ICRA
IEEE INTERNATIONAL CONFERENCE ON ROBOTICS AND AUTOMATION

2026 VIENNA

Investing in Robotics

How to Judge, What Breaks, What's Hot

ellipsis

Workshop Sponsor - ATEC 2026
AI and Robotics Real-World Extreme Challenge

Women In Robotics

Introduction

09:00

Robert MacKenzie (Dr. sc ETH Zurich)

Technology Company Builder & Investor

20+ Years

- Venture Partner, Ellipsis Venture
- CPTO, ANYbotics (Autonomous Robots)
- CPTO, Labster (3D Digital Education)
- Sr. Product Lead, Hocoma (Robotics, Medical)
- …
- Doctorate, ETH Zurich

ETH zürich · Hocoma a DIH brand · Labster · ANYbotics · ellipsis

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Pre-Seed	EU, US	$30+M
State	State	Fund

250k-1.5 m	15	1
Tickets	Investments	Exit

a16z NORTHZONE KLEINER PERKINS

GENERAL CATALYST IQ CAPITAL COTA CAPITAL

Co- and Follow On Investors

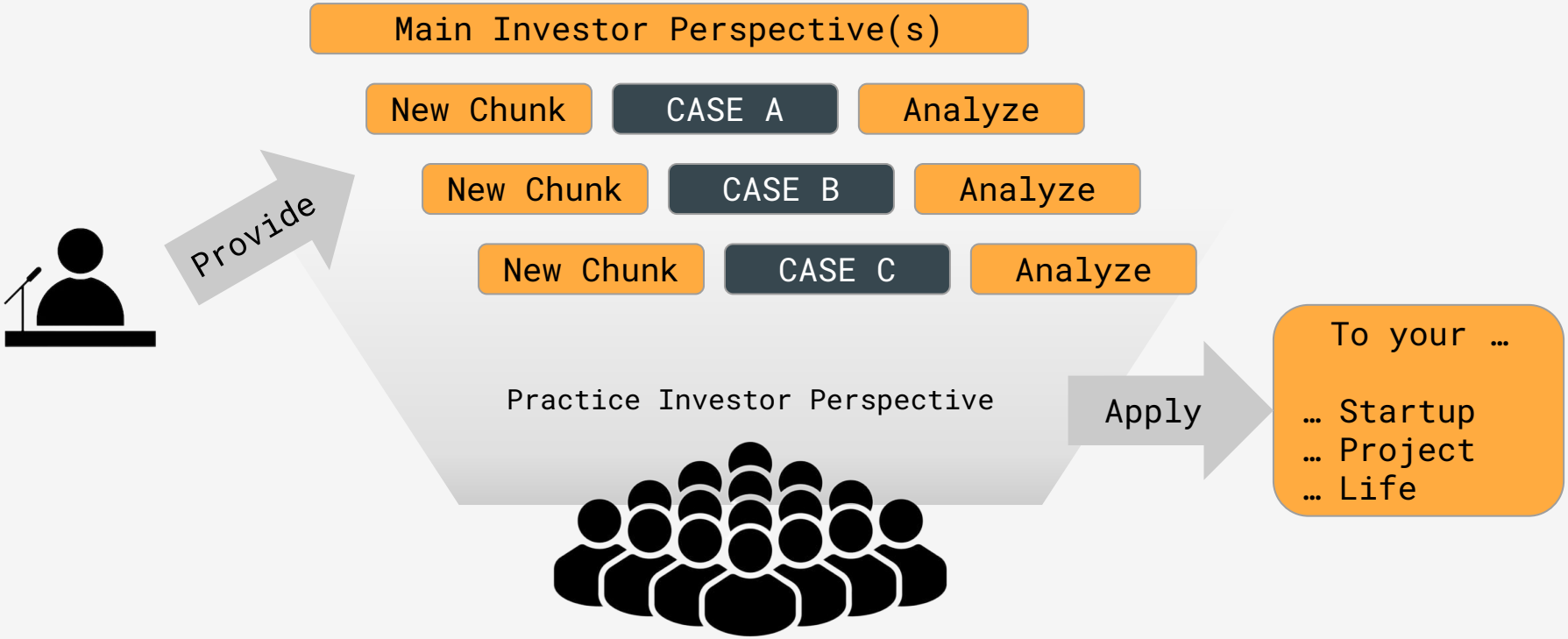
Workshop Goal

By exploring an investor’s view of robotics YOU become better equipped for building (or investing in) robotics companies.

& Outcomes

- Framework(s) for evaluating robotics ventures
- Insights into potential failure modes of robotics companies
- Explore emerging opportunities

Workshop Flow



Contributing Startups

Bleu Robotics
Benoît Berkoukchi, CEO

Collective Robotics
Henry Hickson, CTO

TUMI Robotics
Francisco Cuéllar Córdova, CEO

Startup companies were selected from a list of applicants wishing to contribute to this workshop.

Workshop Leaders

Women In Robotics

Kateryna Portmann
Presenter, Q&A

Ayla Watsuji
Slides, Q&A

ellipsis

Dr. Robert MacKenzie
Presenter, Moderator

robert@ellipsis-venture.com

Participation!

Work and submit in any mode:

Individually

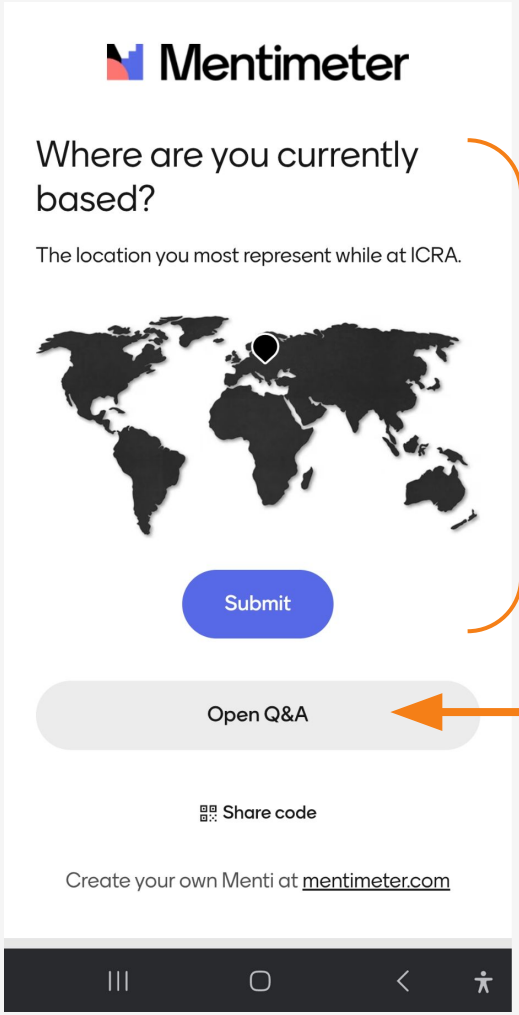
As a Group

Work Together,

Submit Individually

Participation!

https://www.menti.com/
Code: 8884 2733



Active Task

Ask Questions
At Any Time

Warm Up Case

09:10

Levtek


Vehicle mode
Collaborative mode
Autonomous mode

Warm Up: Levtek (www.levtek.io)

Product: Cognitive ride-on robots with payload

Problem/Aim: Move people and things across large facilities, quickly, safetly

Product Readiness: Prototype TRL 6-7 in pilot testing

Main Market: Europe (to start)

Main Customers: Warehouses, manufacturing logistics, large facilities e.g. IKEA, potentially last-mile delivery e.g. delivery companies

Business Model: Sell the basic robotic system, plus monthly fees for the intelligent software layer and updates

Margin: 50-75% combined gross margin

Levtek

Some fun extras

Our first solution, Cognitive ride-on robots

Utility robot for moving people, equipment and goods.

AI for reasoning and imitation learning.

Cost effective, mass producible.

Sensors	Actuators	Compute
Vision + LiDAR	Multiple options	100+ TOPS

Weight	Max load	Range	Top Speed
30 kg	220 kg	30 km	35 km/h

ATEC 2026 — *AI and Robotics Real-World Extreme Challenge*

09:20 - 09:30

Investing in Robotics

How to Judge, What Breaks, What’s Hot

09:30

Structured Scorecard

Scoring Key

0	1	3	5
Fulfills **none** of the criteria	Fulfills a **minority**	Fulfills a **majority**	Fulfills **all or exceeds**

Staged Evaluation Gates

Main Question / **Criteria**	**Weight**	**Initial** 30/50 (Target > 60%)	**Expert** 38/50 (Target > 75%)	**Final** 45/50 (Target > 90%)
Do the fundamental round dynamics fit our thesis? ▪ Pre-Seed / Seed ▪ Europe, North America ▪ 250k to 1.5m USD ticket	20%	3	3	
Is the team excellent? ▪ Demonstrate impression execution ▪ Able to learn (the right things) ▪ Perseverance, have clear reasons to overcome challenges	25%	3	5	
. . .	. . .			

Simple ellipsis Robotics Criteria

Pragmatic Robotics

Company/team can complete the product!

A few valuable jobs done 99+% well

Not dependent on multiple breakthroughs

Obsessed with operating & learning in REAL WORLD

One Solution in More Than 1 Vertical

Vertical integration

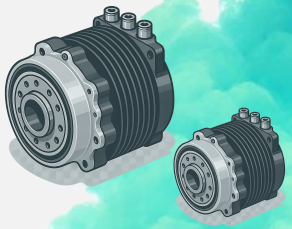
Only 1 vertical is seen as risk (for many VCs)

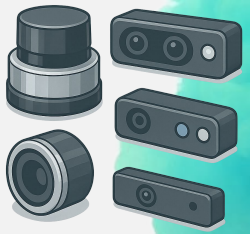
HW & SW Revenues

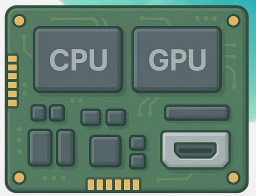
Revenue per job done (robots earn salary)

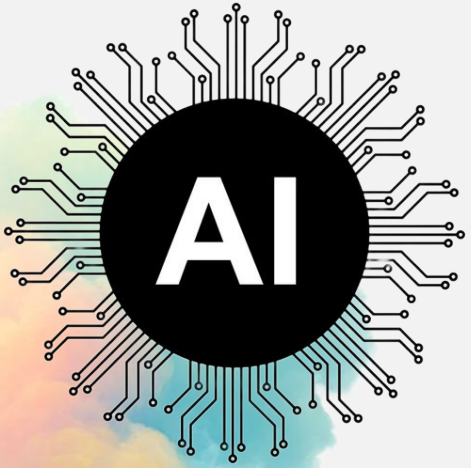
Healthy margins
HW-only often too low

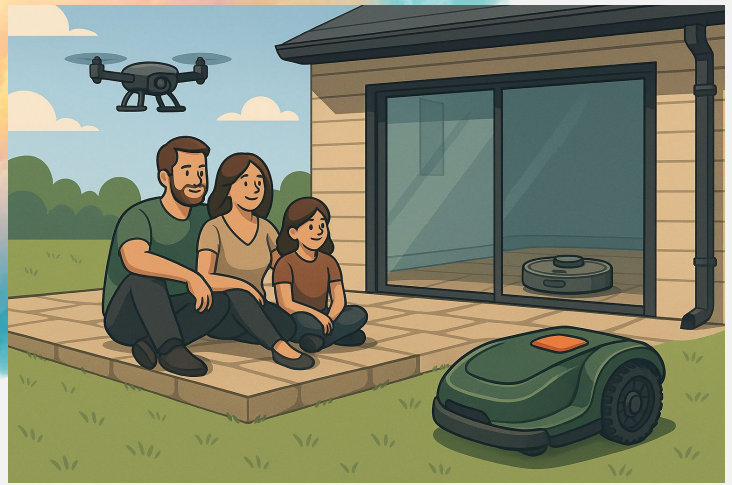
Robotics: Why the excitement?



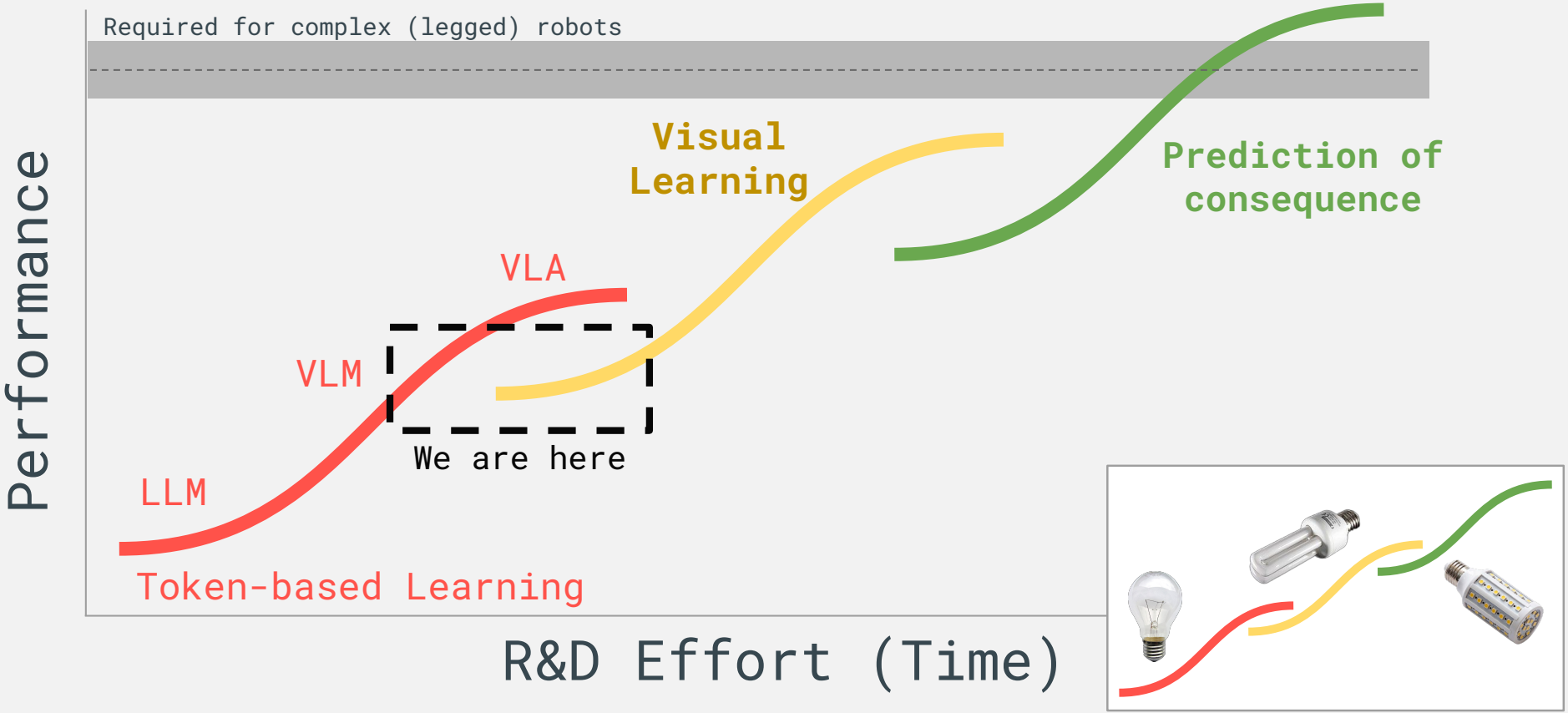




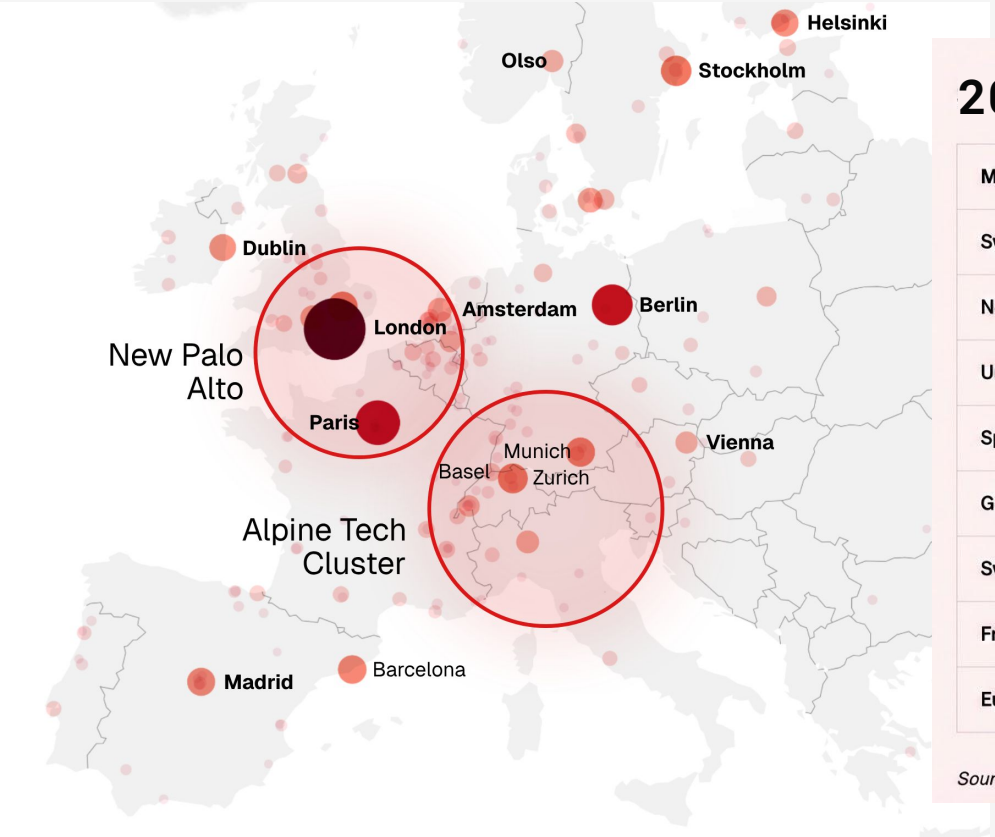




AI: Tipping Point of new Technology Window



European Clusters: Deep Tech Zurich/Munich

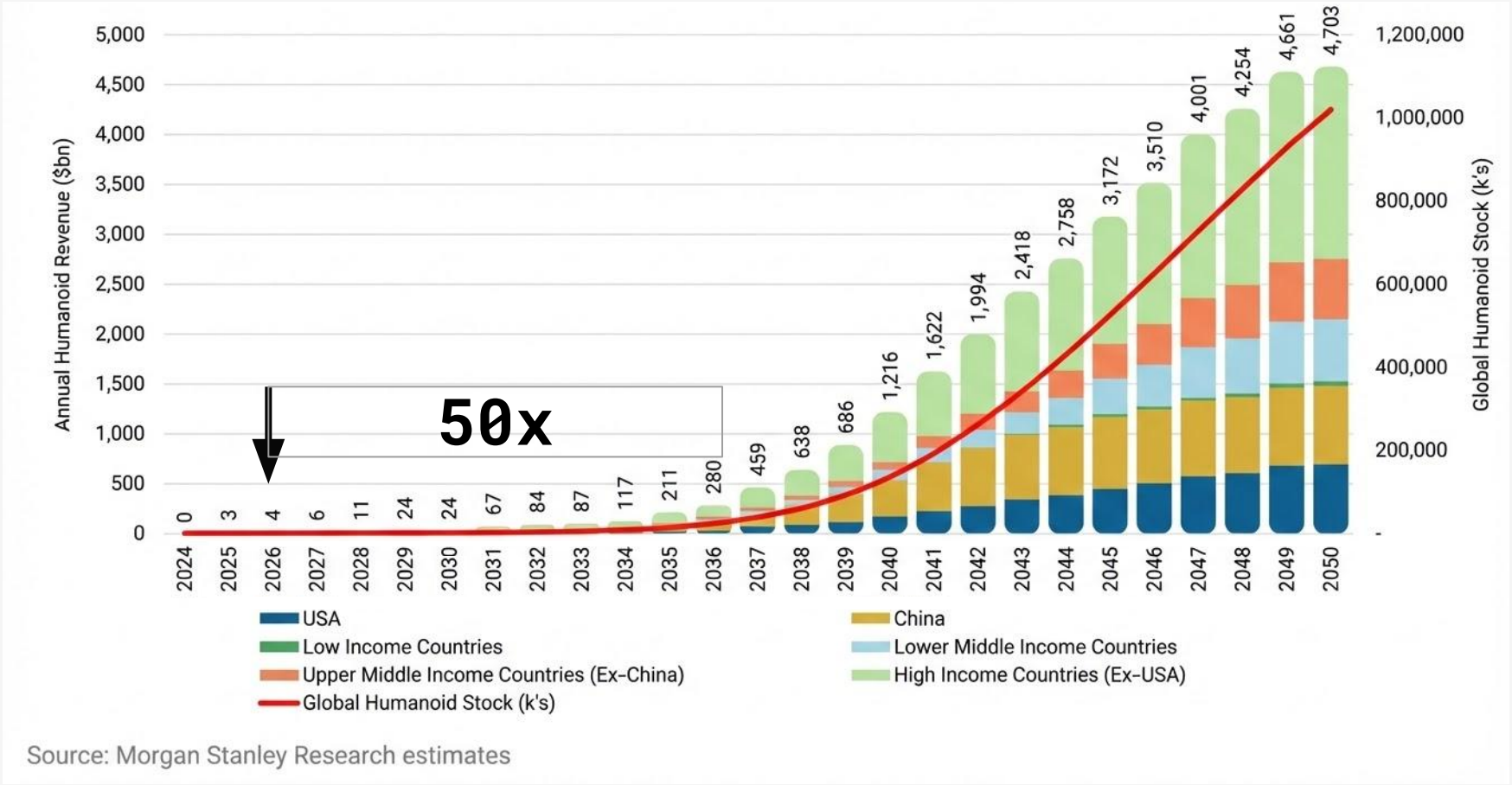


2025 Venture Growth Rate

Market	Growth Rate (YoY)
Switzerland	+23.9%
Netherlands	+14.2%
United Kingdom	+7.8%
Spain	+4.3%
Germany	-2.1%
Sweden	-8.5%
France	-11.7%
Europe (Avg)	+6.5%

Source: Pitchbook 2025 Annual European Venture Report (only markets with over $2B p. annum)

Global Humanoid Revenue Projections



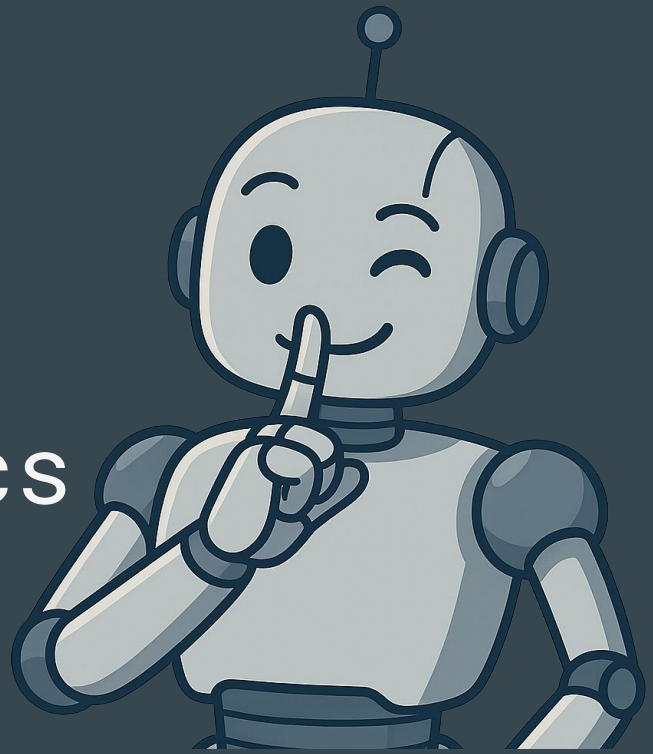
Source: Morgan Stanley Research estimates

Investor Perspective: Investments have increased as hype 🤩 and capital 💰 are high.

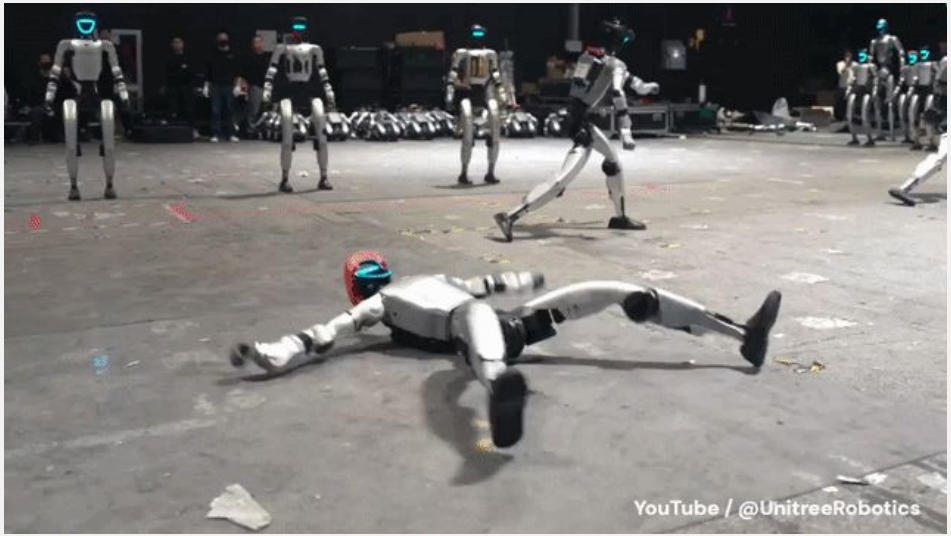
Prediction: Entering a Golden Age, and a corrective dip is coming…

… because robotics is more complex than most investors realize.

There is still a massive “hidden” complexity in robotics & robotics companies.



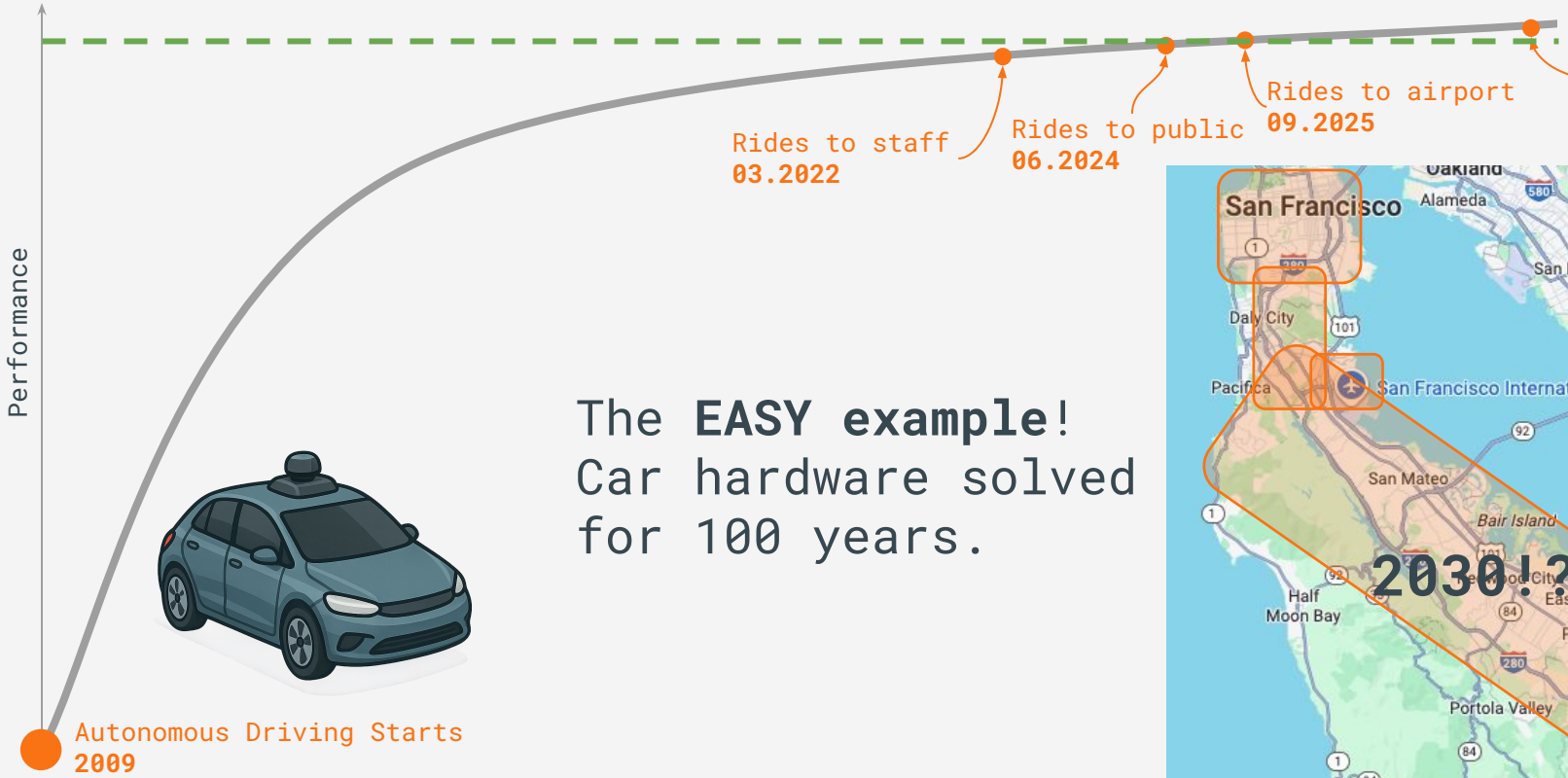
Aren’t robots already incredible?



Valuable in Entertainment only

Movement ≠ Work

Where is the complexity?



The **EASY example**!
Car hardware solved
for 100 years.

Where is the complexity?

Complexity MASSIVELY shifts with:

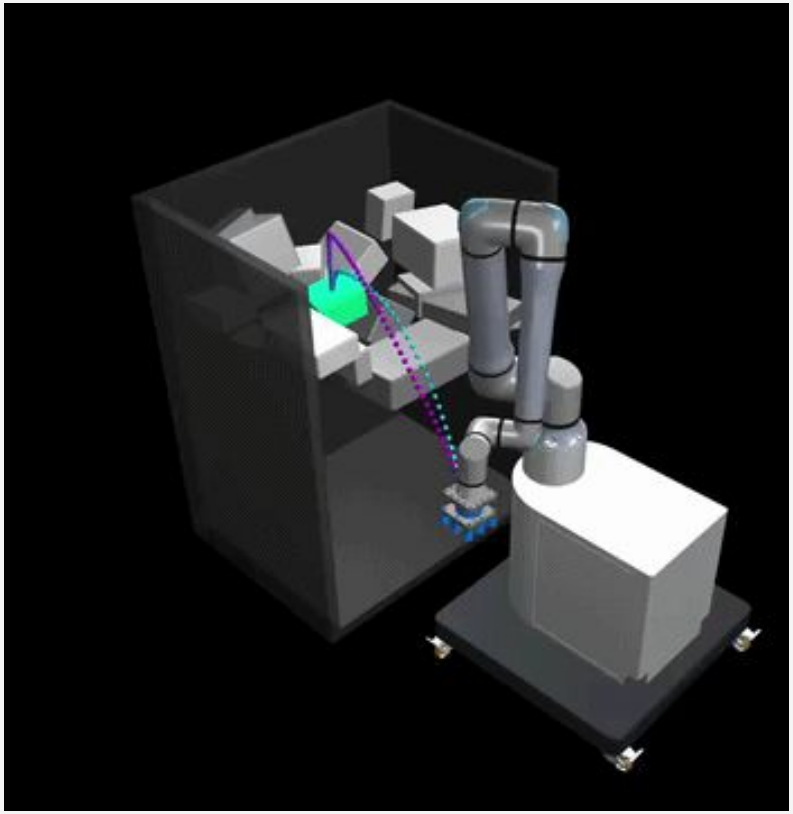
- unstructured environments
- The job / use case
- standards e.g. explosion proof

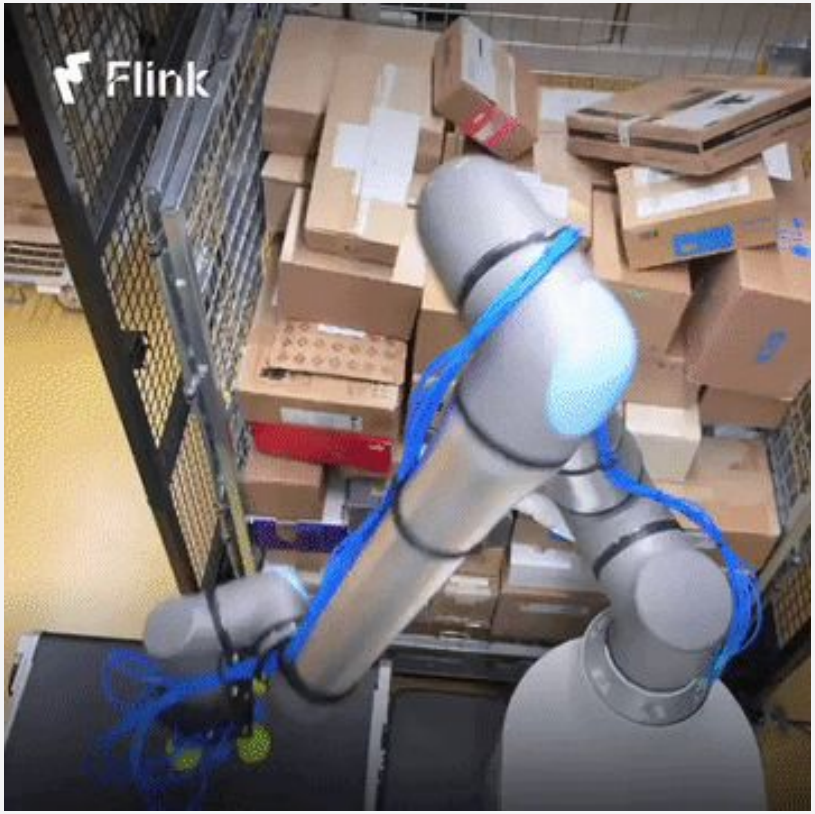
Complexity

"**RE**-Maturing"

Maturing

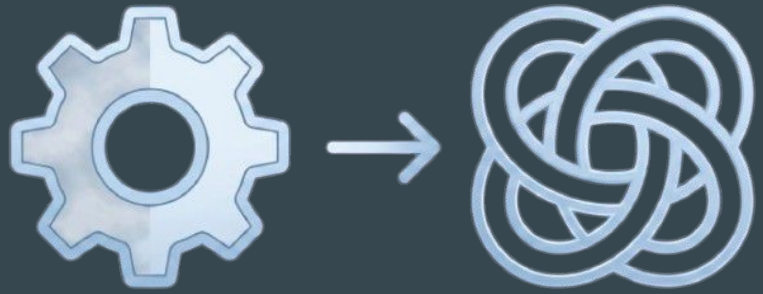
Robots doing work “intelligently”





Still incomplete / impossible?

1. **Understanding surroundings**
2. **High-level reasoning & planning**
3. Truly reliable learning transfer
4. Complex (mobile) Manipulation
5. Dexterous hands & tactile sensing
6. Power for long-term autonomous operation
7. Multi floor operation with certification e.g. ATEX



Developing a **complex product** increases the risk of becoming a **complex company**.

Pure Software

Company Complexity

Product Development

"Software" - Data, AI Models, Software Architecture, UI/UX, Web Applications, APIs, Server/Cloud

Testing & Security

Deep Tech!

Company Complexity

Full Product Development

Robotics Breakthroughs!

"Software"
Data, AI Models, Perception, Motion Control, Observability, Architecture, Firmware, Middleware, UI/UX, Web Applications, APIs, Server/Cloud

"Hardware"
Systems Engineering & Design, Actuation, Sensors, Power Systems, Mechanical & Electrical Architecture, Test Fixtures

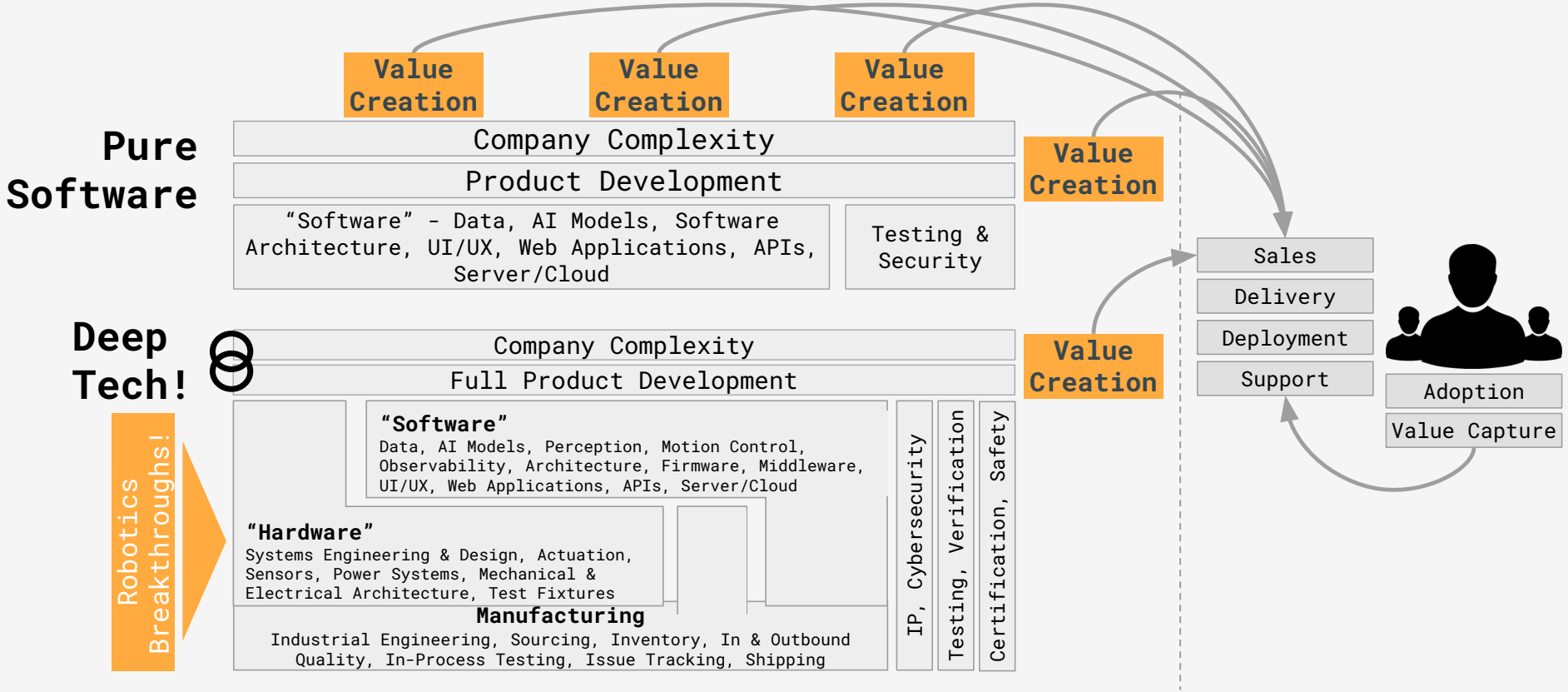
Manufacturing
Industrial Engineering, Sourcing, Inventory, In & Outbound Quality, In-Process Testing, Issue Tracking, Shipping

IP, Cybersecurity

Testing, Verification

Certification, Safety

Robotics: Only Full Product = Real Revenue

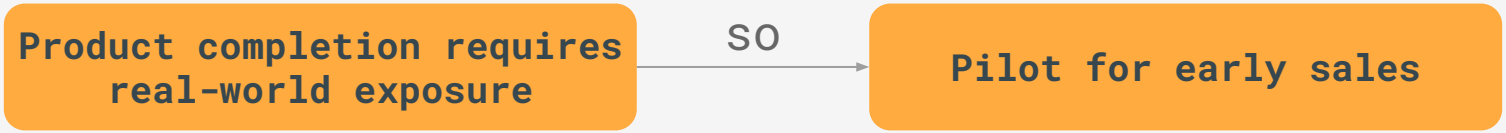


Robotics Scaling

Sell Like Hell

Build Great Tech

Everybody knows…



Almost nobody knows how to pilot well at a company level!

Robotics: Danger of Premature Commercialization

Pushed by C-level Founders & Investors...

- A sales team is hired too early.
- Pilots are sold to customers expecting a product. The product isn't reliable enough.
- Failures appear in real-world use. The right learning mechanisms aren't established. Insights flow through a sales lens. Pilots accumulate without increasing understanding.
- A customer-facing layer is introduced to handle those failures. Engineering is pulled into reactive work. Resources shift from resolving fundamental issues to managing symptoms.
- The cost structure expands. Sales and customer functions consume capital required to complete the product.
- Conflicting pressures emerge. Sales is told to push harder. Engineering is told to deliver faster. Neither can resolve the underlying issue.
- Leadership bandwidth is consumed by crisis management. Focus is placed on optimizing the product roadmap instead of meaningfully re-visiting the company strategy and plan.
- Core issues remain unresolved or are resolved slowly. Resource burn is high. Complexity compounds faster than the organization can absorb it.

This is not a sales problem.

It is not an R&D problem.

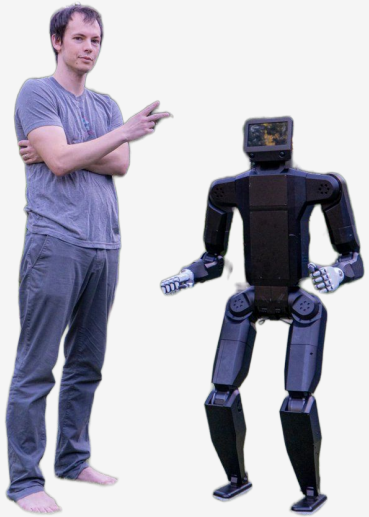
It is a sequencing problem at the level of **company leadership**.

Investor Perspective: Companies are commercializing complexer robotics systems; many are rushing.

Prediction: A surprising number of companies will “soon” fail.

- Products won’t fulfill promise.
- Business models won’t work
- Funding will stop for many.

k-scale labs



Open Source Humanoid

$1M preorders

Couldn’t secure investment

Shut down November 5.2025

Sell the dream before finishing the product

1x Neo - Launch Video (October 28.2025)

- 20,000 USD (or 499 USD per month)
- Wants/needs “all” data from your home

Behind the Scenes

! Huge full autonomy gap
Historical Privacy Swap
Robotics ≠ Web Apps
Raas ≠ SaaS

Sell the dream before finishing the product

Figure 03 & Helix (February 2026)

Robotics Scaling: Smarter Staging!

Performative Commercialization

Structural Commercialization

Product-minded business development

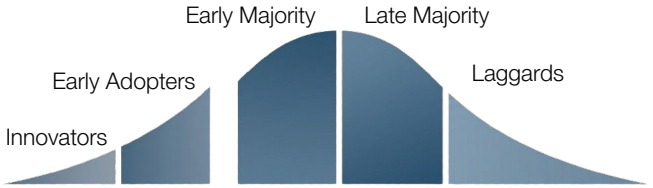
Conscious market interaction

Partner customers

Learning goals & mechanisms

Build Great Tech

Structural Commercialization



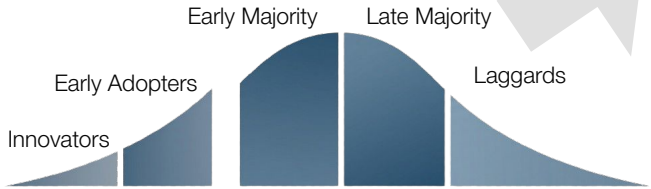
Performative Commercialization

Structural Commercialization

Build Great Tech

0 1 2 3 4 5 6 7 8 9

Technology Readiness Levels



Sell Like Hell

Build Great Tech

0 1 2 3 4 5 6 7 8 9

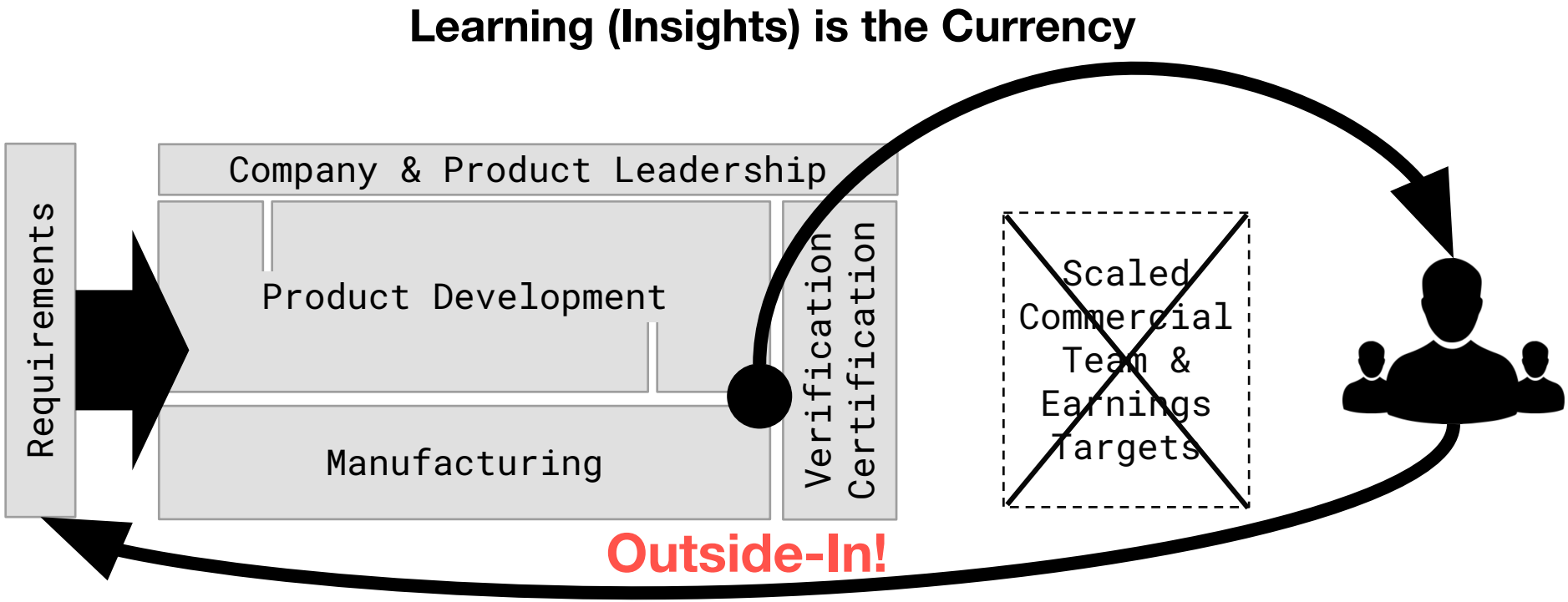
Technology Readiness Levels

Structural Commercialization

DEPLOY! Agree with investors on a “Learn over Earn” phase.

Don’t scale and resits “sales” until your robots are boringly reliable, even in new environments.

Learn Over Earn



Investor who
knows their s%3t

Investor Perspective: Almost all robotics founders underestimate the journey ahead.

Pragmatic Robotics

Operational Knowledge: Company/team can complete the product!

Focused: One/few valuable jobs done 99+% well

Real: Obsessed with operating & learning in REAL WORLD

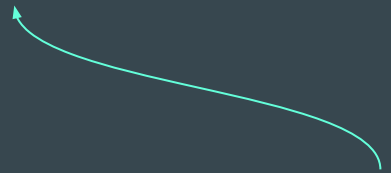
Healthy Ambition: Not dependent on multiple breakthroughs

BOM
Bill of Materials

COGS
Cost of Goods Sold

Margin

Your **combined gross margin** is decided at the design table, not the negotiating table



A strong robotics VC can read your company from the BOM

VC Grade BOM, COGS, Margin

BOM

Every cable, actuator, connector, fastener, with supplier, quantity, and lead time

COGS

BOM x 1.4

Budget extensively for assembly and test time

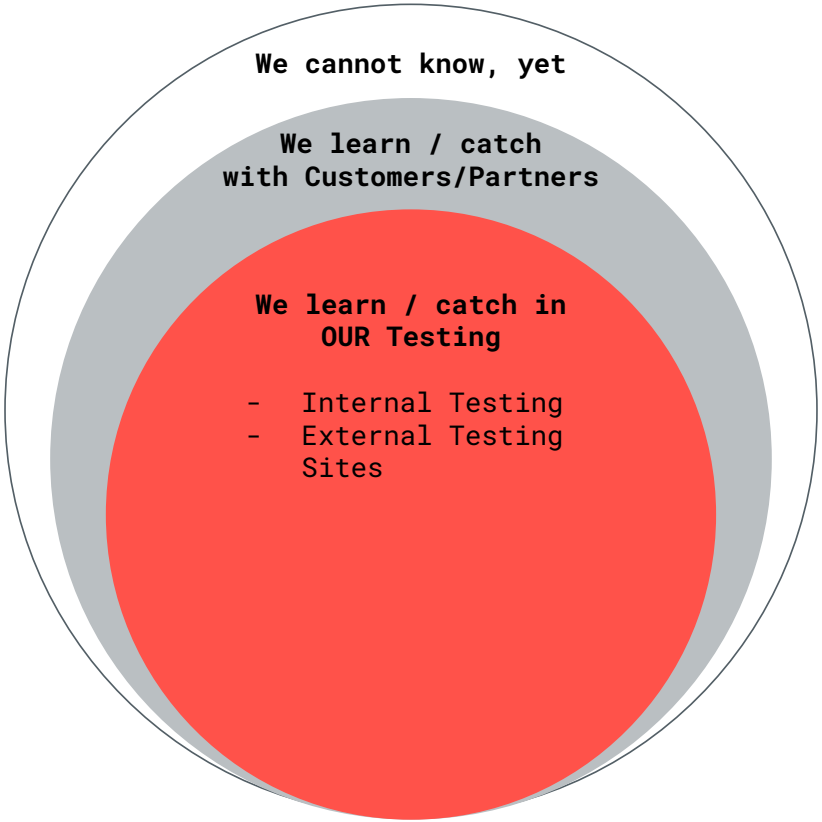
40-60% Margin

Real Agreements with PRICING showing **2.3 - 3.5 x BOM**

Careful

- Lowering the BOM can raise COGS (e.g. difficult assembly, repair)
- Design Freeze isn't real until 99.9% verified reliable
- BOM isn't real until DESIGN FREEZE

Ingredients for a solid “Systems Design Freeze”

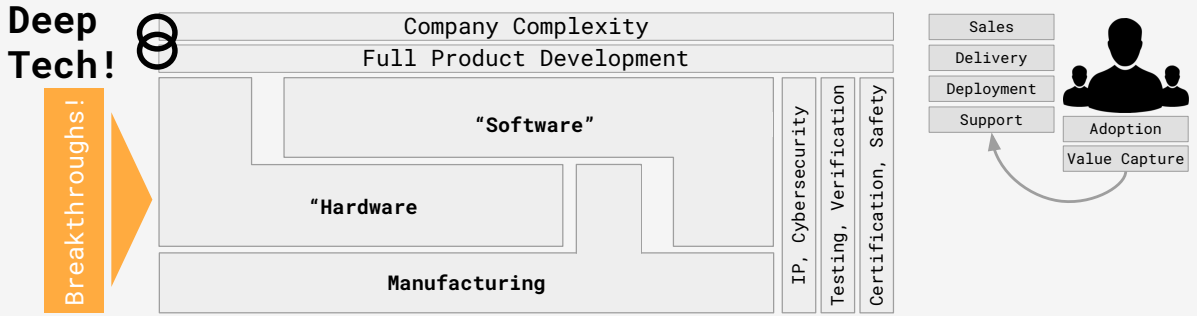


- **Push Product Beyond Known Limits**

- Every Issue Becomes INTERNAL Test
- Outside-In Performance Metrics

- Engineers don’t self-verify
- Strong Systems Engineering
- Design for Manufacturability DfM
- Robust internal test suite
- Common issue / deliverable rating - R&D, Field Teams, Manufacturing
- Everyone learns to deploy
- Tools exist to learn from deployments

DeepTech: More Phases Than You Know



Product Complete (TRL 9) → Doesn’t Guarantee → **Value Creation & Capture** → Doesn’t Guarantee → **Return on Investment**

- Lack resources & capability for the adoption journey
- Competition faster, captured accessible market
- New technology changes the rules

- Business model broken
  - Pricing
  - BOM (Bill of Materials) and COGS (Cost of Good Sold) eat margins
  - Fundraising mistakes

Manufacturing Quest

Top sourcing, trained staff, professional production quality, production partner, large budgets

100 identical “for sure”

Frozen system design, built by staff, needs in-process quality control

10 “the same”

5 “similar”

Emergent sourcing, still built by experts

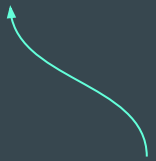
1-3 prototype “somehow”

Many parts, skilled engineers

99% is not enough

99% vs 99.999%

Robot falls downs the stairs 1x per week



“All” real value created here

Examples of 99.9%

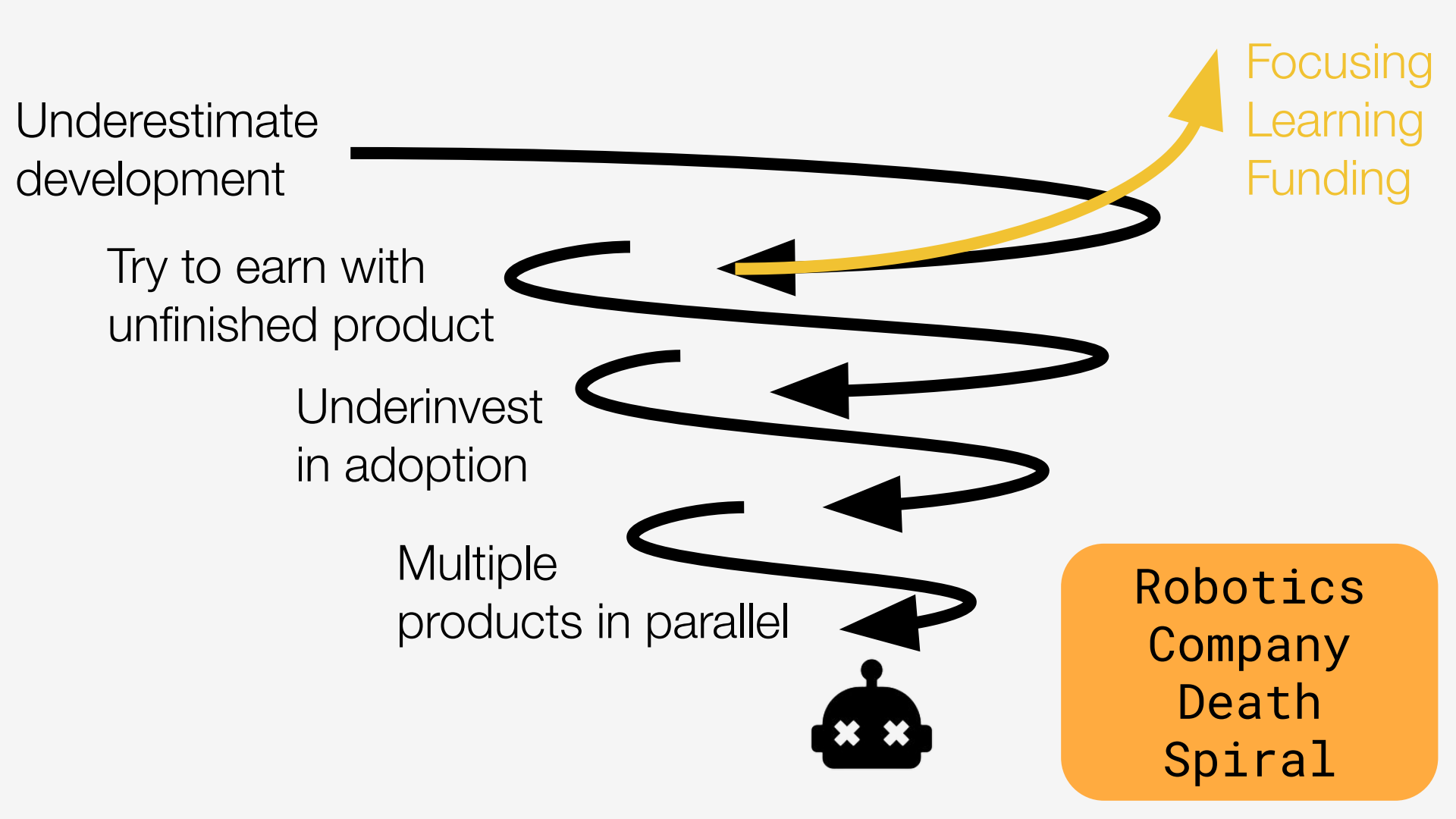
ANYbotics ANYmal

06.2021 - 95%

2.5 Years

02.2024 - 99.9%

Europe's **margin of error is smaller**.
Product and company mistakes compound.


Underestimate development
Try to earn with unfinished product
Underinvest in adoption
Multiple products in parallel
Focusing
Learning
Funding
Robotics Company Death Spiral

Investor Perspective: All investors want you to succeed. Few know how to help in robotics.

Prediction: Capital will shift from megarounds into deployment financing and revenue based contracts.

Top 7 Robotics Funding Rounds in 2026 (to date, May 27, 2026)

Waymo
Icom | Series D

$16B

Feb | USA

Skild AI
Series C

$1.4B

Series C

Country

Jan | USA

Wayve
Series D

$1.2B

Country

Feb | UK

NEURA Robotics
Series C

~$1.2B

Robotics

Mar | GER

AMI Labs
Brain

$1.03B

Seed

Country

Mar | FRA

World Labs
Undisclosed

$1B

Undisclosed

Country

Feb | USA

Apptronik
Series A-X

$520M

Series A-X

Robotics

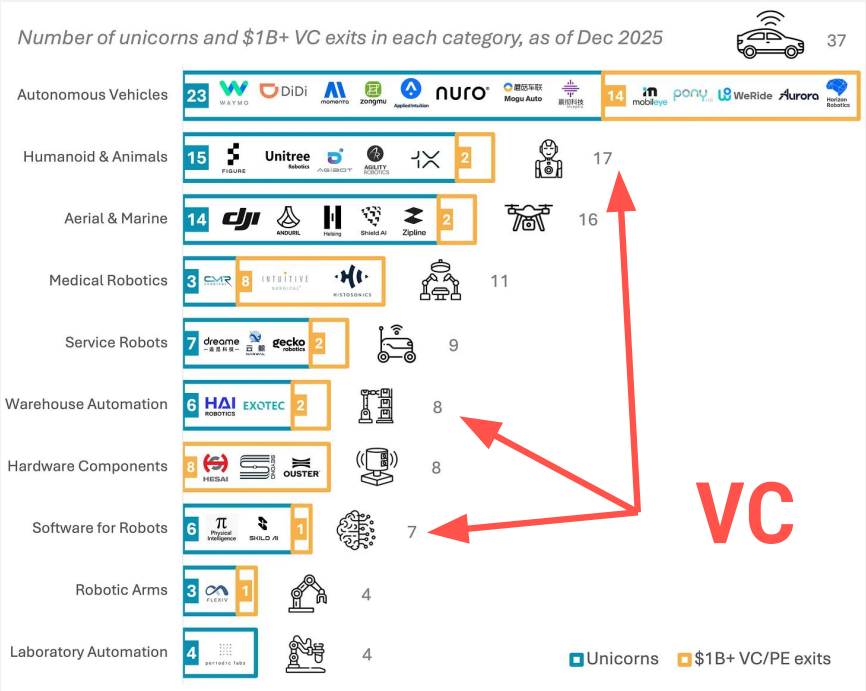
Feb | USA

FLEXION ROBOTICS

$51M (2025)

ellipsis Venture

Hottest Robotics Segments (VC, PE)



Valuation Upside

Area	Market Size (TAM), $B 2025	2030	2035	2050	Scalability	Moat	Valuation Upside (2030 -> 2035)
Autonomous Vehicles	70	2[illegible]	1000+	**5000+**	Moderate	High	$100B -> **$500B+**
Humanoids & Animal Robots	<[illegible]	[illegible]70		**5000+**	High	Moderate	$10B -> $100B+
Unmanned Aerial & Marine	35	60	150	~500			$100B -> $200B
Medical Robotics	22	45	155	~300	Moderate	**Massive**	$20B -> $100B+
Service Robots	15	[illegible]	400	**~1000**	Moderate	Moderate	$30B -> $100B+
Warehouse Automation	25	55	200	~300	High	Moderate	$50B -> $100B+
Hardware Components	40	[illegible]	500	**~1000**	High	Limited	$10B -> $100B
Software for Robots	10	30	200	~300	**Massive**	Limited	$50B -> $100B
Robotic Arms	35	65	140	~300	High	Moderate	$10B -> $50B
Laboratory Automation	10	15	35	~100	Moderate	**Massive**	$10B -> $100B

70x

5000x

100x

25x

ellipsis

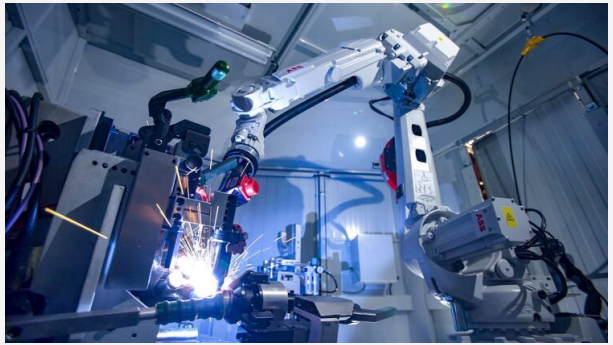
What is already commoditized?

1. Robotic hardware for **industrial** arms, AGVs, drones
   a. Actuators
   b. Sensors

2. **Low-level motion control** (also for legged systems)
   a. NVIDIA Isaac Sim, Reinforcement Learning

3. Navigation technologies for **drones, AGVs** (not yet legged systems)
   a. SLAM, static and dynamic obstacle avoidance

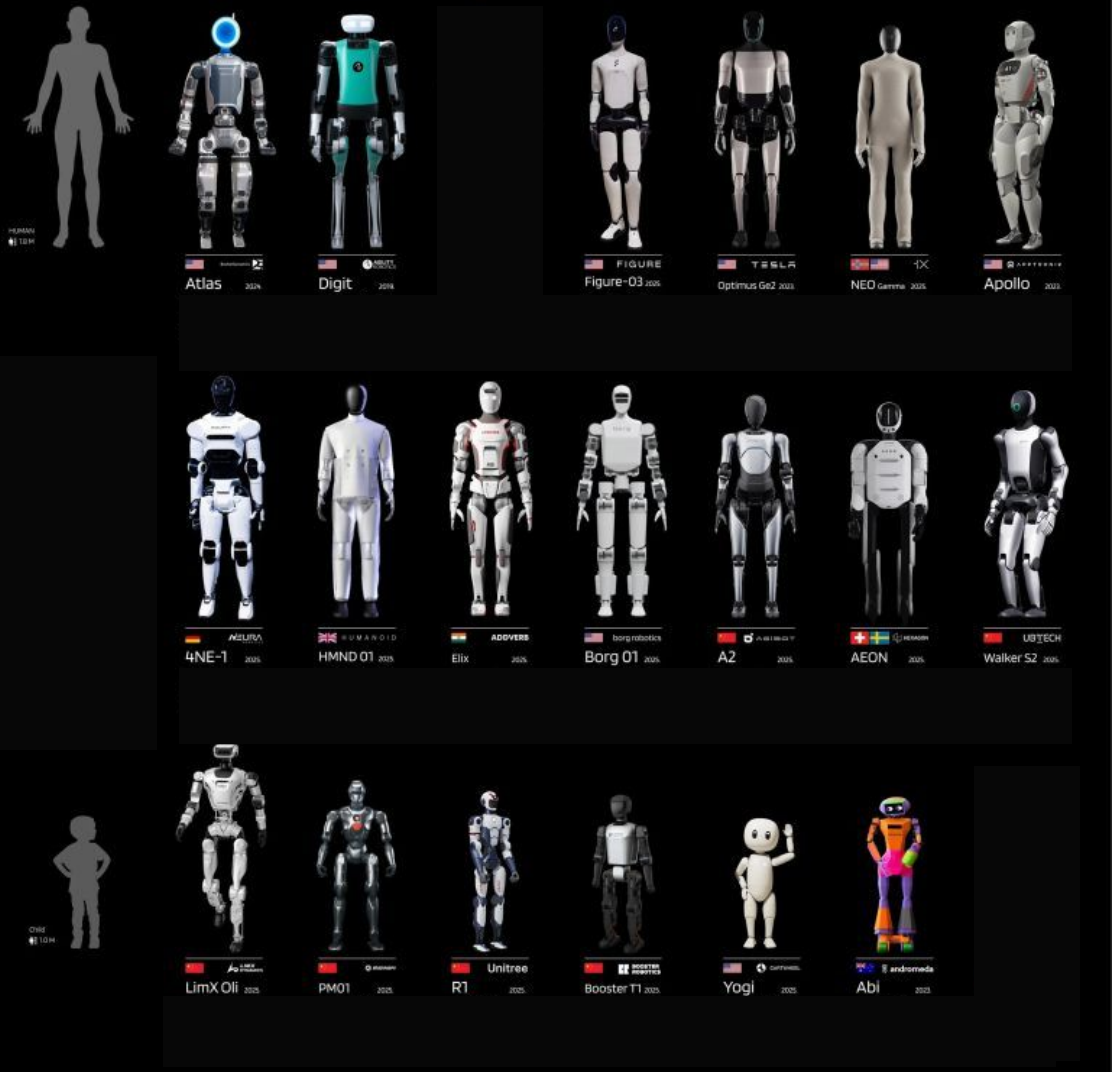
4. **Basic vision models** for simple object detection and recognition
   a. Computer vision, YOLO, etc.



>100 companies building Humanoids

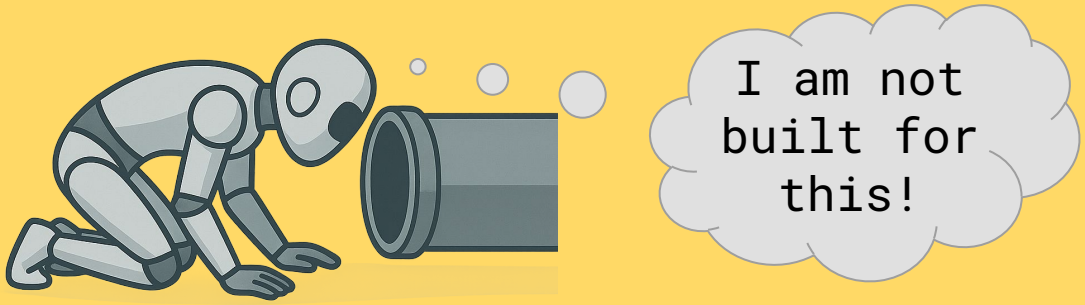
ALL need multiple breakthroughs

< 10 reached “real” pilots



Hype: Humanoids everywhere, soon!

Prediction: Many job-specific robots and humanoids! Long way until real humanoid value.



Job-Specific Robots > Humanoids

Job-Specific Robots > Humanoids

Material Loading/Unloading → Material Transportation → Welding → Assembly → Final Inspection

Simple ellipsis Robotics Criteria

Pragmatic Robotics

Company/team can complete the product!

A few valuable jobs done 99+% well

Not dependent on multiple breakthroughs

Obsessed with operating & learning in REAL WORLD

One Solution in More Than 1 Vertical

Vertical integration

Only 1 vertical is seen as risk (for many VCs)

HW & SW Revenues

Revenue per job done (robots earn salary)

Healthy margins
HW-only often too low

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CASE A

Bleu Robotics

09:55

Challenges of building an autonomous robot

Kateryna Portmann

11:00

CASE B

Collective Robotics

11:20

CASE C

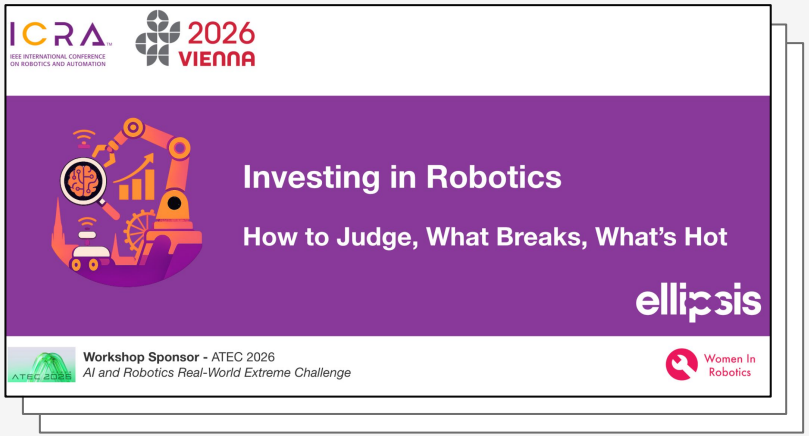
TUMI Robotics

11:45

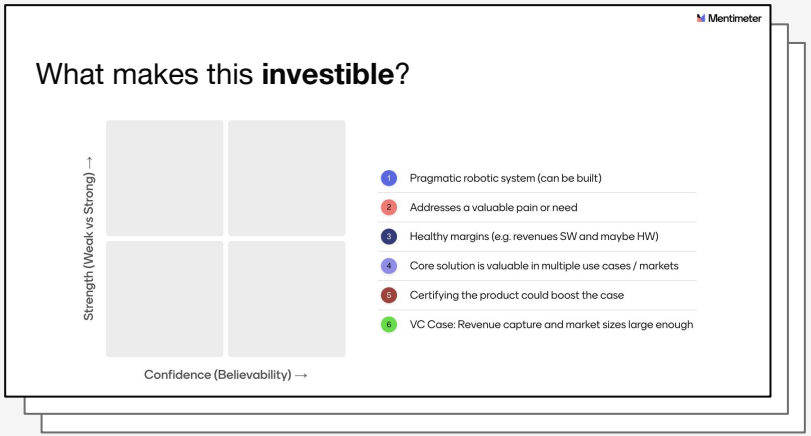
Appendix

12:20

Post-Workshop Package



Robert's Workshop Slides

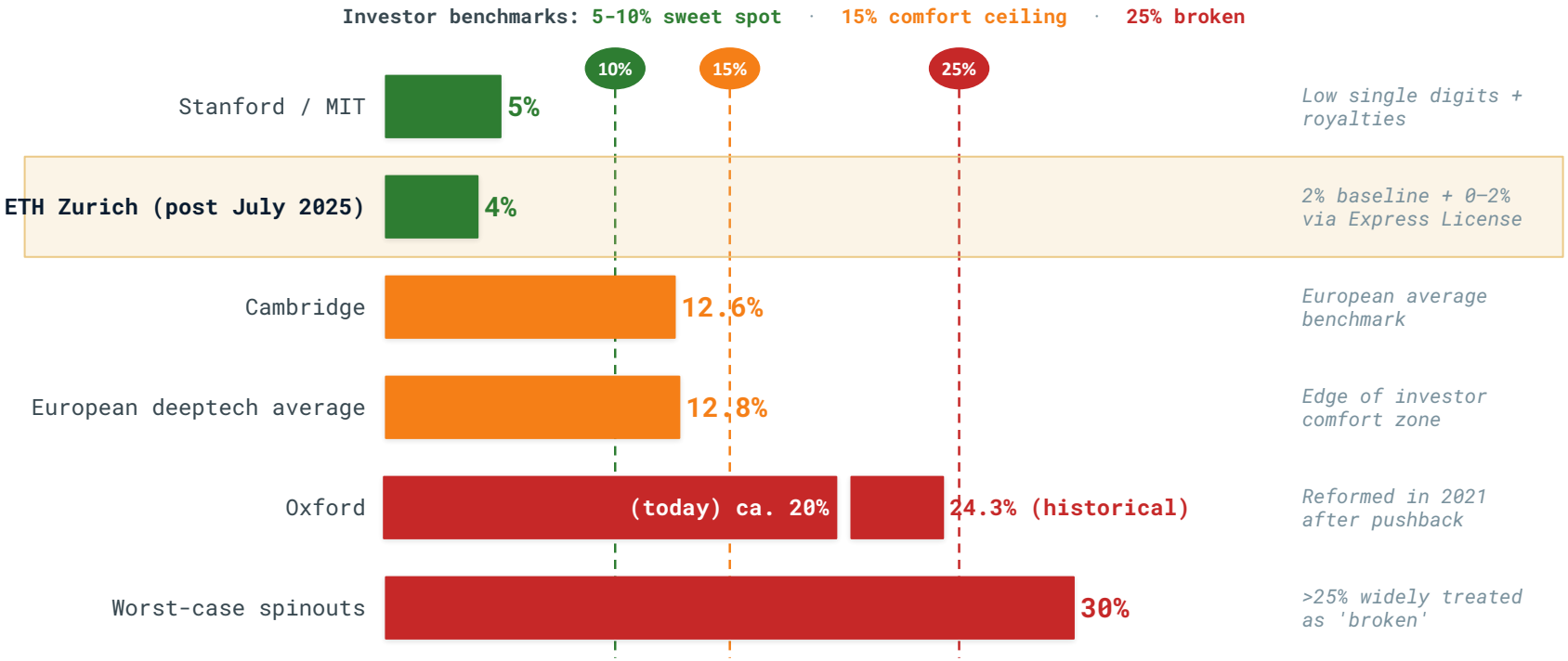


Interactive Results

Bonus: Overview of "good" university equity

How much equity does the university take?

Initial stake at incorporation, before funding rounds



Bottom line: ETH sits in the Stanford/MIT range — far below the European average and worlds away from the historical Oxford profile. This single fact is why ETH spin-offs HAVE BECOME easier to finance than most European peers.

Healthy cap table vs. broken cap table

Rules of thumb: What good looks like

10–15% — **University stake cap**
At incorporation. Above 15% raises eyebrows.

70%+ — **Founders combined**
At incorporation, ahead of 50–70% dilution.

Low single digits — **Professor equity**
Tied to a real role; advisor ≠ co-founder.

10–15% — **ESOP at incorporation**
Defined upfront — never as a forced VC fix.

all dilutable — **Real ordinary shares**
No phantom stock, no anti-dilution carve-outs.

Warning signs – broken cap table

University stake > 15%
Often >25% — VCs treat this as broken.

Non-dilutable shares
Anti-dilution clauses kill downstream rounds.

Passive prof. with > 10%
Equity not earned through ongoing work.

Phantom stock for institution
Opaque, confusing to acquirers.

Founders combined < 60%
Won't survive Series A and B dilution.

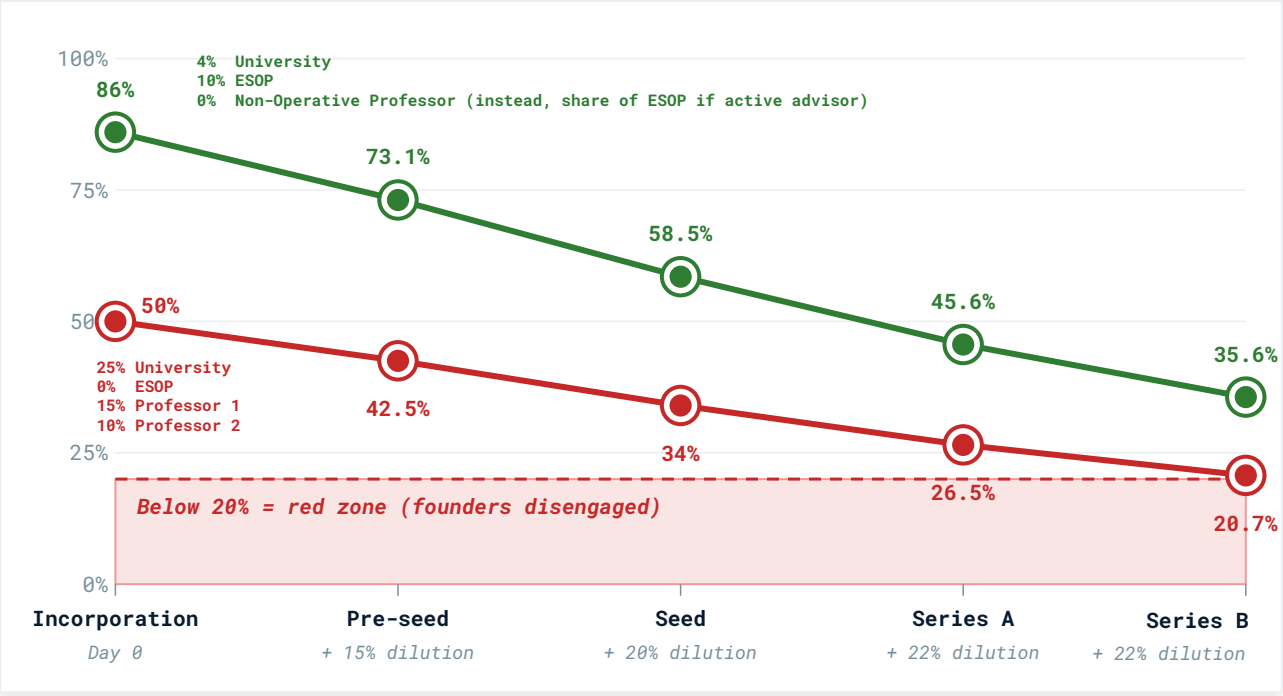
Royalty + equity stacking
High royalties + high sublicense + min payments.

No ESOP defined
Triggers a forced 30–40% pool — pure dilution.

Each red flag alone is survivable. **Two or more in combination is when investors walk away from a deal they like.**

How founder ownership collapses across rounds

Same dilution, two starting points. The line at 20% is where most VCs assume founders are no longer sufficiently incentivised.



Two starting points, two very different exits

ETH/Sandford-style start

Founders 86% at Day 0

→ ~33% at Series B

Founders still meaningfully aligned. Room for follow-on rounds and an acquirer's offer.

Broken start

Founders 50% at Day 0

→ ~19% at Series B

Below the red zone. VCs assume the team will lose motivation through 8–10 years of grind.

The first 5 percentage points matter most. Saving 10% of equity at incorporation translates into a roughly 4% larger founder stake at Series B — and the difference between staying or quitting.

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