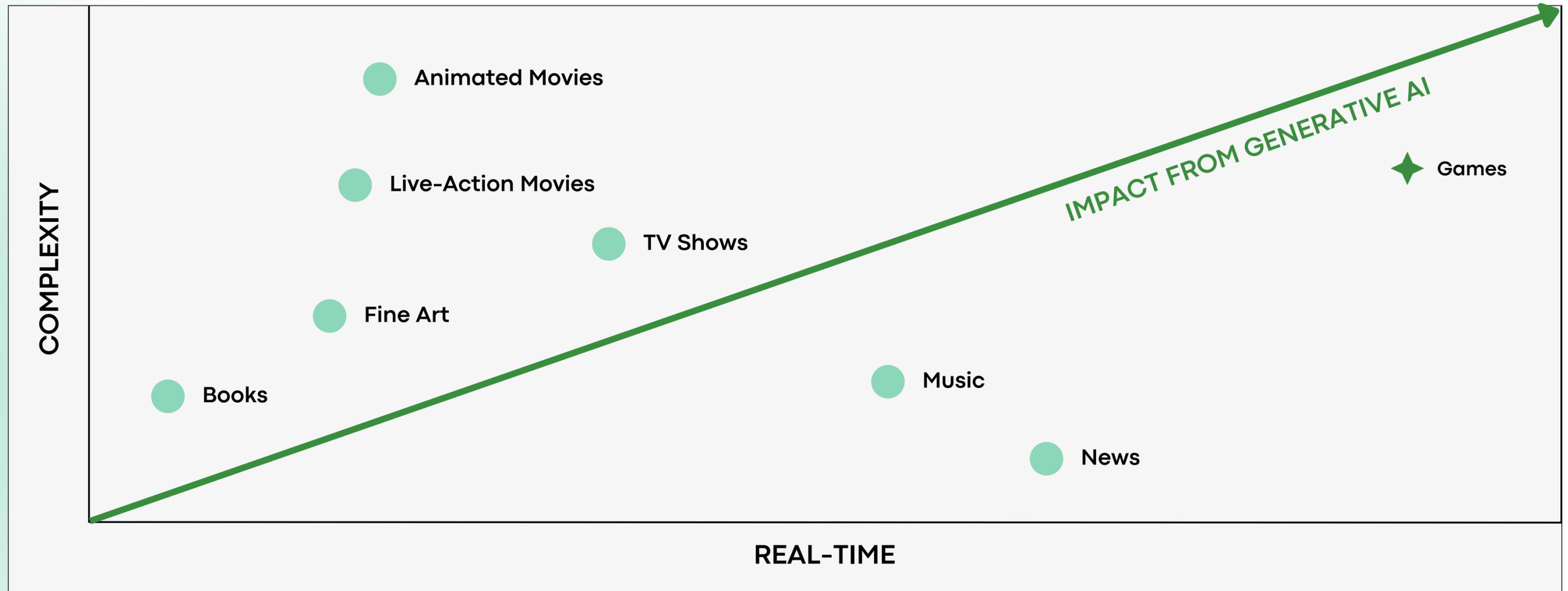


Free-flowing budget that can be divided on either side depending on scope & size of project. For smaller studio's this typically goes to manpower. For larger studios it can be allocated to Marketing or Tech.

Outside India, typical game developer profiles can cost between \$100-\$300K per year



✦ Generative AI will impact Games more than it will impact any other creative content type





Section B

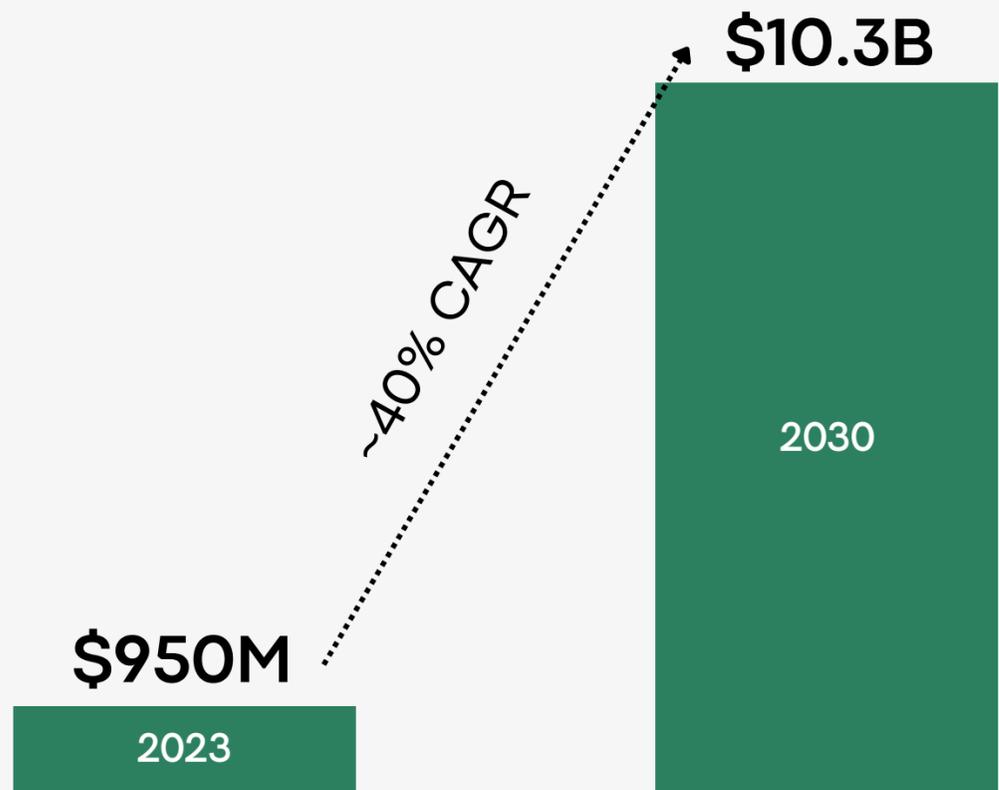
The Impact of Gen-AI on Gaming

"Game development is about to become a whole lot easier"

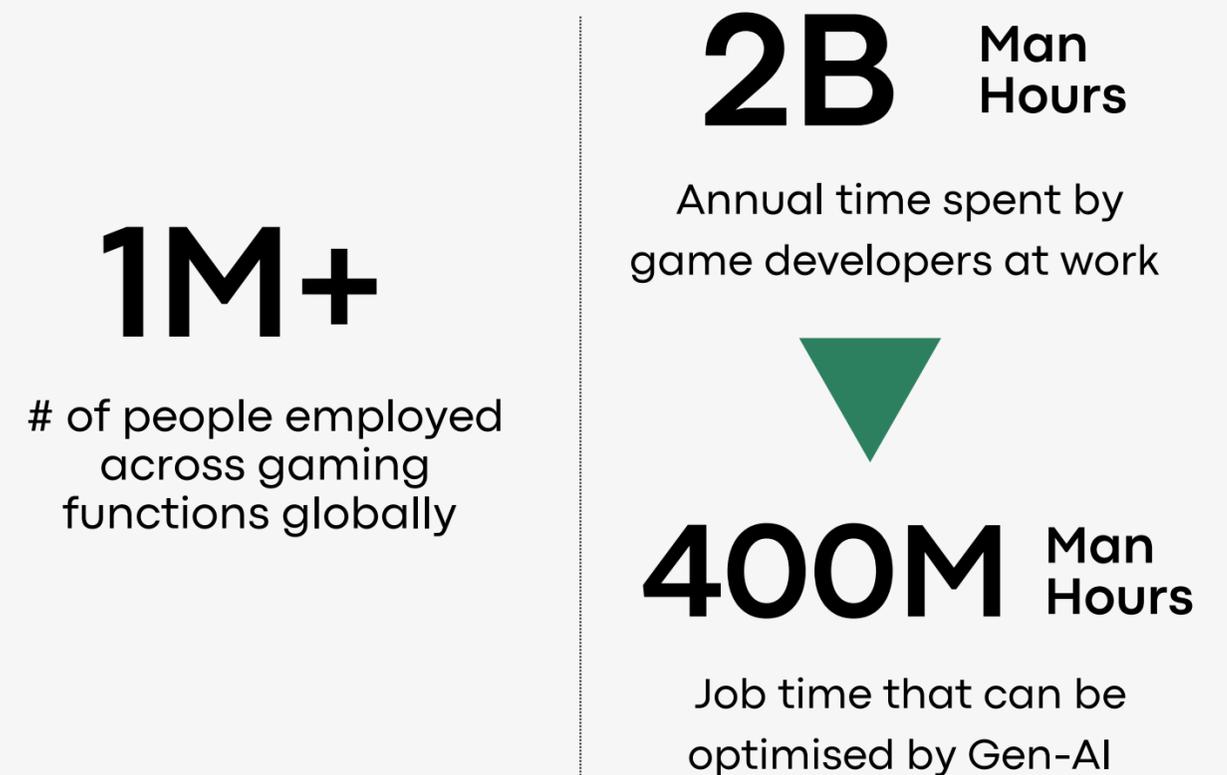
Gen-AI is primed to re-shape the future of Game Dev



Market Value of AI-based Game Dev Tools will account for over 1% of the total gaming market



Gen-AI can increase productivity for game developers by over 20%

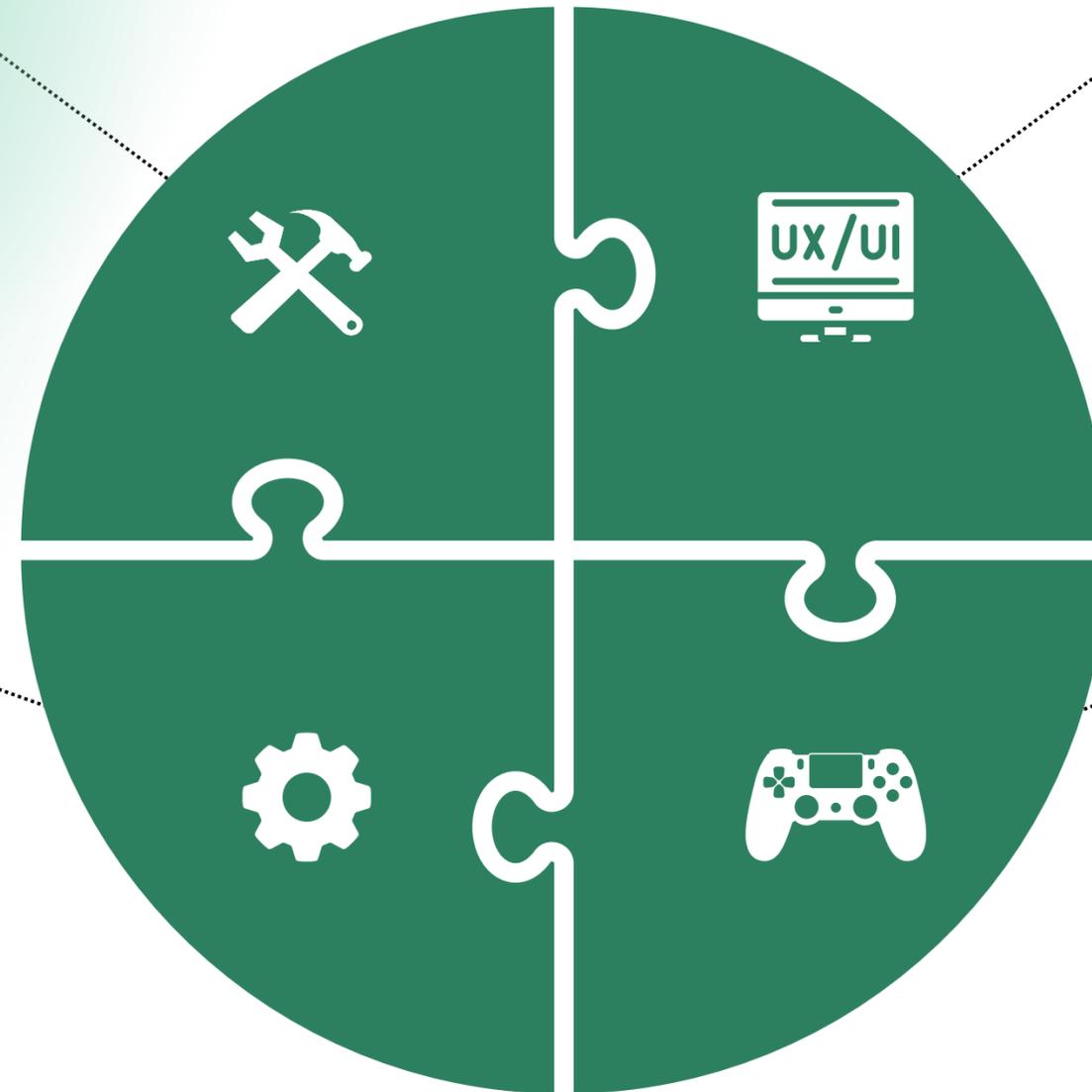


Gen-AI impacts several core development elements



Main Loop	
Initialisation	
Player Input Process	✓
Game Logic Performance	✓
Screen Render, Graphics, SFX	✓
Shutdown	

Load & Cache Game Data	
Game Resource Formats	✓
3D Environment Mesh	✓
2D Sprites & Texture Data	✓
Sound, Music, Animations	✓
Effects, Cinematic Shader	✓



Game UI & States	
Human Game View	
Player Movement Control	
Screen Elements	✓
Game Controls, Events Data	
Event Listener & Manager	✓

Programming Input Device	
Game Controller Work	
Touch Device Controller	
Two Axis Controls	
Get State & Normalising Input	

✦ Gen-AI will lead us to the 'Direct from Imagination' Era



	Description	Level 0	Level 1	Level 2	Level 3	Level 4	Level 5
Studio as creator	Developers create and dictate the experience using tools that lie outside a particular game framework	No automation, own engine & backend	Off the shelf tools and code	Non-Tech tools for creative inputs	Gen-AI tools used for pipeline, human-heavy	Automation of 1+ creative pipes, prompt to output	Multiple generative pipes used smoothly
Game as creator	The Game loop itself creates generative experiences and content, in real-time	Set gameplay, no variations	Rule-based procedural content	Limited 'live' generated content	Extensive 'live' generated content	Personalisation based on player inputs	Game designer friend optimising fun
Modder as creator	Creativity happens within a game system but outside the core game loop	No inherent modding	Limited game provided tools	API to build mods	Conditionally generative AI Pipes	Integrated Generative Tooling	Complete mods from prompts
Player as creator	Players express themselves within the core-game loop	Limited creativity	Player as content, but no big impact	World-building by players	Actions affect persistent content	Integrated Generativity, Modding in loop	Dream it, prompt it
				2023		▶	2030?

✦ Specific use-cases that Gen-AI has opened up in Gaming



Major impact

	Description	Cost Reduction	New Features & Functionality
End-to-End Content Generation: Pre-release and procedural	Game creators will be able to go beyond human intelligence for creating a wide range of game elements, either from scratch (ideation) or by training models to replicate on foundational elements - maps, levels, characters, background scores, everything.	Yes	Yes
Enhance NPC Behaviour	There are select games where AI models are powering NPC behaviour, but Gen-AI takes this a notch above allowing NPC's to act more genuinely and organically, leading to greater immersive, interesting and unique gameplay experiences.		Yes
Simplified Testing & Debugging	Testing and debugging is a herculean task especially with AAA and Hardcore games. Gen-AI models will be able to analyse and detect errors, run multiple scenarios and potentially even fix bugs.	Yes	Yes
Personalized Gameplays	Gen-AI will allow studios to offer far more personalised player experiences, depending on interest, engagement levels and in-game player behaviour. The Game engine framework could come up with variations in real-time across elements - characters, levels, difficulty and more.		Yes
Re-purpose Games for different platforms	Migrating game titles designed for a particular platform to another is often a repetitive albeit consuming task for development teams. Here, specific tools could automate specific development processes and reduce time-to market significantly.	Yes	Yes

✦ Adoption of AI tools is on the rise, expected to flow top-down from large AAA studios to smaller mobile gaming studios



87%

Studios currently using 1 AI tool in development

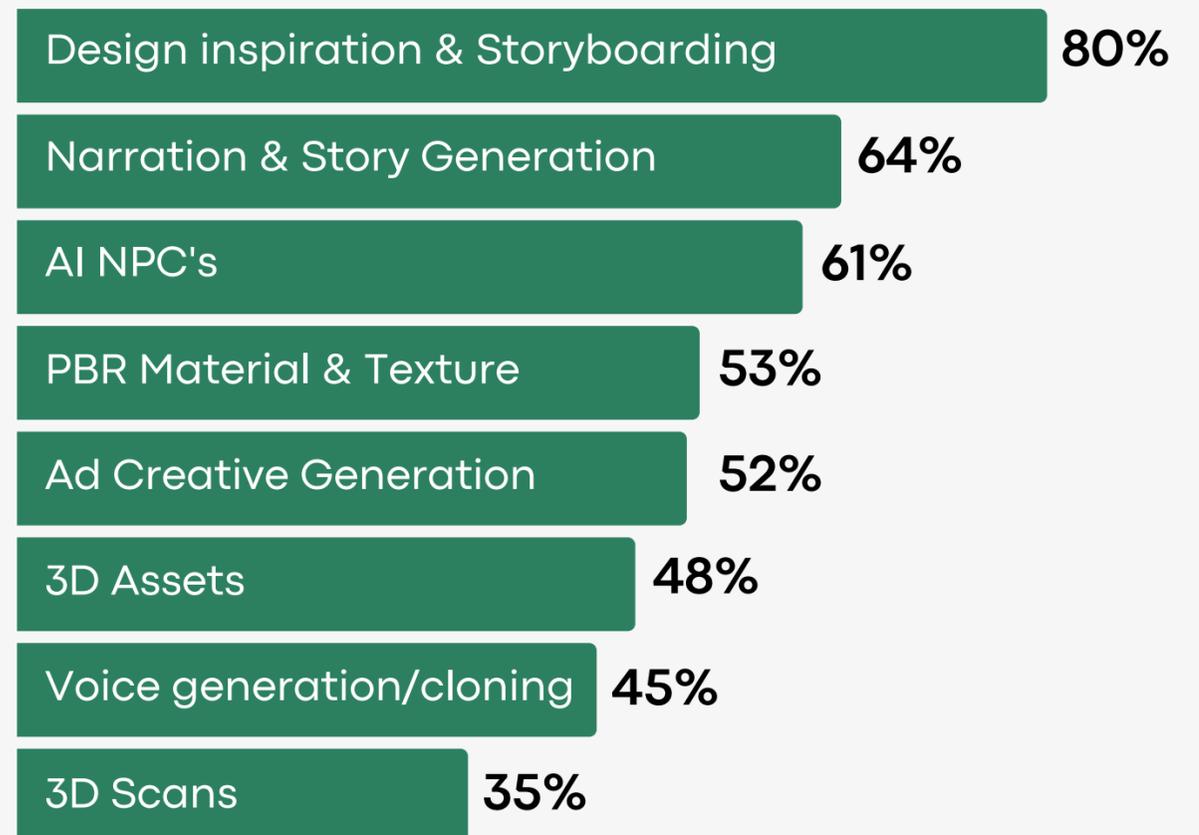
64%

Studios planning to fine-tune and train their own proprietary models

48%

Studios use Unity/Unreal as their primary engine, likely to utilise in-built AI features

% of studios planning to leverage AI on their next project for





Section C

Market Landscape

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

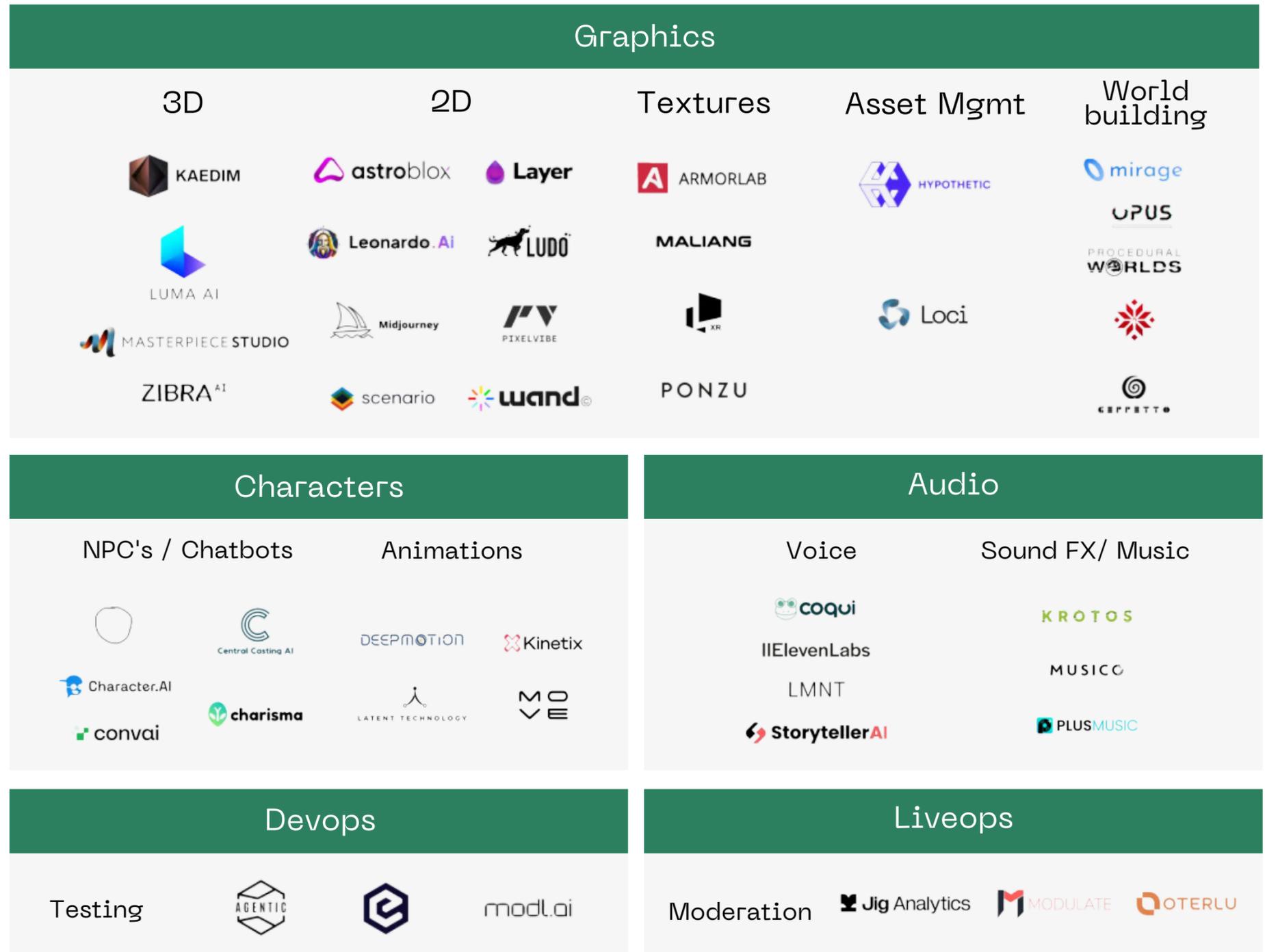
Emerging Global Vertical Gaming focused Gen-AI companies

\$300M+

Venture Funding till date

~75

Total # of Vertical AI Gaming Startups



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

Leading Vertical Gaming-focused Gen-AI startups



Company	What they do	Funding
	<p>Inworld is a Character Engine for AI NPCs that goes beyond LLMs. It adds contextual awareness and multimodal expression of personality using advanced AI to build generative characters whose personalities, thoughts, memories, and behaviors are designed to mimic the deeply social nature of human interaction.</p>	<p>\$120M Bitkraft, Lightspeed, Kleiner Perkins, M12</p>
	<p>rct AI is providing AI solutions to the game industry and building the true Metaverse with AI generated content. It uses cutting-edge technologies, especially deep learning and reinforcement learning within it's game engine platform truly dynamic and intelligent user experience both on the consumers' side and production's side.</p>	<p>\$15M Galaxy Interactive, Y Combinator</p>
	<p>Hidden Door is a game technology studio building the first narrative AI — a platform that transforms any work of fiction into an infinite social roleplaying experience, bringing together players, authors and other creators.</p>	<p>\$7M Northzone, Makers Fund</p>
	<p>Scenario offers an AI-based platform that allows developers to generate high-quality, style-consistent 2D assets for games.</p>	<p>\$6M Play Venture, Anorak Ventures</p>
	<p>Regression Games is building an accessible and enjoyable experience esports ecosystem for players to create game AIs, code characters, train models, and compete in their favourite games.</p>	<p>\$4M NEA, a16z</p>

✦✦ Exciting Areas of Opportunity for Indian Game Developers ✦



Studio Plays

AI-first Indie Studios

Leveraging and incorporating AI into their own development pipe aggressively (casual/midcore)

Service Studios

Leveraging and incorporating AI to serve other studios more effectively and efficiently

GameDev SaaS Plays

Unity/Unreal extensions

GameDev SaaS Tools and extensions that are distributed via Unreal Marketplace or Unity Asset Store

Proprietary Platforms

GameDev SaaS Platform that solved for a development function, potential to scale end-to-end. Will likely change development approach.

✦✦✦ Additional Resources



- [The Generative AI Revolution will enable anyone to create Games - a16z \(Article\)](#)
- [The NeverEnding Game: How AI will create a new category of Games - a16z \(Article\)](#)
- [Gaming x AI \(The Infinite Power of Play\) - Lightspeed \(Article\)](#)
- [How AI is helping Build, and Humanise, Virtual Worlds - Bitkraft \(Article\)](#)
- [AI is rewriting the Rules of \\$200B Games Industry - Bloomberg \(Article\)](#)
- [Five Levels of Generative AI for Games - Jon Radoff \(Article\)](#)
- [The Generative AI Revolution in Games - a16z \(Article\)](#)

- [Computational Creativity, Building the Metaverse - Jon Radoff \(Article\)](#)
- [The Future is Now - the AI Gaming Revolution - Justin Yuan \(Substack\)](#)
- [Generative AI in Games: A Builder's Perspective - Synthetic Futures \(Video\)](#)
- [Creating NPC's with Generative AI and OpenUSD - Nvidia Omniverse \(Video\)](#)
- [Gaming AI with Haiyan Zhang - Microsoft Research \(Podcast\)](#)
- [Unlocking the Power of AI in Gaming with Unity's Marc Whitten: For Your Innovation \(Podcast\)](#)
- [Unity AI Explained - Samson Vowles \(Video\)](#)

Thank you



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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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