Where are we now in XR?

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Author of Reality Check: How VR and AR Can Supercharge Your Business

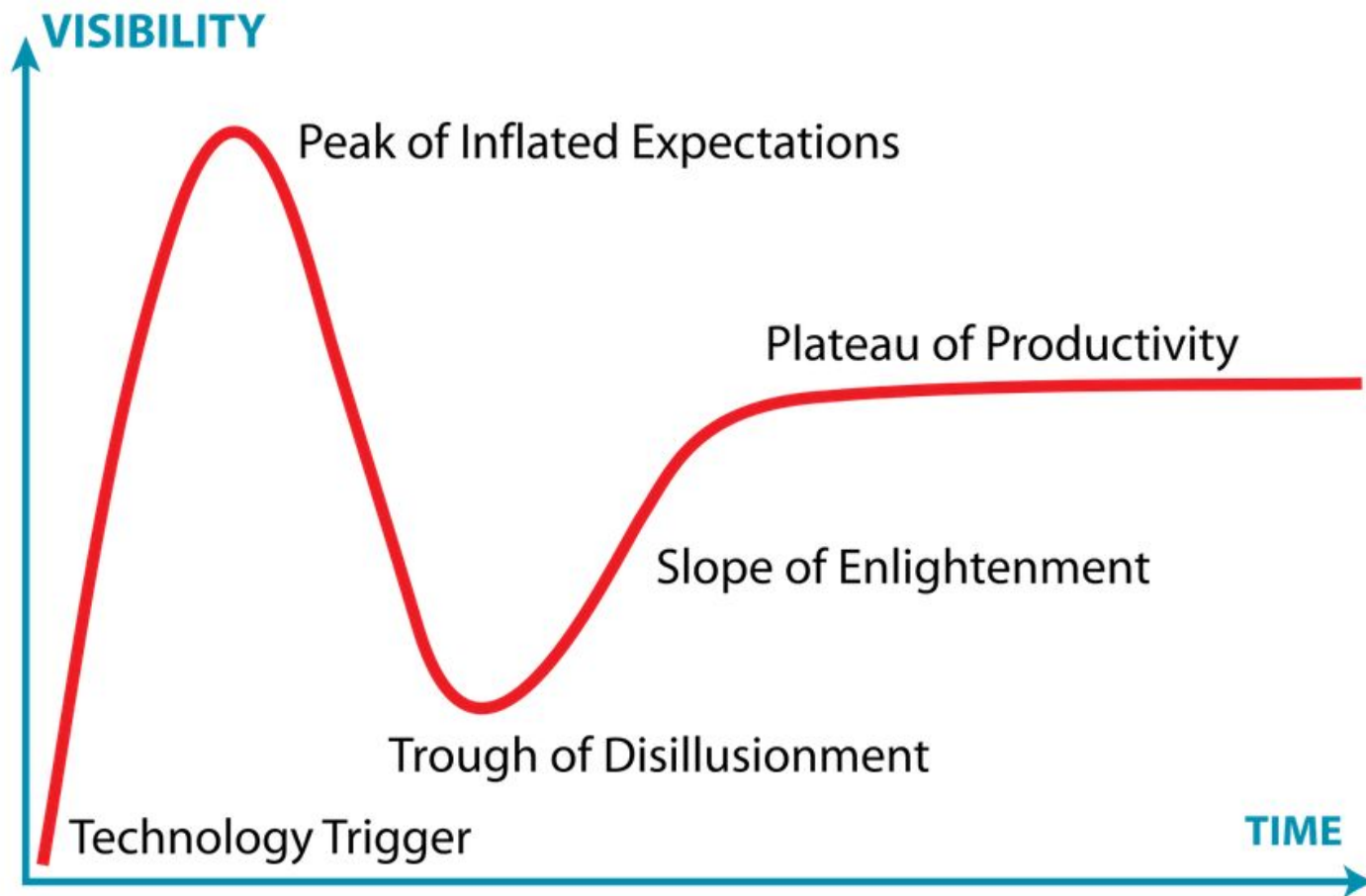# Hello, everyone!

Gartner Hype Cycle

- VISIBILITY (y-axis)
- TIME (x-axis)
- Technology Trigger
- Peak of Inflated Expectations
- Trough of Disillusionment
- Slope of Enlightenment
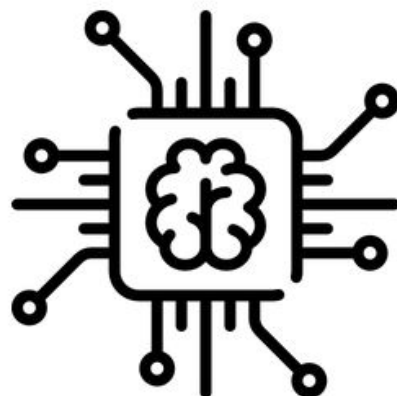- Plateau of Productivity

Three factors contributed to where we are now

Metaverse
hype

Economic
challenges

Artificial
Intelligence

What is the metaverse? According to investors...

Category	Percentage
It's a virtual world	37.57%
It's Facebook's new name	20.63%
It's linked to web 3.0	14.29%
It's a crypto	14.29%
It's a new Google	6.35%
All of the above	6.35%
I don't know	0.53%
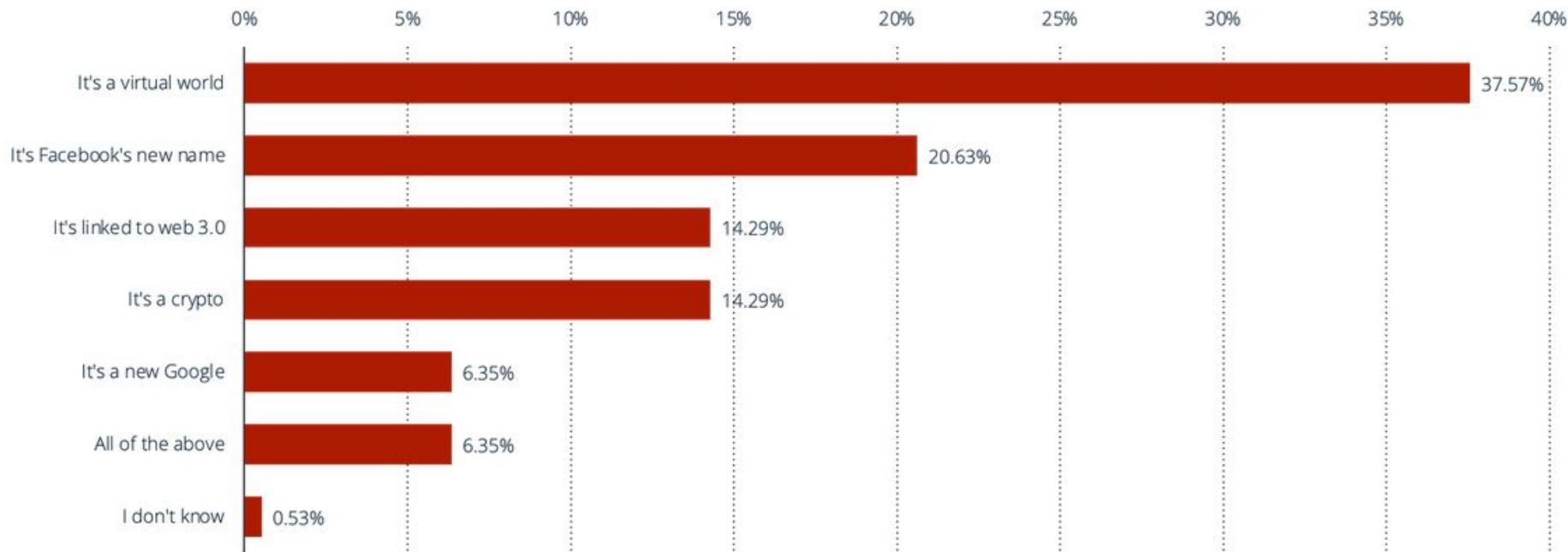
What is holding XR back

A killer application?

What is the killer application of the smartphone?

There are four main obstacles to XR adoption - **CECE**

Cost

Education

Content

User
Experience

Education on XR's benefits is an ongoing challenge...

Learning and development

- **Faster training**.
- Improved learner **confidence**.
- Improved learner **focus**.
- Improved **retention** of information.
- Increased **emotional engagement**.
- Reduced reliance on human trainers.
- Greater **cost efficiencies** in deployment.
- **Reduced upkeep** of physical training locations.
- Increased **portability** of training.
- **Less disruption** to operations for on-site training.
- Improved **learner insight** through unique data capture.
- Improved ability to **deliver high-risk training** safely and effectively.
- Improved company **culture**

Operations

- **Reduced complexity** of operations.
- **Reduced costs**.
- Time saved.
- **Reduced travel** and associated carbon emissions/improved sustainability.
- Improved remote **collaboration**.
- More efficient and effective **remote assistance**.
- Decreased number of **accidents**.
- Decreased accident-related costs.
- Faster **speed** to market.
- Reduced time and cost of creating **physical prototypes**.
- Improved understanding of **complex data**
- Greater alignment of **design vision**

Sales and marketing

- New **revenue** channels.
- Improved **customer engagement**.
- Greater **conversion rates** from interested customers to buyers
- Increased **dwell time** from customers
- Increased understanding of **consumer behaviours**.

Firsthand experience sells XR solutions

Data   Meeting   Demo   Sale
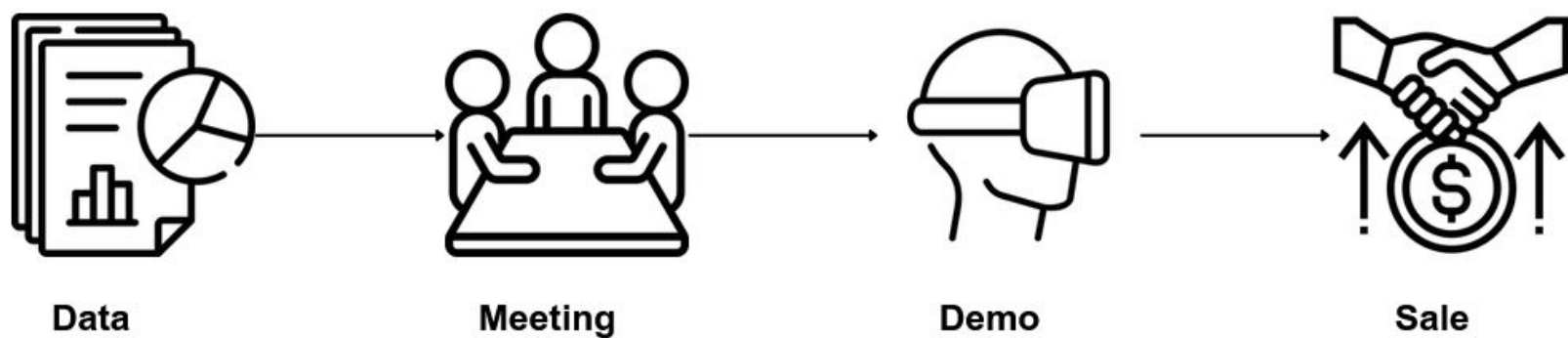
Quantitative data helps...

Financial cost of new solution

Benefit of new solution

... but it's not the full story

Financial cost
of new solution

**+ Friction of
onboarding
new solution**

**+ Difficulty of
using new
solution**

Benefit of new
solution
**over and above
alternative solutions**

The net result is the true 'return on investment'

Financial cost
of new solution

**+ Friction of
onboarding
new solution**

**+ Difficulty of
using new
solution**

ROI

Benefit of new
solution
**over and above
alternative solutions**

User experience represents an extensive group of issues...

Physical comfort

- Weight
- Form factor
- Fit
- Heat distribution
- Hypoallergenic and moisture wicking face mask material
- Cushioning
- Suitable adjustability of straps

Software optimizations

- Speed and repetitiveness of initial setup and calibration
- Graphical quality of application
- Tracking reliability (driver quality)
- Latency (graphical load)
- Stability
- User interface intuitiveness
- Accessibility features for users with disabilities
- Safeguarding options for moderating negative behaviour in social XR

Physiological comfort

- Cyber sickness
- Eye strain
- Fatigue
- Headache
- Neck/shoulder strain

Hardware optimizations

- Visual fidelity of optical system
- Field of view of optical system
- Fashionability of design
- Controller ergonomics, intuitiveness, complexity and familiarity
- Battery life
- Tracking reliability (sensor quality)
- Latency (processing power)
- Restrictive wiring (tethered headsets)
- Granular and wide-ranging IPD control
- Thermal management
- Durability
- Sound quality

Psychological comfort

- Hygiene concerns (sharing headsets)
- Social awkwardness in mixed groups
- Self-consciousness in mixed groups
- Data privacy concerns

Ecosystem optimizations

- Interoperability between different platforms
- Content refresh frequency
- Standardization of accessories and peripherals

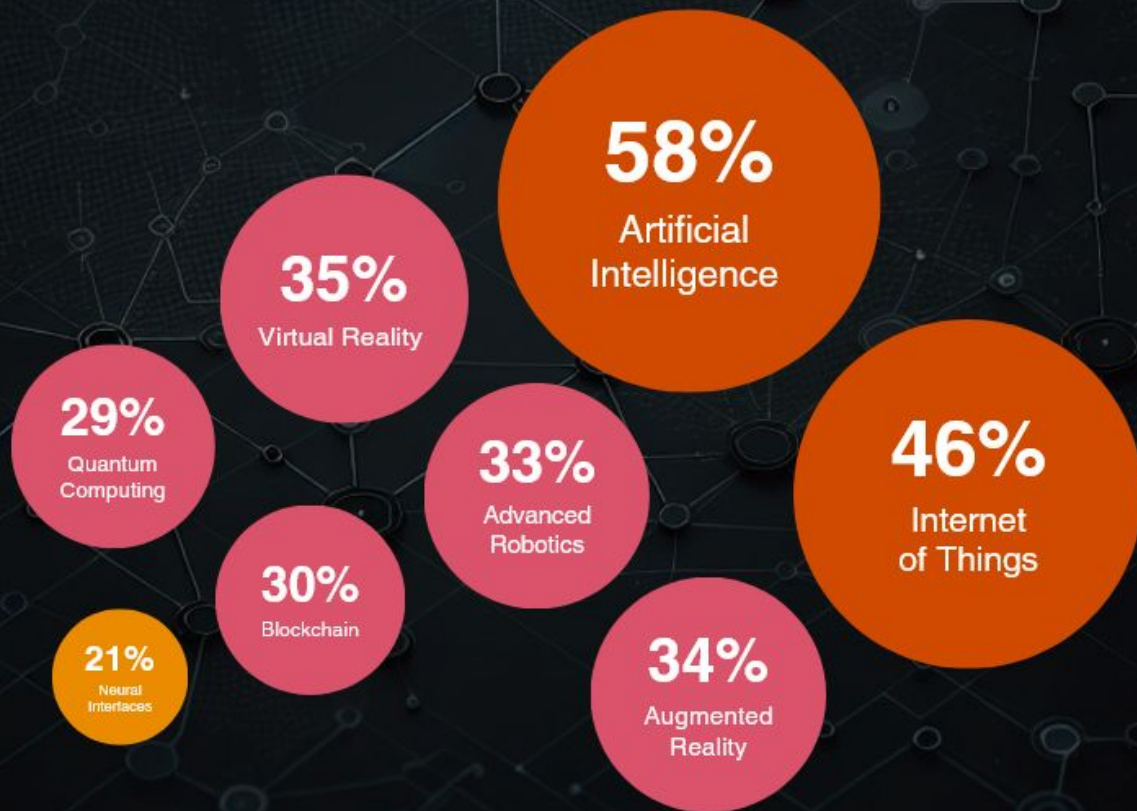Where are we heading now

PwC's Emerging Technology Survey

PwC surveyed 1,026 executives in the United States:

- 46% in business roles, 54% in technology roles on topics related to emerging technologies.
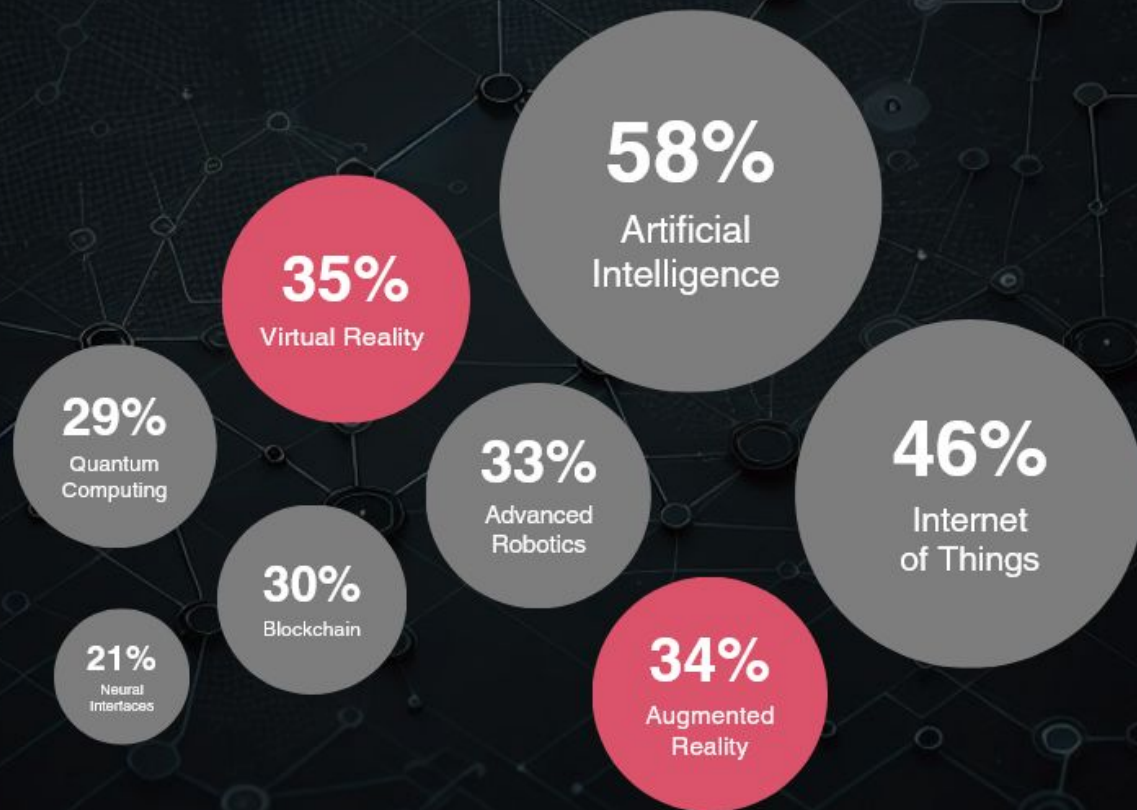- Organizations from public & private sectors

Industry split

- Technology, media and telecommunications (20%)
- Financial services (19%)
- Consumer markets (18%)
- Industrial products (17%)
- Health (11%)
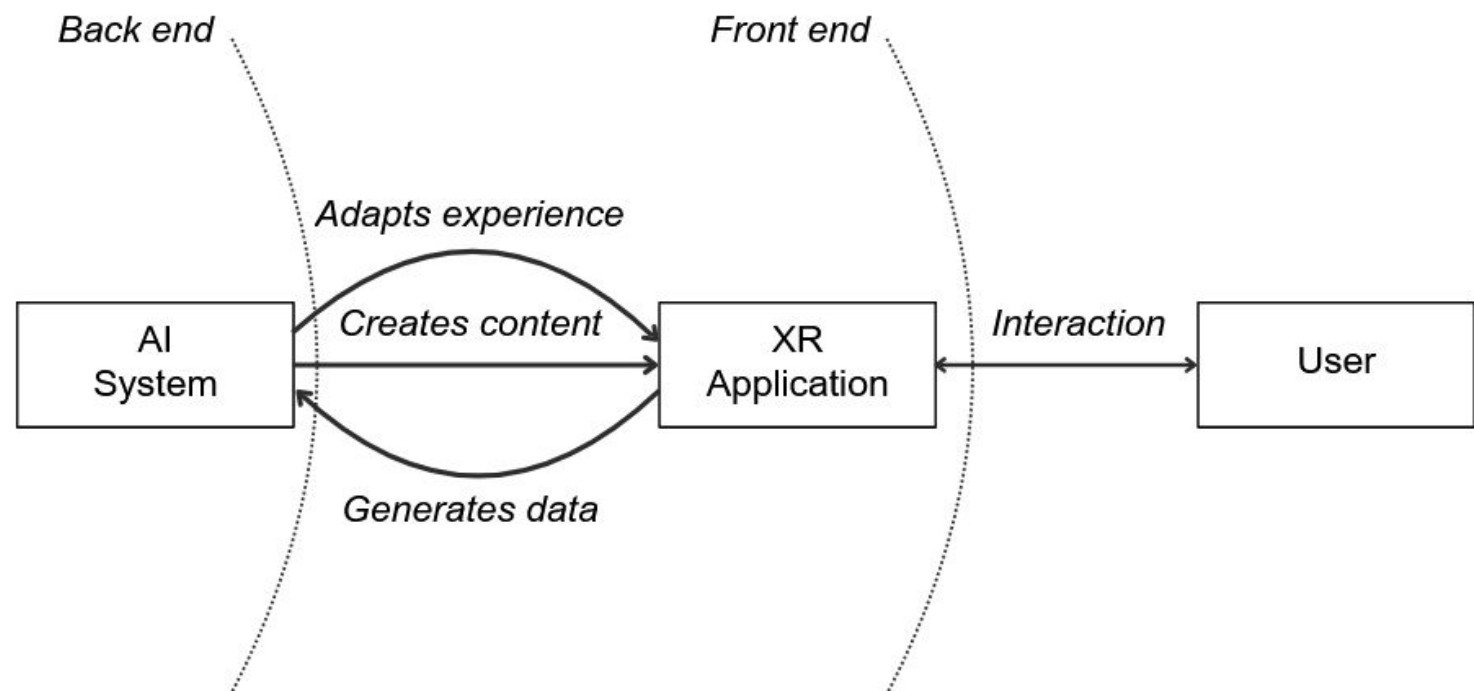- Energy, utilities and resources (9.5%)

Where investments will flow

58% Artificial Intelligence

35% Virtual Reality

29% Quantum Computing

33% Advanced Robotics

46% Internet of Things

30% Blockchain

21% Neural Interfaces

34% Augmented Reality

Where investments will flow

58% Artificial Intelligence

35% Virtual Reality

29% Quantum Computing

33% Advanced Robotics

46% Internet of Things

30% Blockchain

21% Neural Interfaces

34% Augmented Reality

AI and XR are complementary technologies

AI does two main things for XR applications

	What	Why
Create	1. Virtual environments and objects	Reduce time and cost spent on creation
	Virtual agents	• Communicate information and feedback • Improve customer satisfaction • Build a more engaging, interactive experience
	Dynamic content	Personalize experiences in real-time
Analyze	User's performance	• Communicate relevant feedback • Adapt the experience
	User's emotional state	
	Physical environment	• Provide relevant insights to the user • Enable accurate user position in VR or virtual object position in AR
	Simulation	Forecast future simulation states
	User's voice	Enable voice interaction (with user interface and virtual agents)

We are here
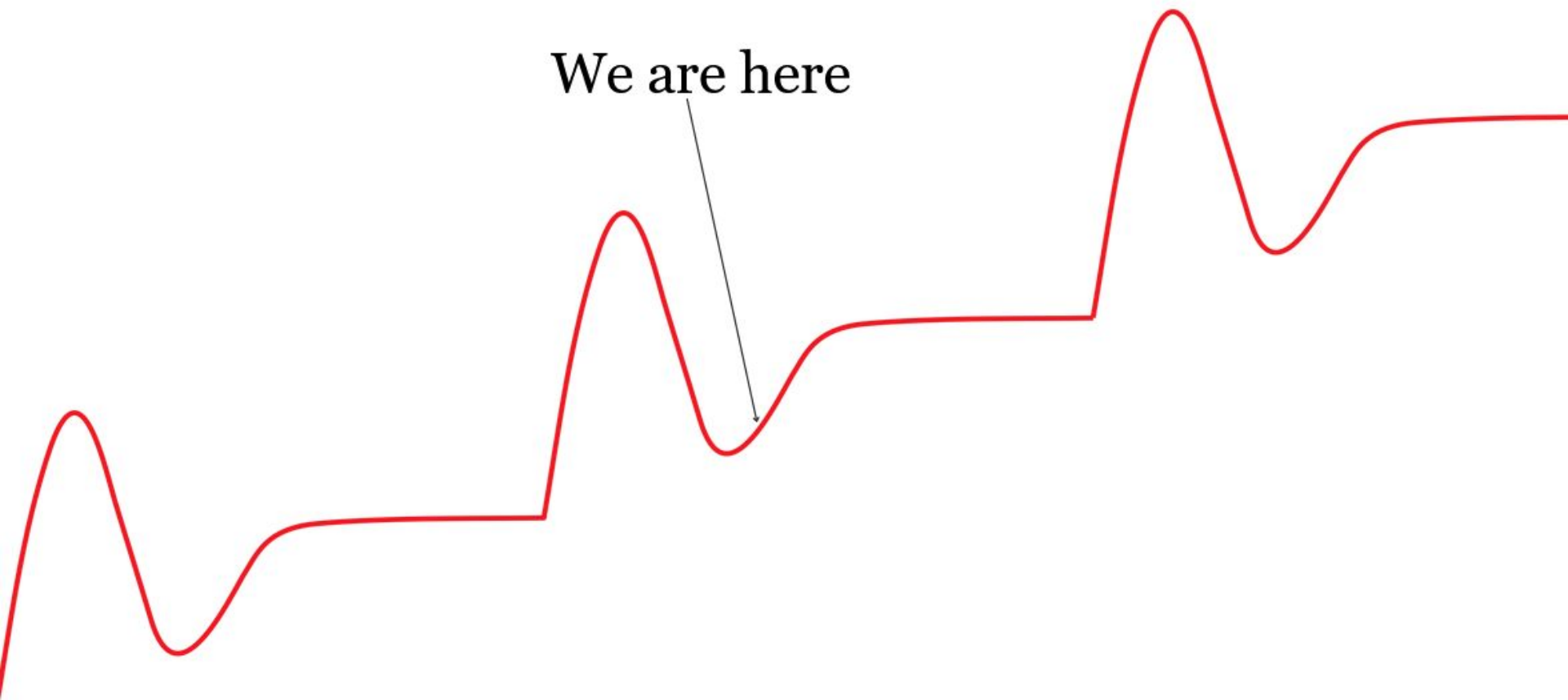
Thank you

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