

Ten Year Futures

Benedict Evans

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www.ben-evans.com

Ten Year Futures

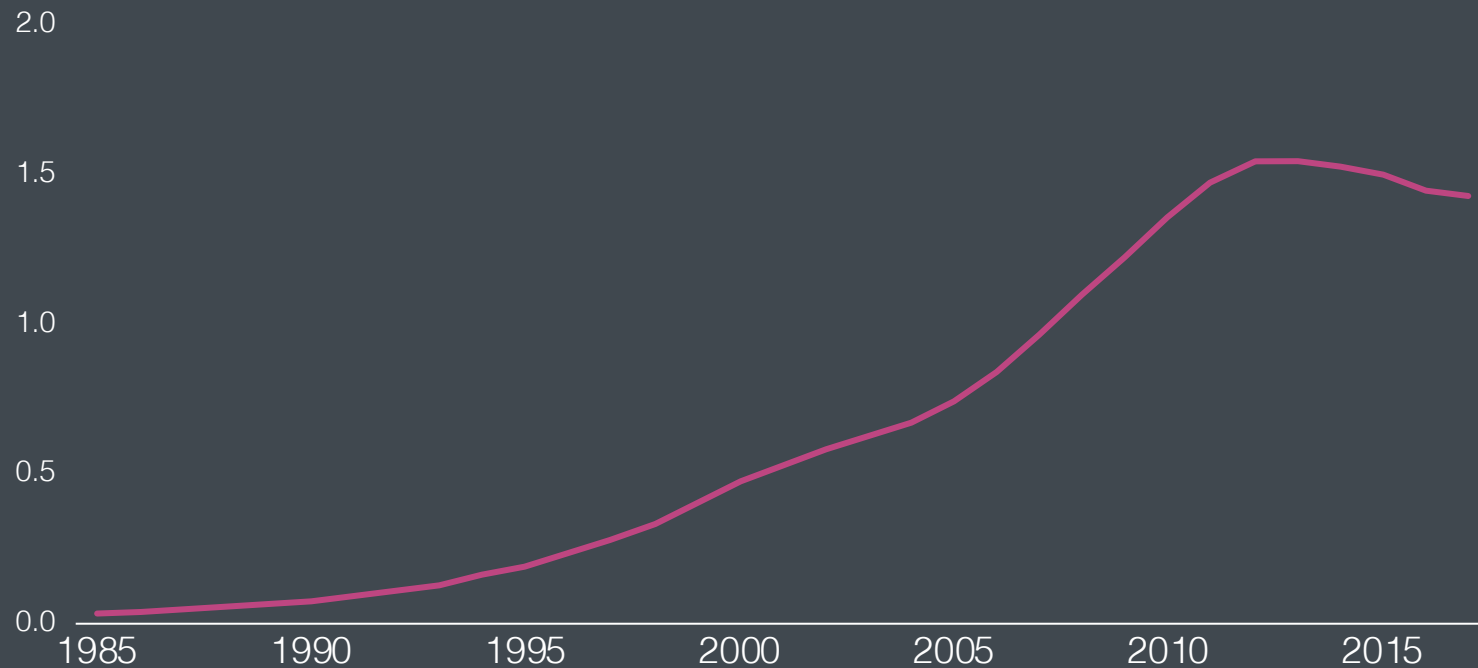
BENEDICT EVANS

Partner

Andreessen Horowitz

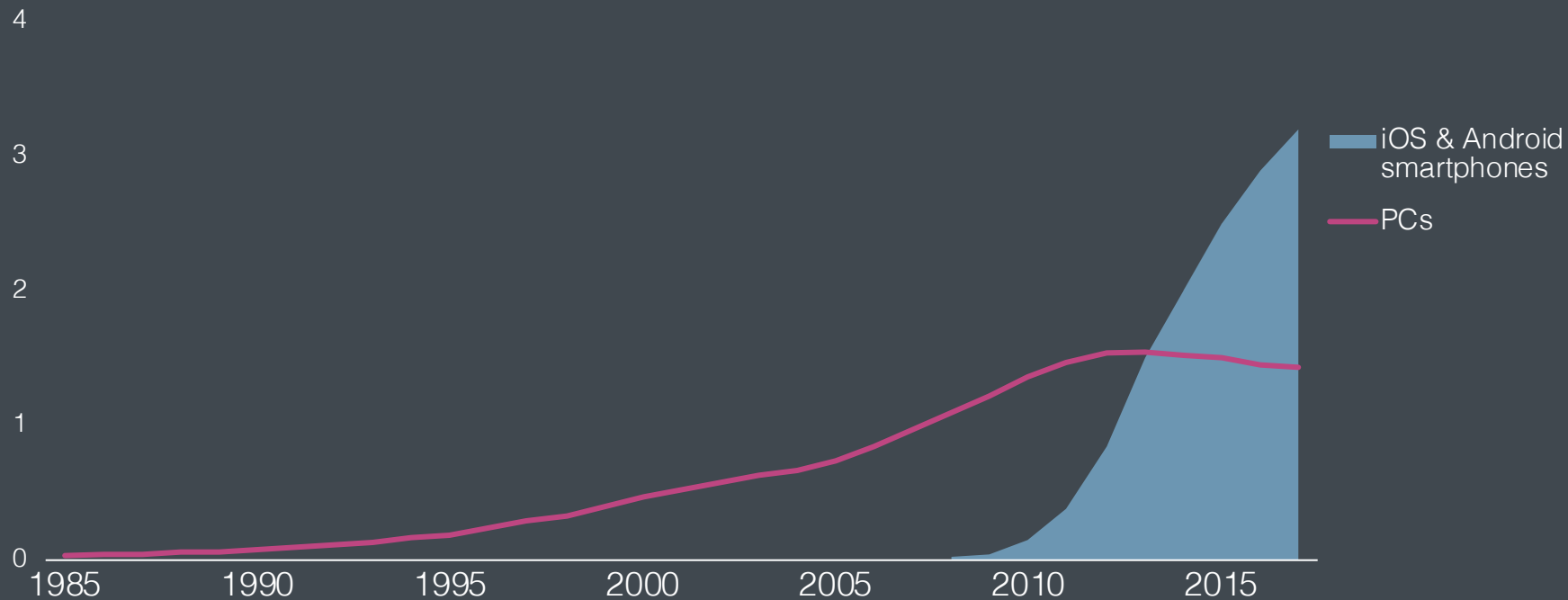
S Curves

Global PC installed base (bn)



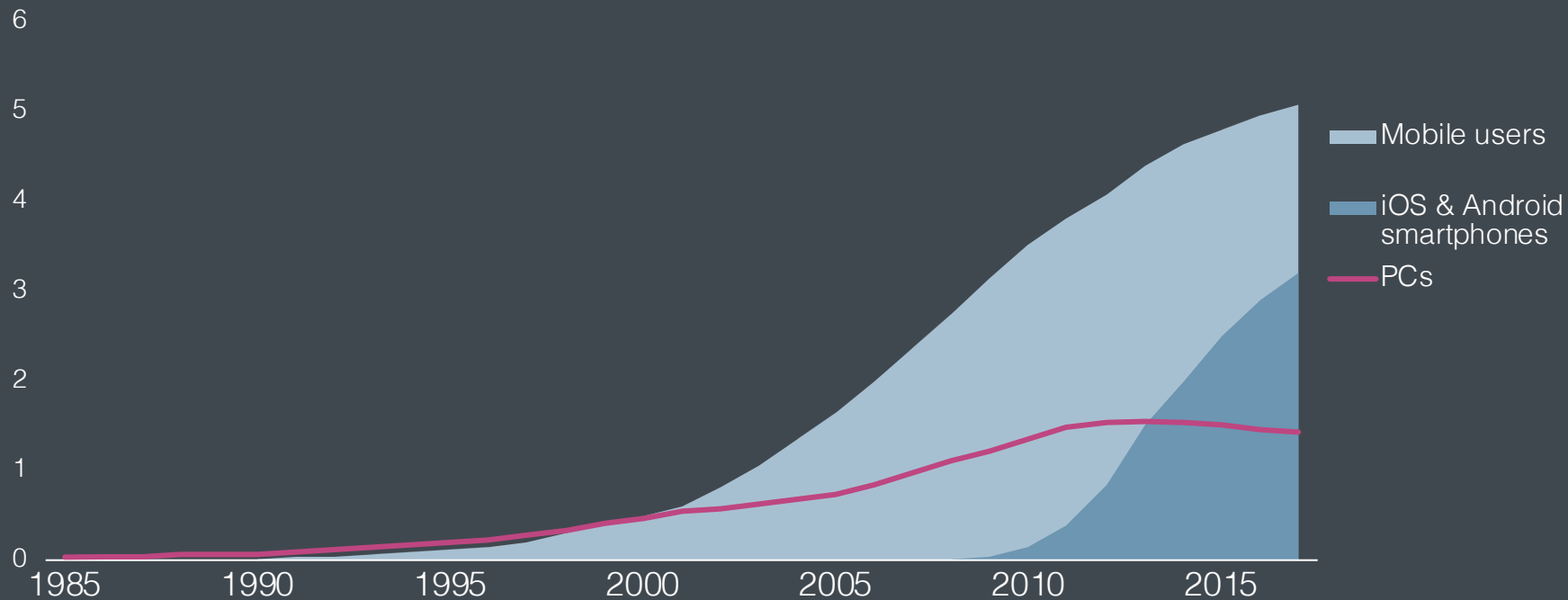
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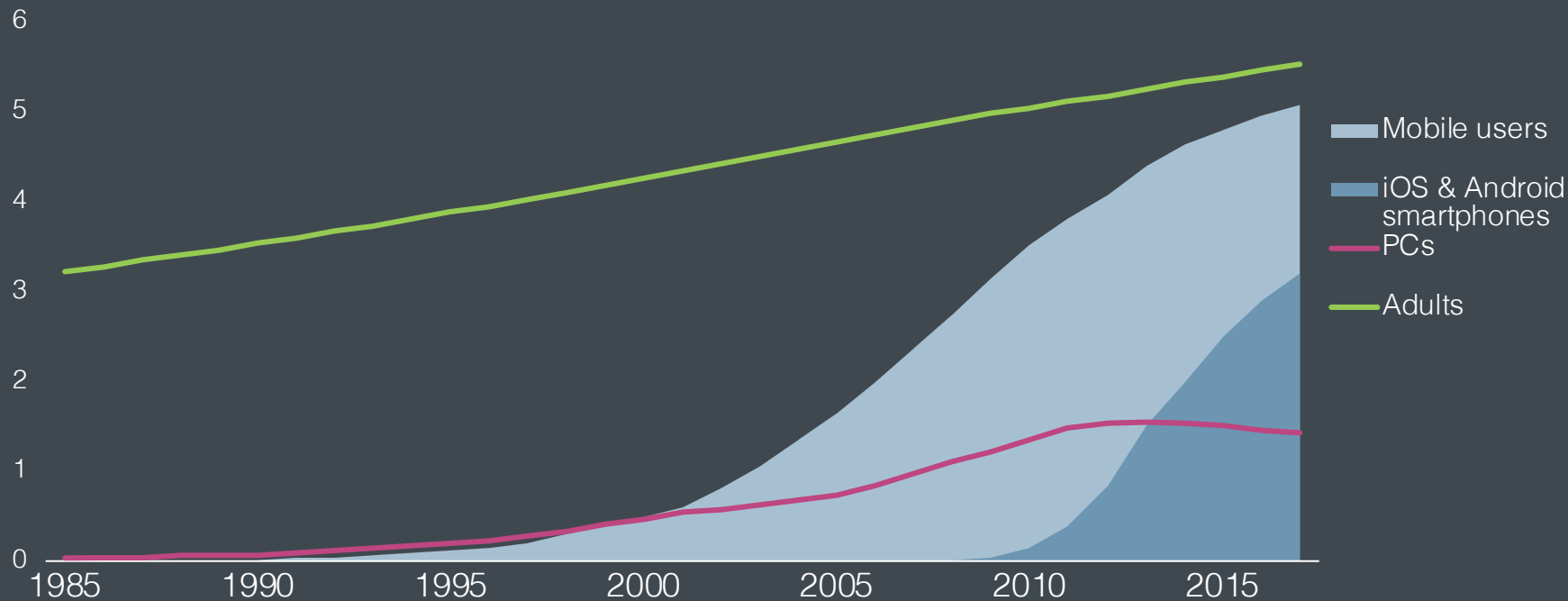
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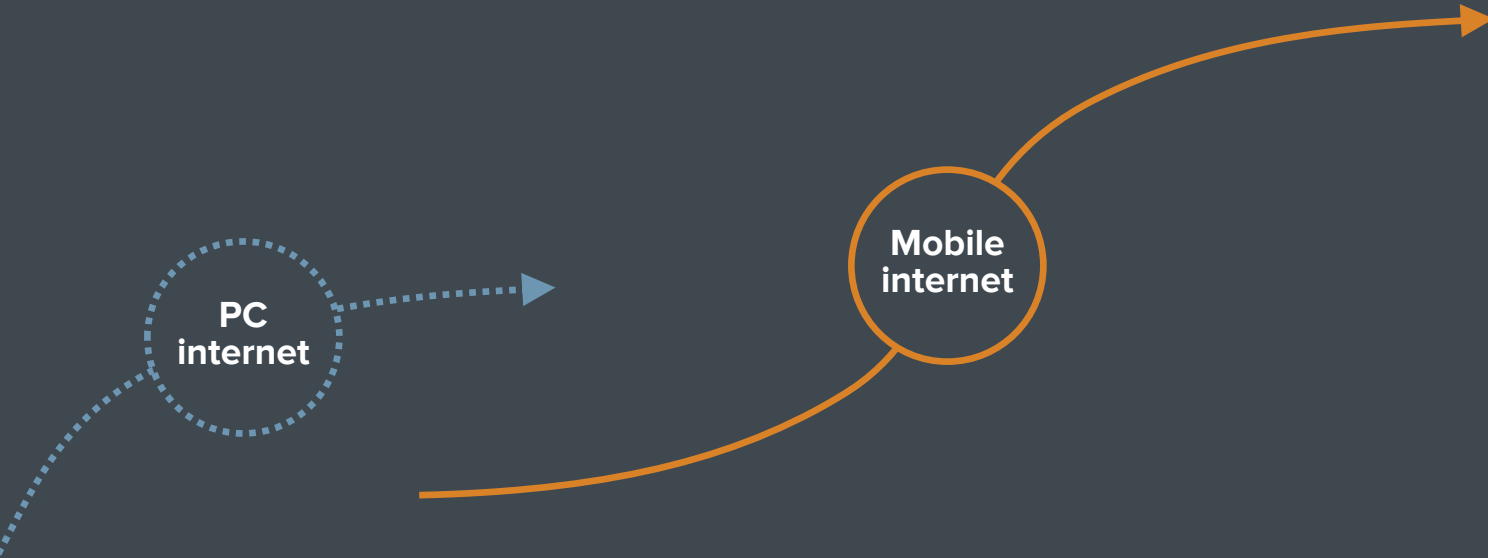


S Curves

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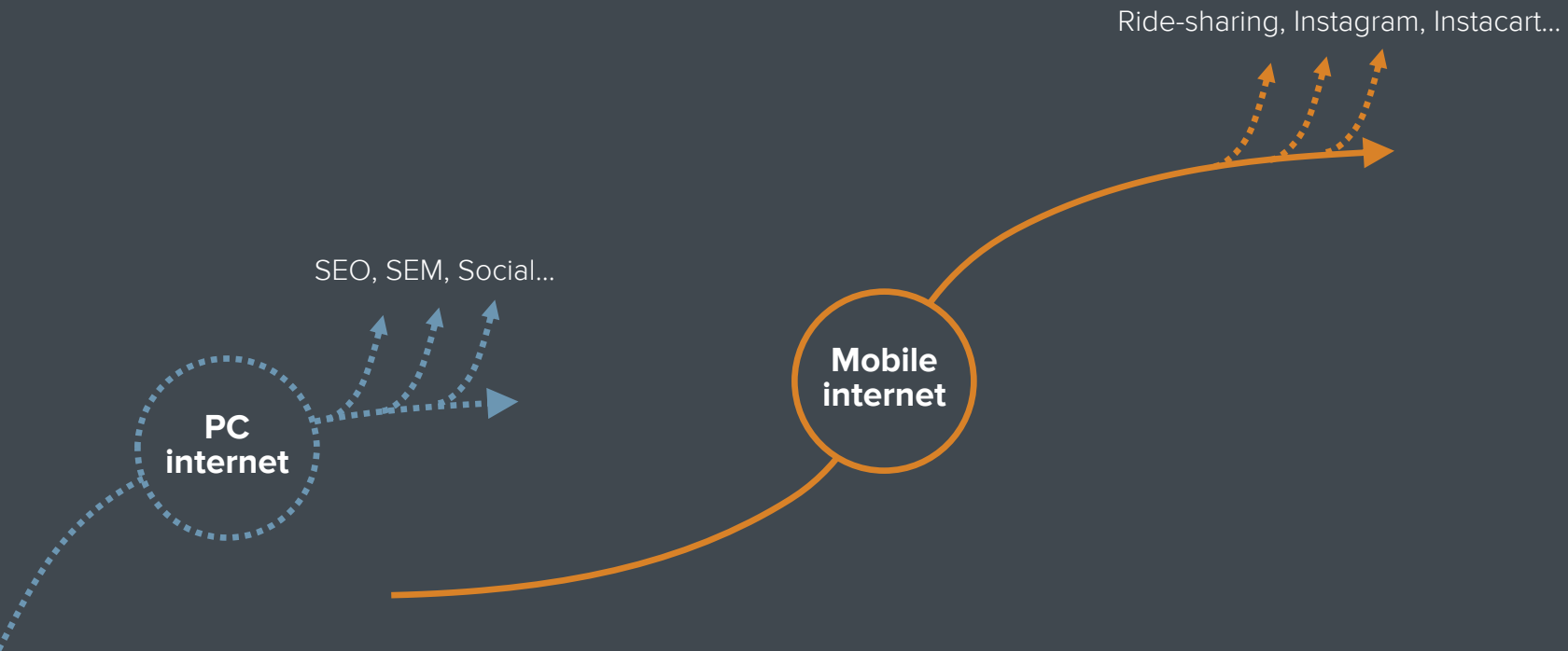


S Curve follows S Curve

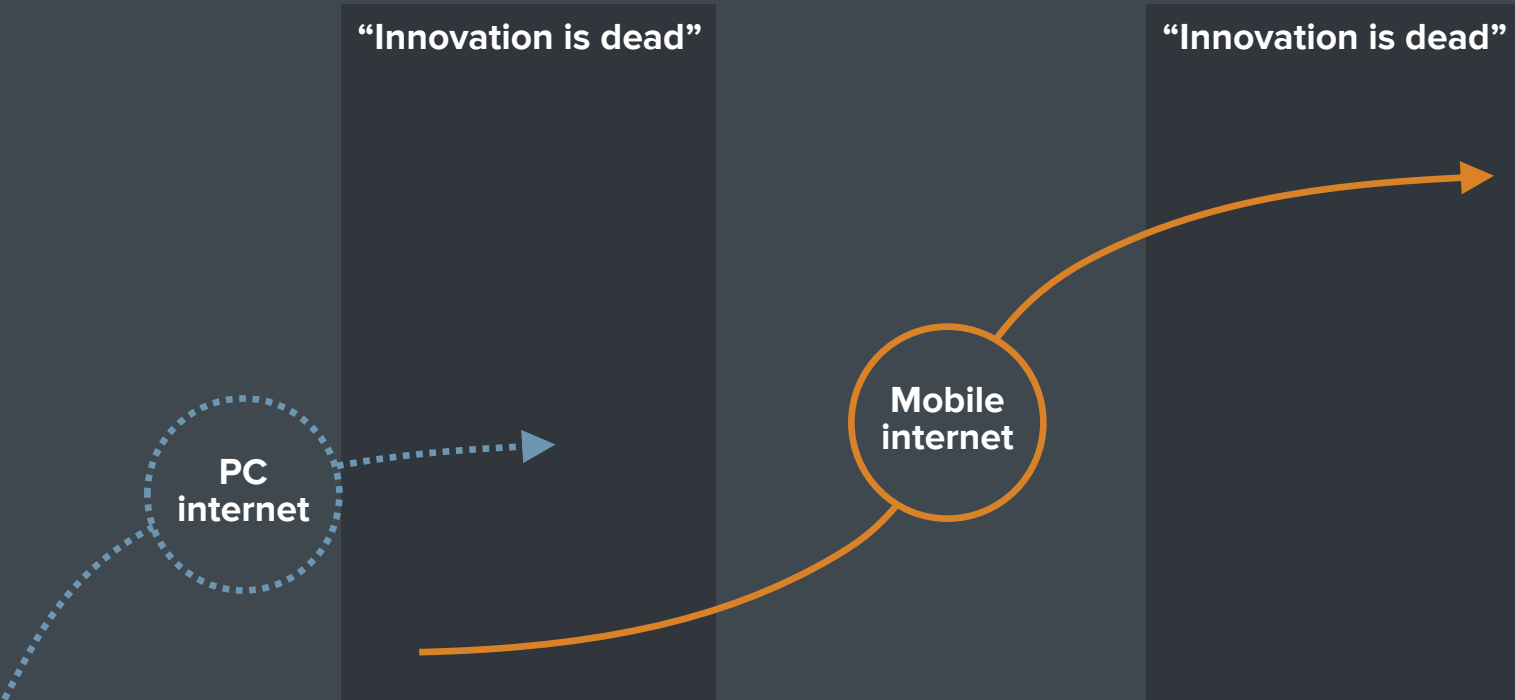


Mobile now = PCs in 2005

What can you build on top of the platform?



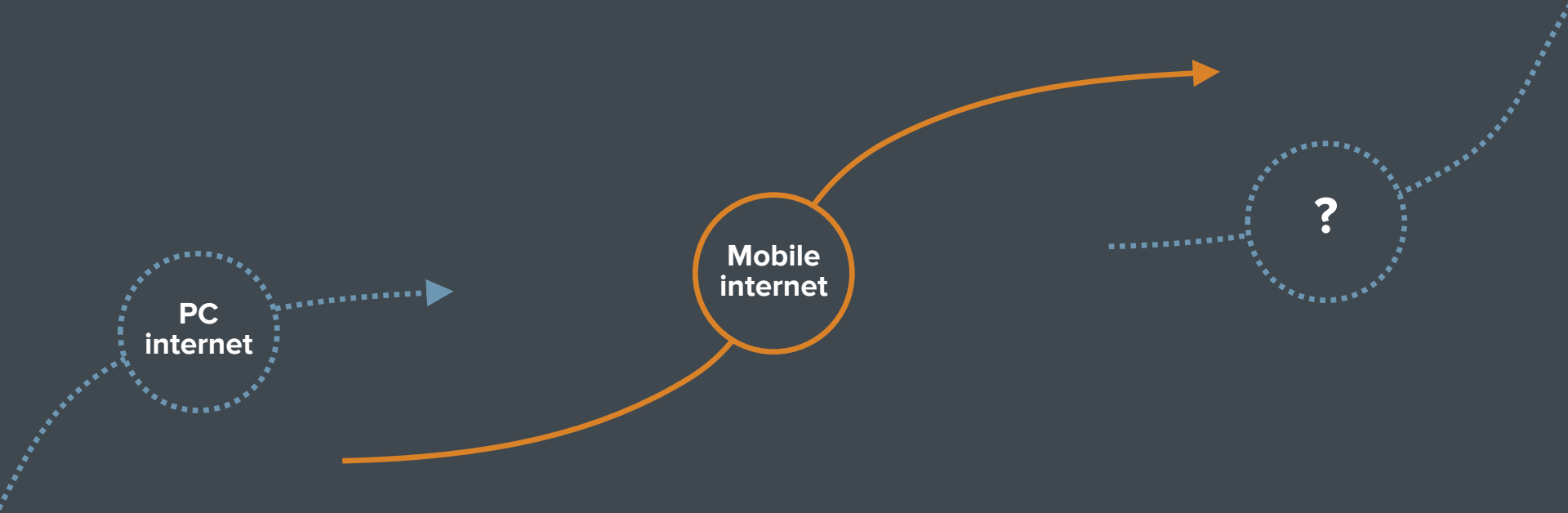
And the future is always boring when we get there



“I arrived in Silicon Valley in 1994 and I thought I was too late and missed the whole thing”

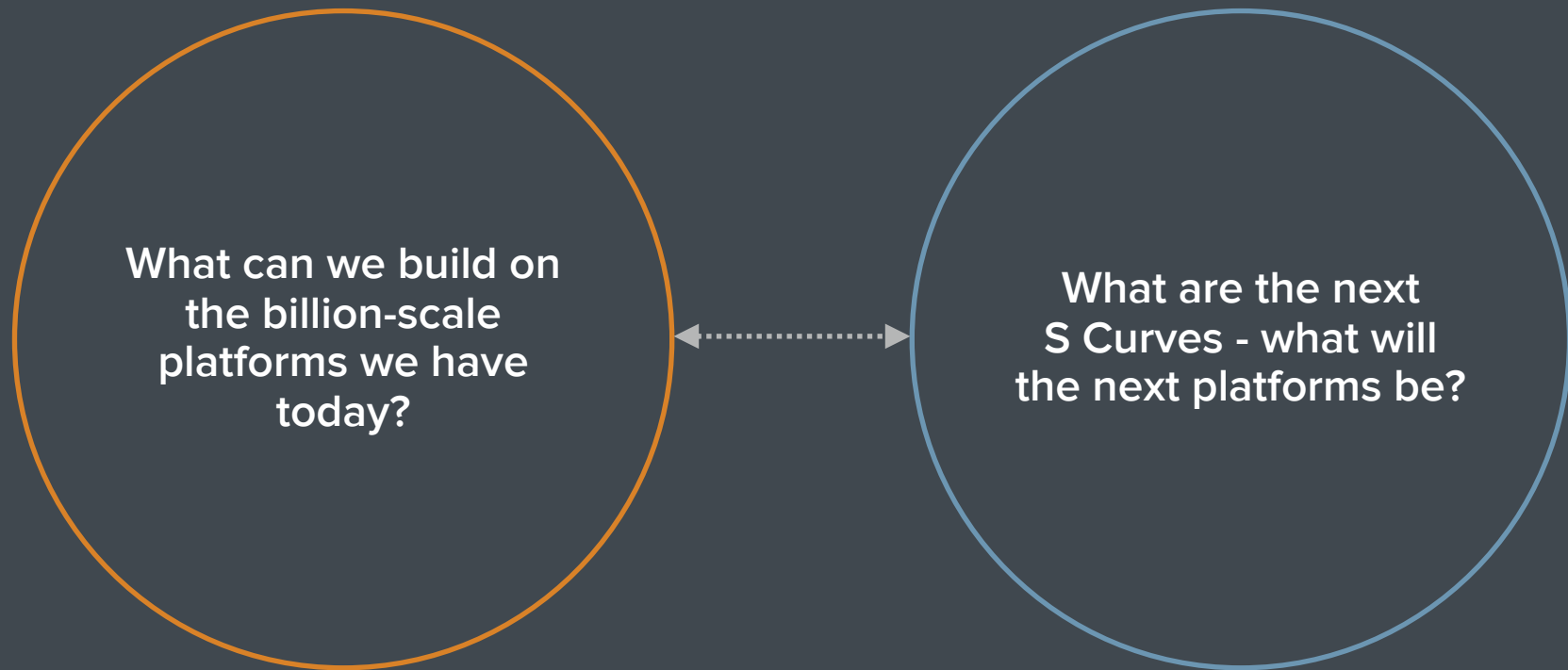
- Marc Andreessen

But there's always something else coming



So, two innovation conversations today

'What now?' and 'What next?'



Massive experimentation around current platforms

New models and end-points

Bots? Voice? Smart speakers?
Wearables? Watches? Smart home?

TV shows? As marketing? Lock-in?

Social as pop culture, camera as
platform

VR? AR? Accessory or next platform?

Meta-conversation

Is there any white space left?

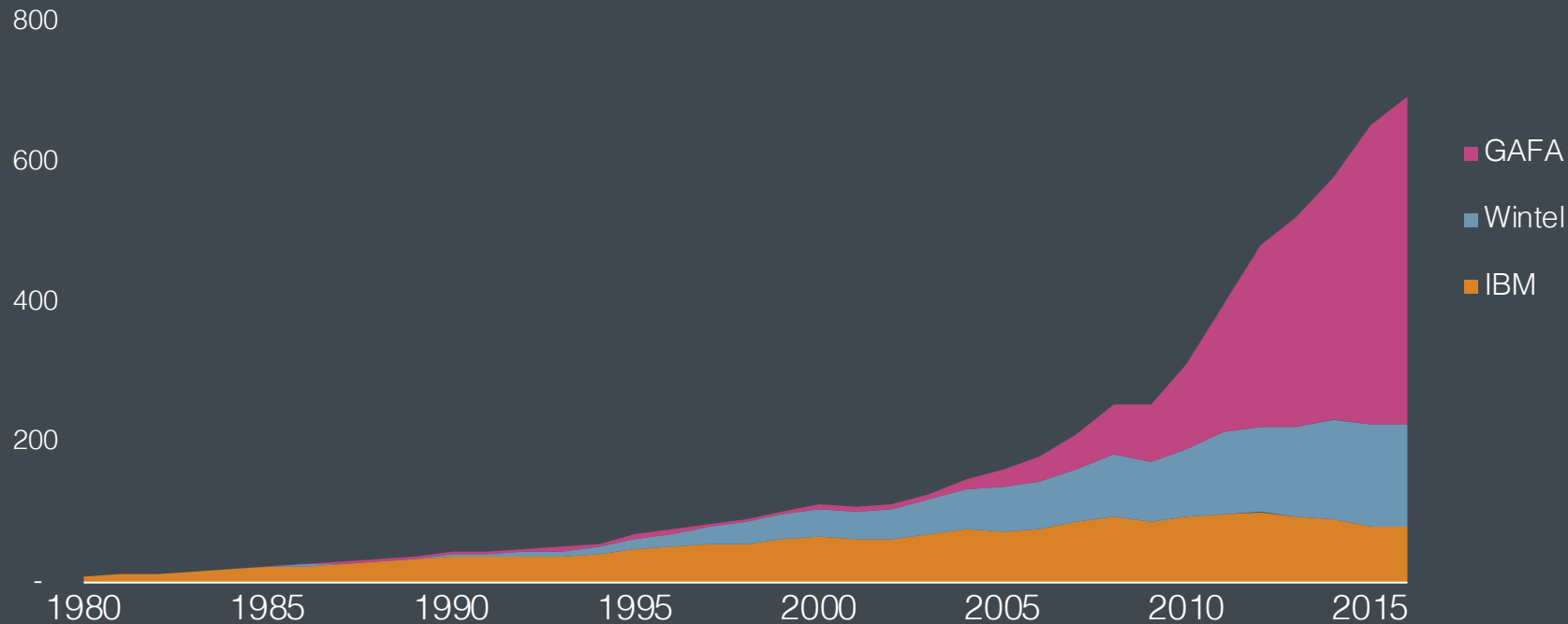
Can you even compete with
Google/Apple/Facebook/Amazon?

Big scary tech giants
are nothing new...



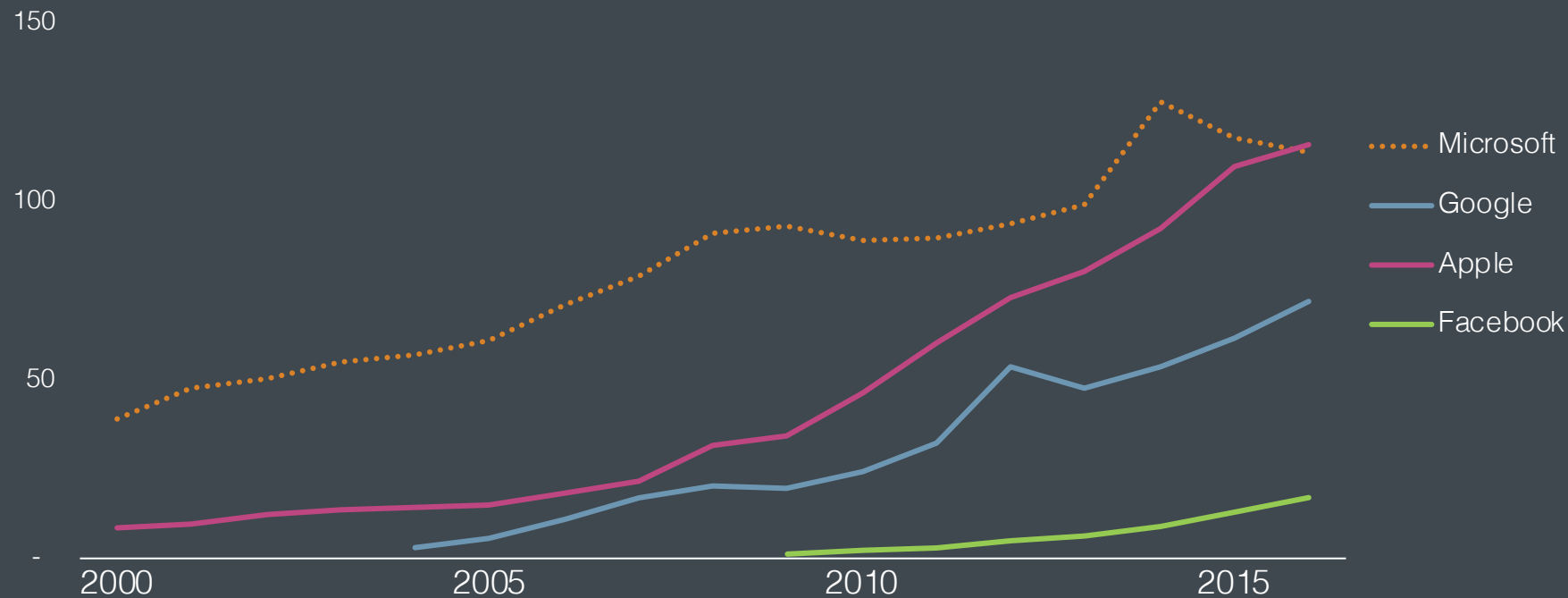
But maybe there *is* something new about these?

Annual revenue (\$bn, real)



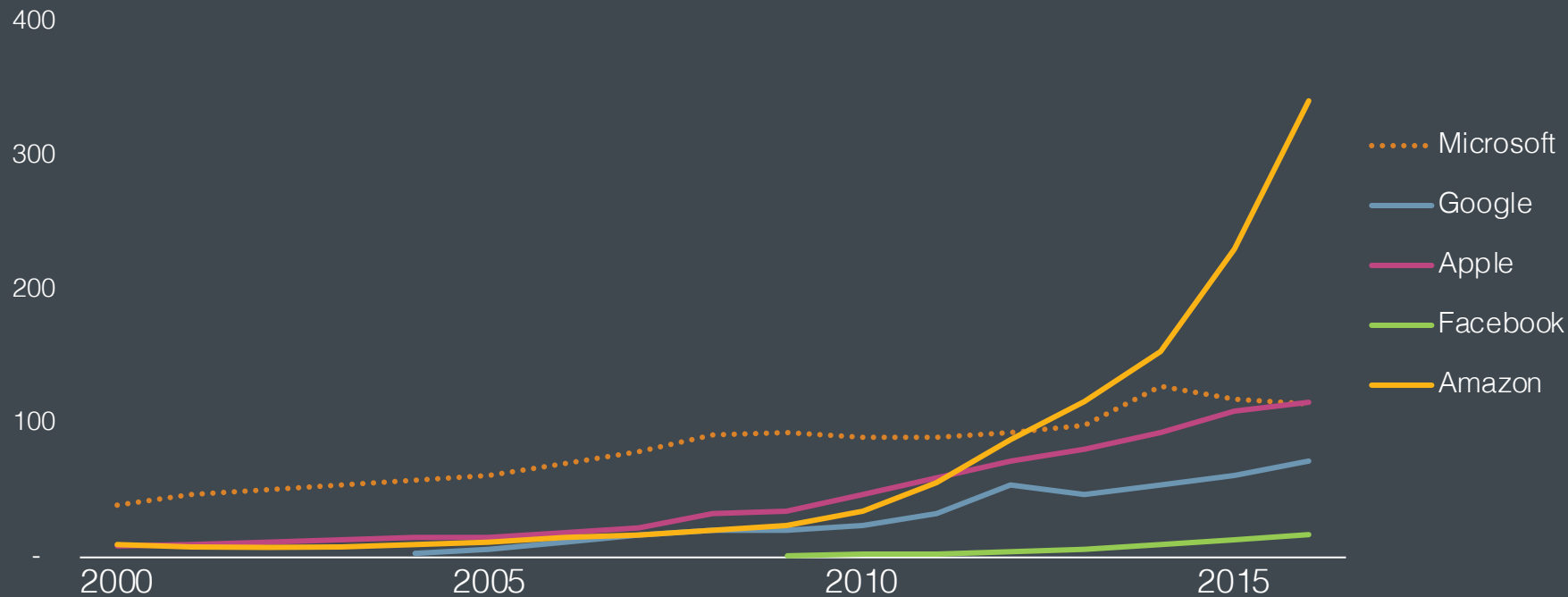
Generational change in scale

Employees (000s)



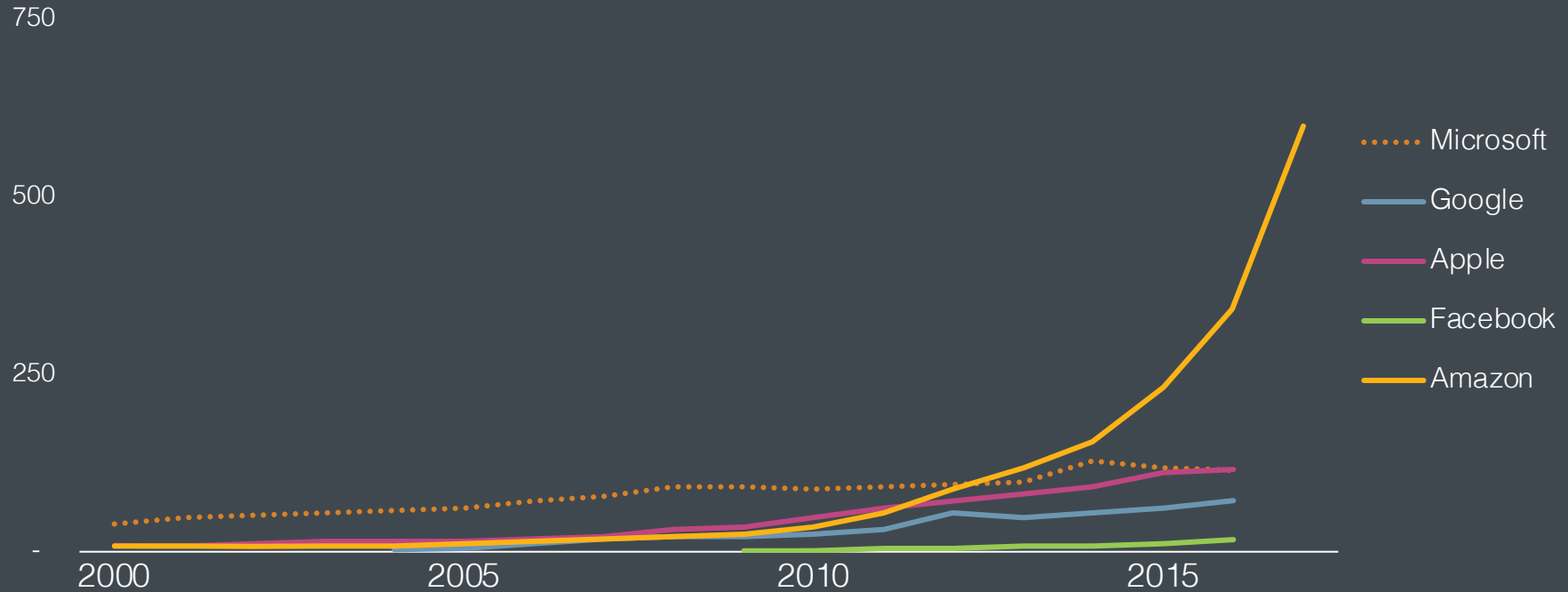
Engineers, salespeople, retail, logistics...

Employees (000s)



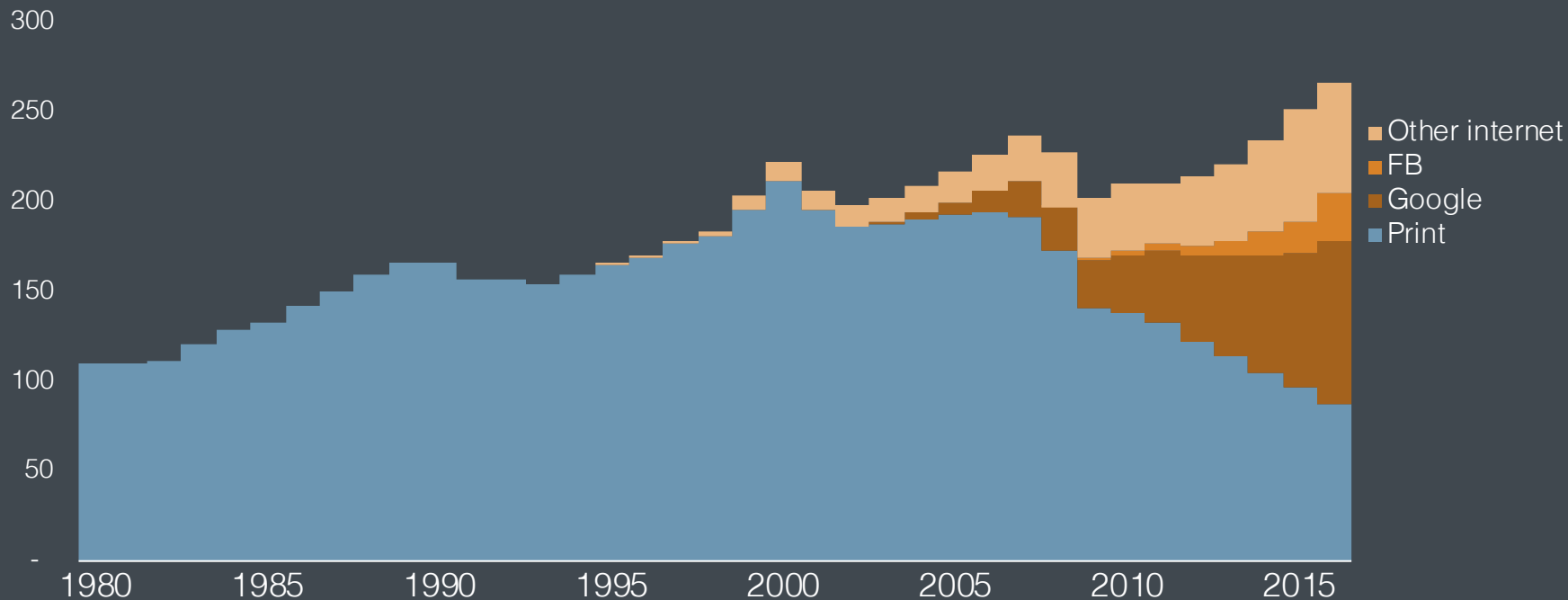
LOTS of logistics

Employees (000s)



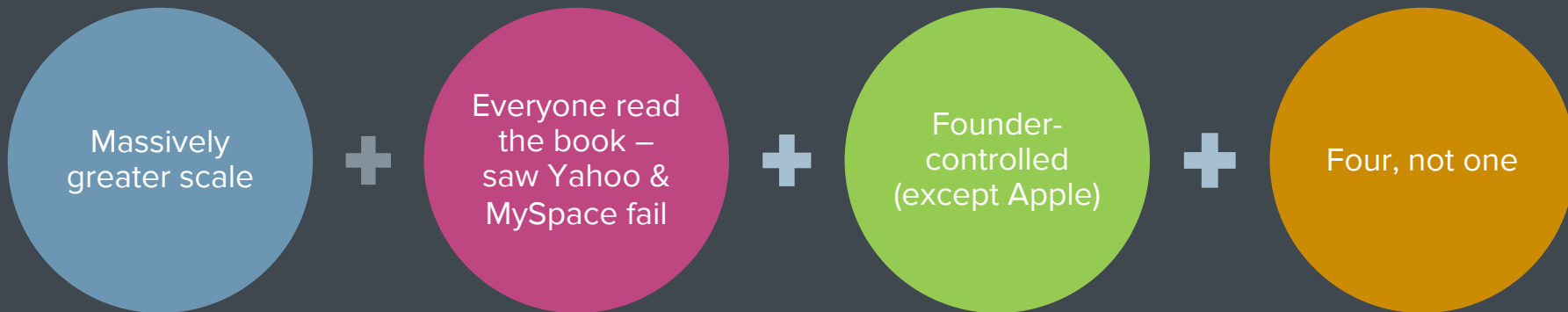
Just try building an ad-funded content business...

Global ad revenue (\$bn, real)



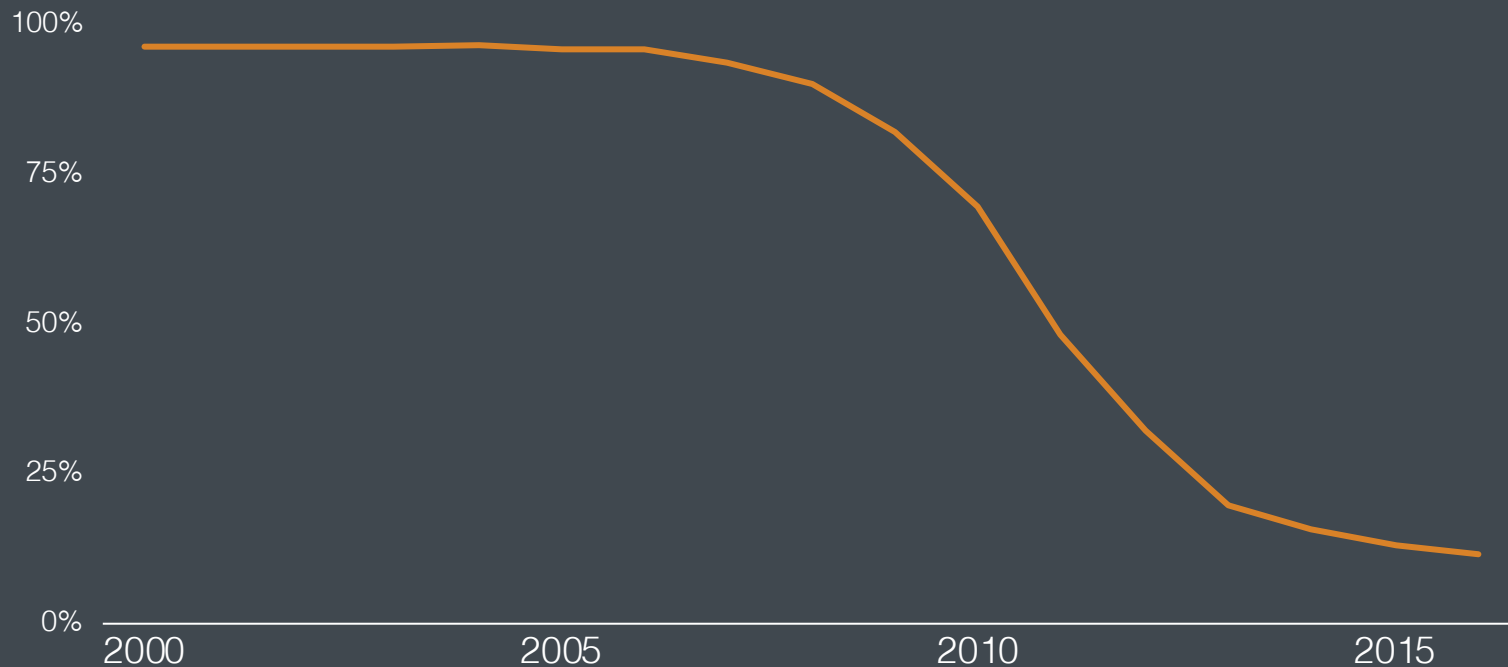
Super-evolved organisms?

GAFA seem to have a different mix of character to many tech giants before them



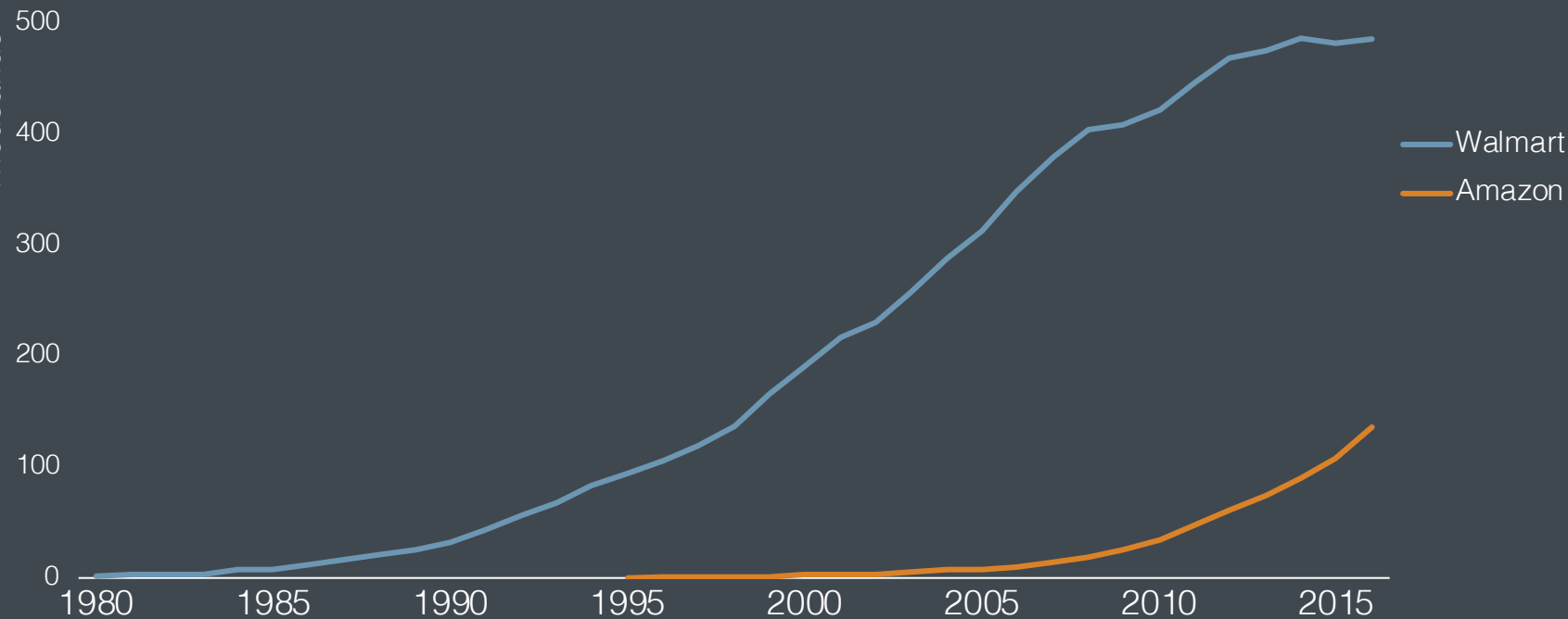
But winners always look invulnerable, until they don't

Microsoft's share of personal computing unit sales (PCs, Macs, Linux, smartphones & tablets)



And some of them haven't quite 'won' yet anyway

Annual net revenue (\$bn, real)



The winners always look invulnerable, until they don't

They lose their market, or their market becomes irrelevant



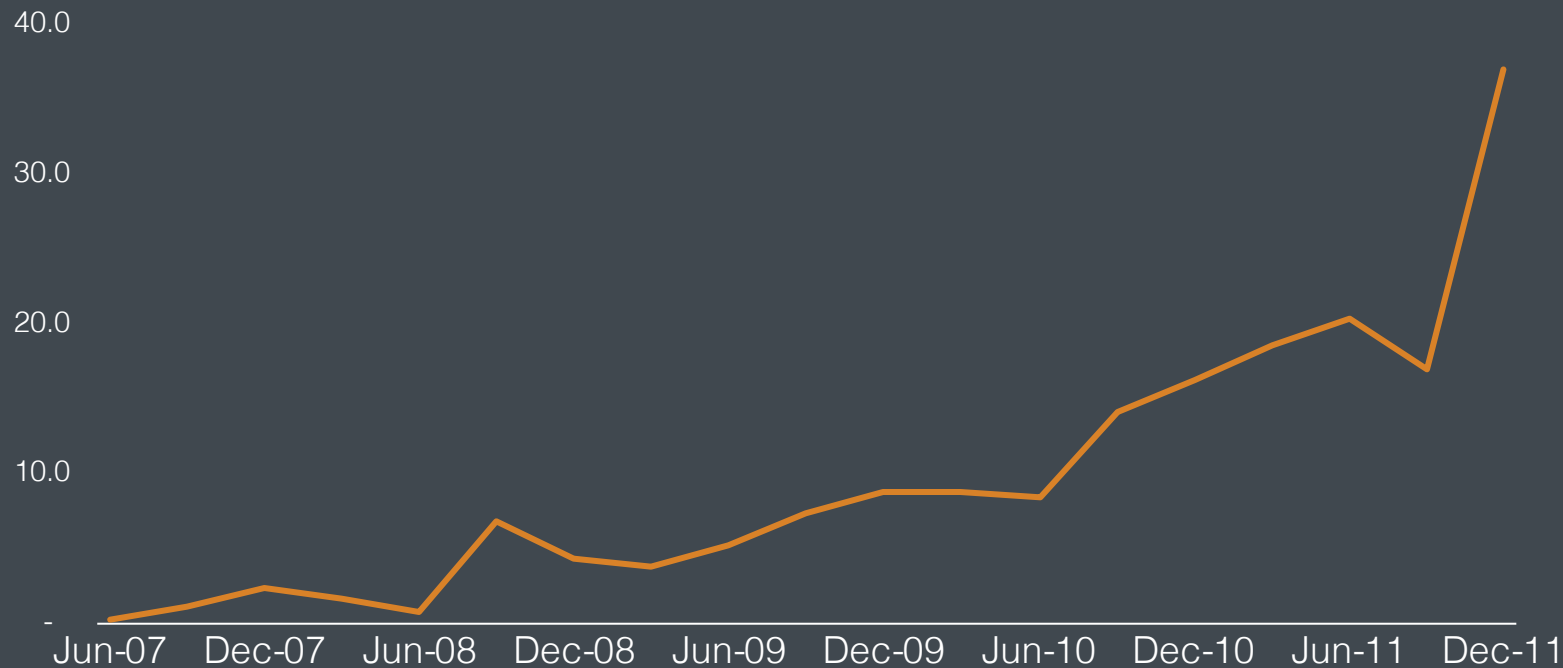
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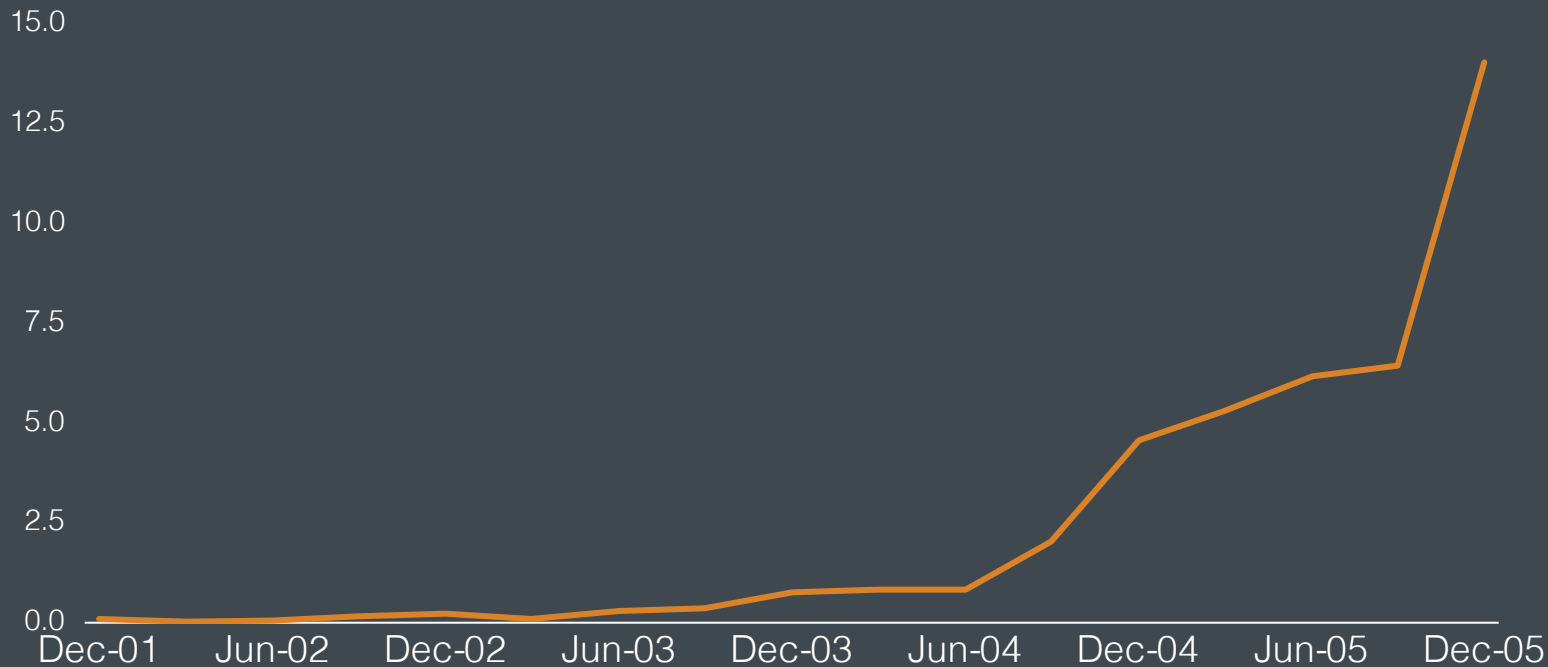
Real S Curves are never quite smooth

iPhone unit sales (m)

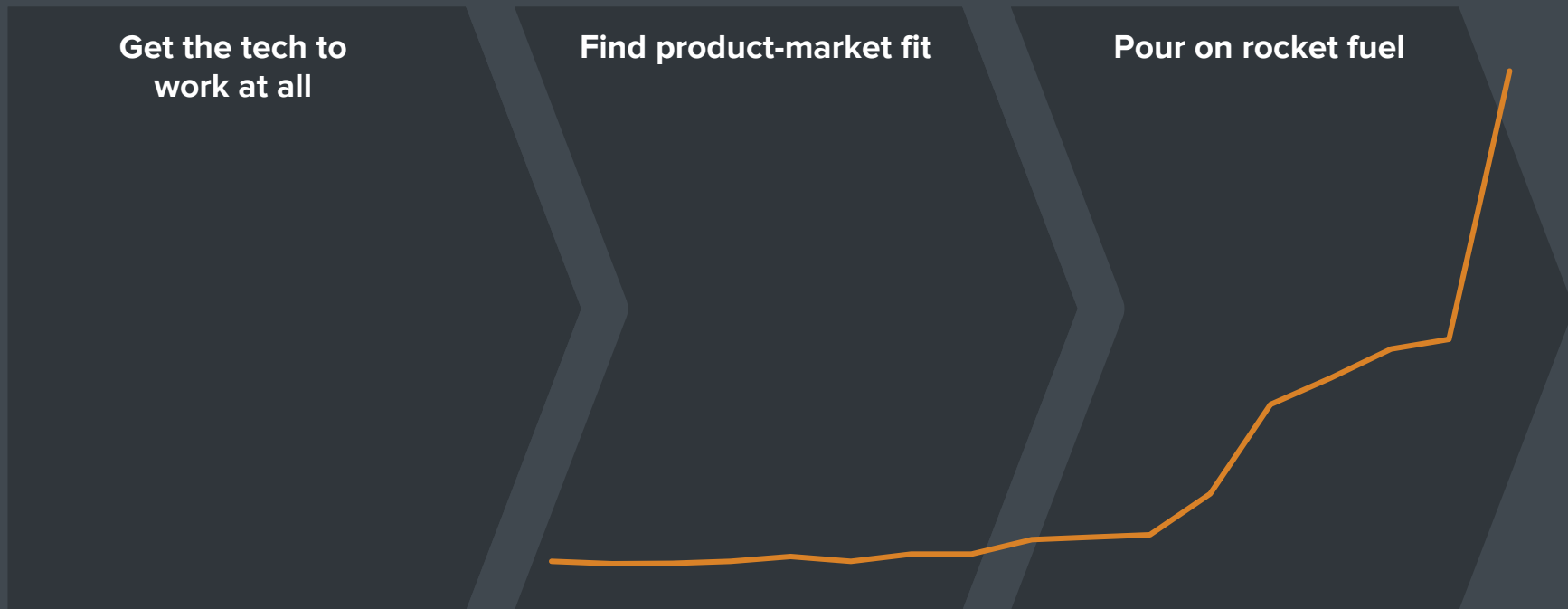


The iPod took almost 5 years to work

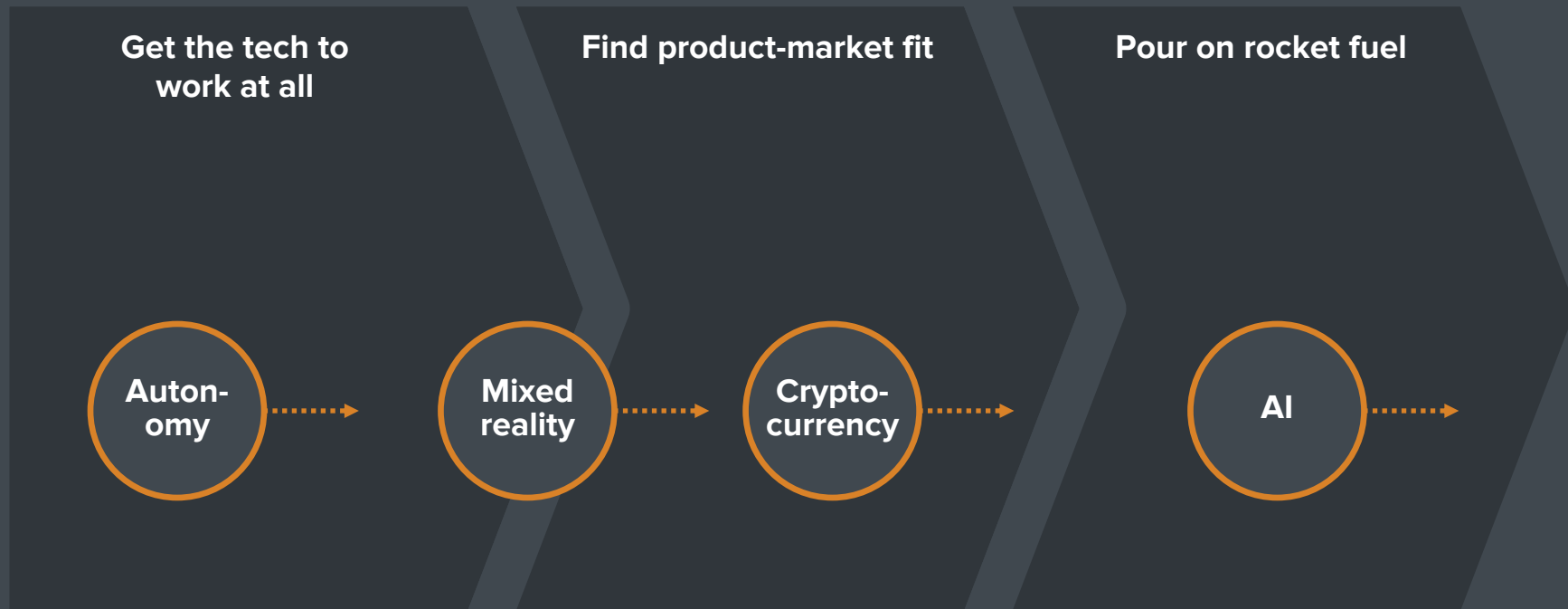
iPod unit sales (m)



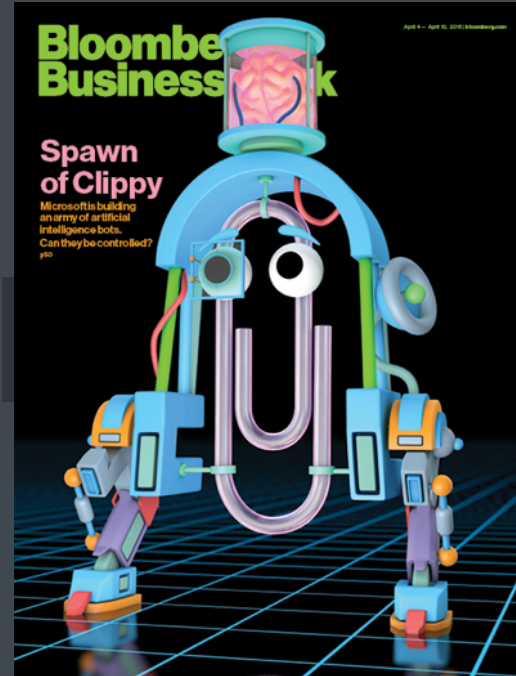
Three phases of creation



Four emerging S Curves to consider



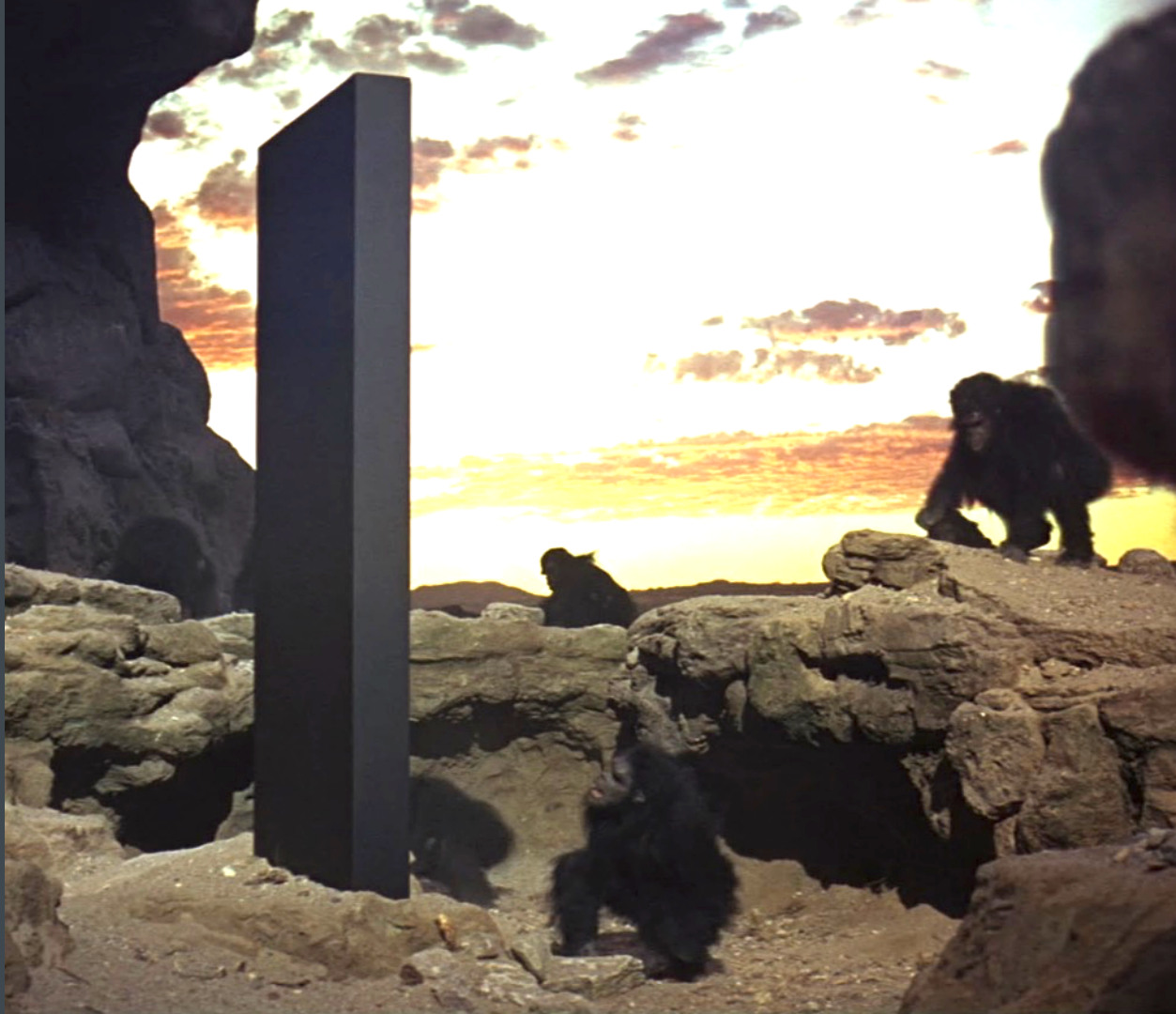
We've all heard of 'AI' by now



Unhelpful ways to talk about AI

Data is the new oil!
Google has all the data!
China will have all the AI!
AI will kill us!
AI will take all the jobs!

Calling it 'AI'



More useful?

Machine learning

Automation

Enabling layers

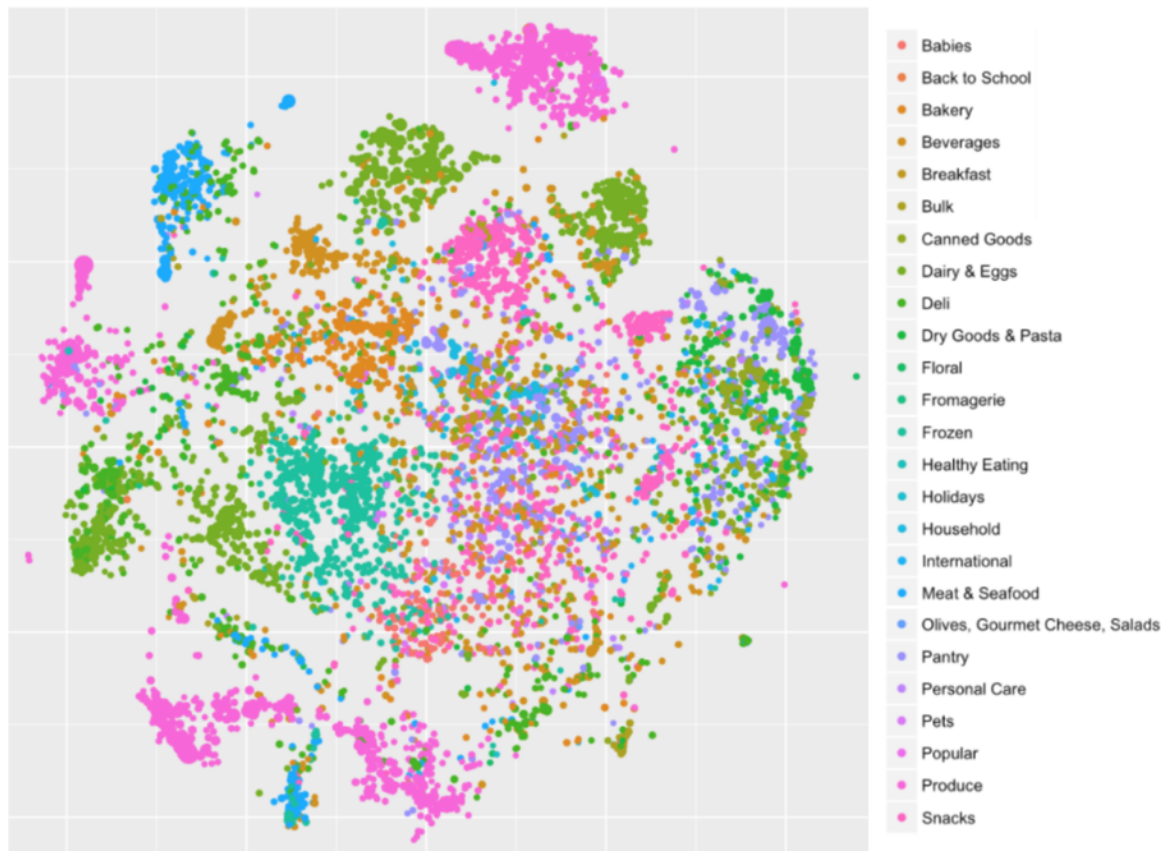
Machine learning as the new relational database

New companies created, but also a new technology that became part of everything



Machine learning = patterns

Techniques to allow statistical analysis of data to find patterns that computers could not see before.



Cat pictures?



What patterns can you look for?

“Is there a cat in this picture?”

“Which customers are about to churn?”

“Will that car let me merge?”

And, the unknown unknowns

Automation means
washing machines,
not robots

We imagine automation
will look like us -
humanoid robots, 'artificial
intelligence'.

We did make robots, but
we call them washing
machines.



There's no such thing as 'data'

A dishwasher can't wash clothes - a voice recogniser can't find network intrusion.

Data is specific to each vertical and problem.

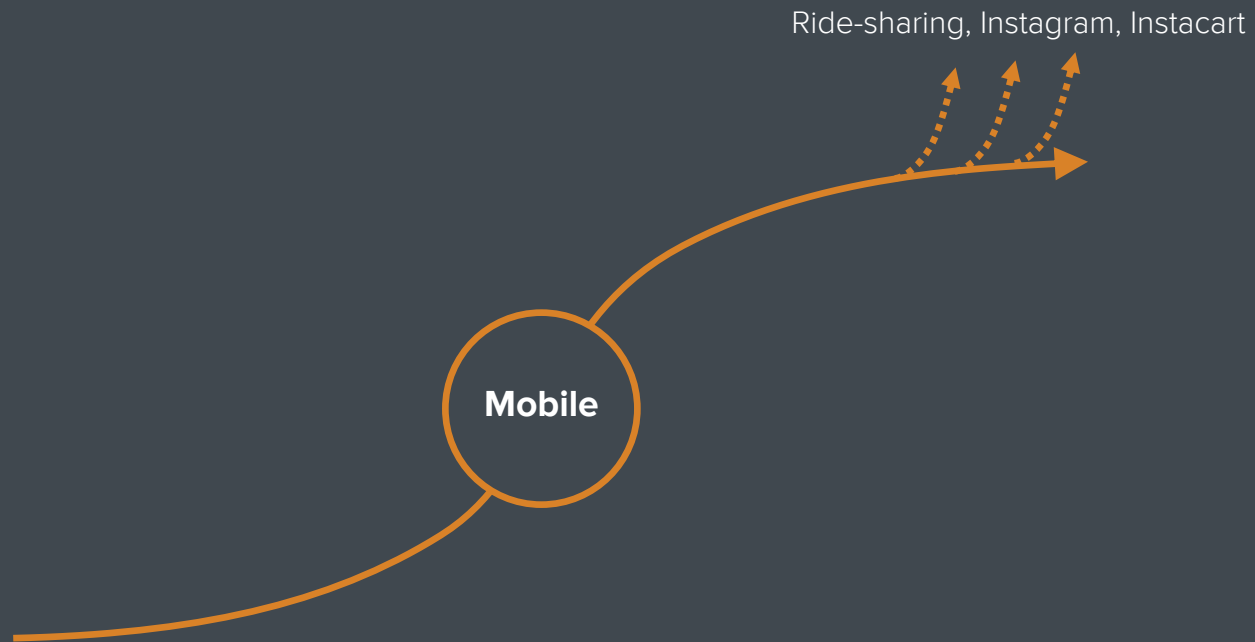
Many new companies to be created here.



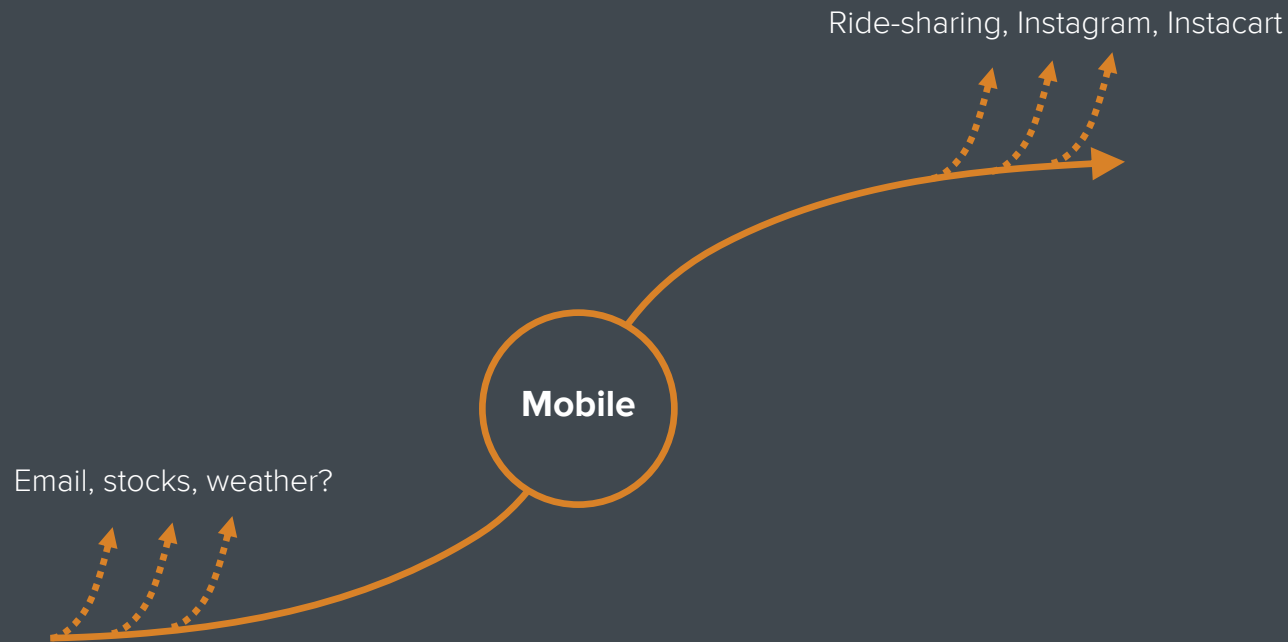
So, what are the washing machines of machine learning?

What can a real company automate?

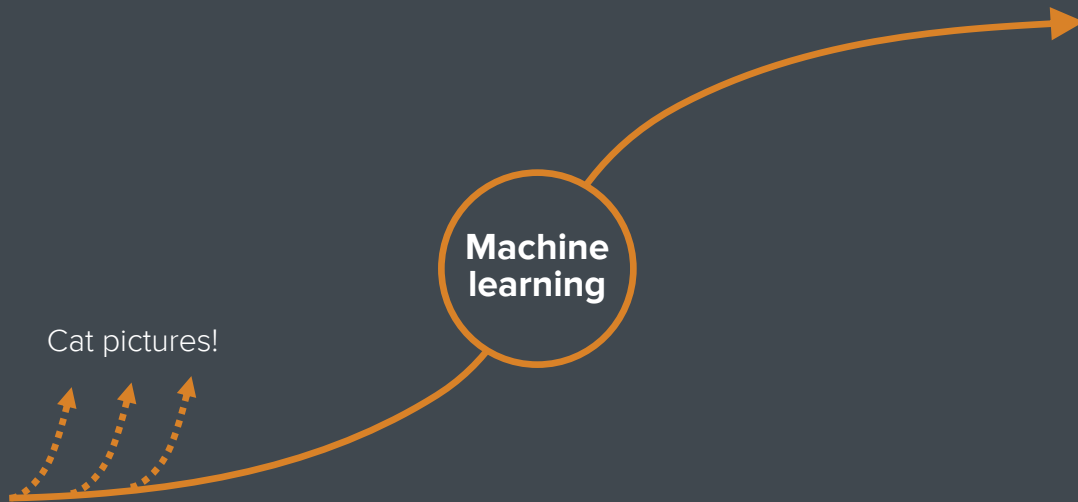




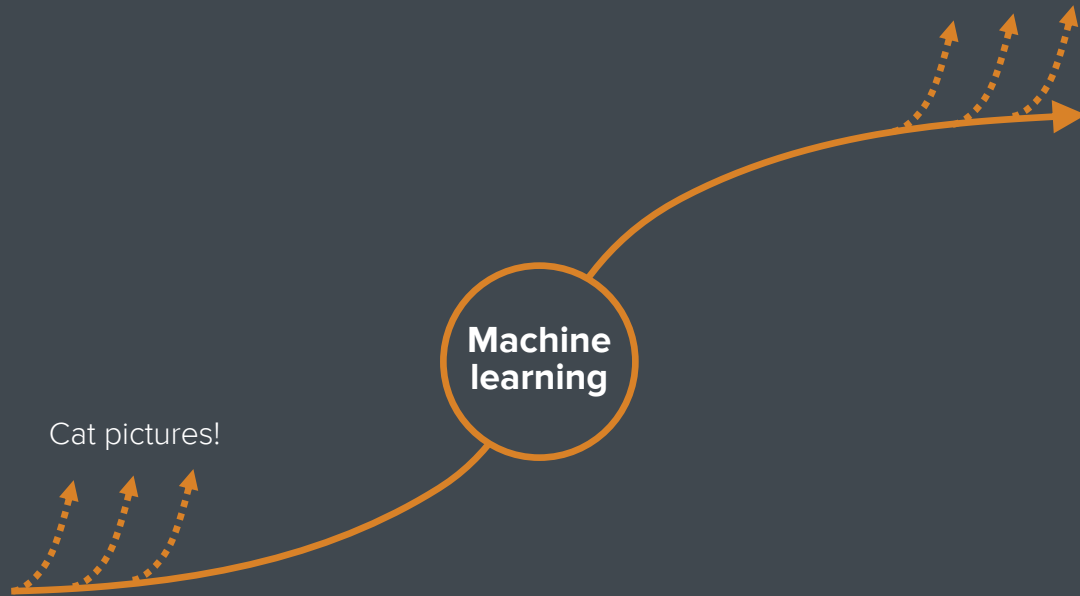
Best use cases may not be clear at the start of the S Curve



The same probably applies to machine learning



The same probably applies to machine learning



Mechanised legs

Ilya Repin, 'Barge-haulers on the Volga', 1873



Mechanised arms

Ford production line, 1920s



Mechanised arithmetic

Billy Wilder, 'The Apartment', 1960



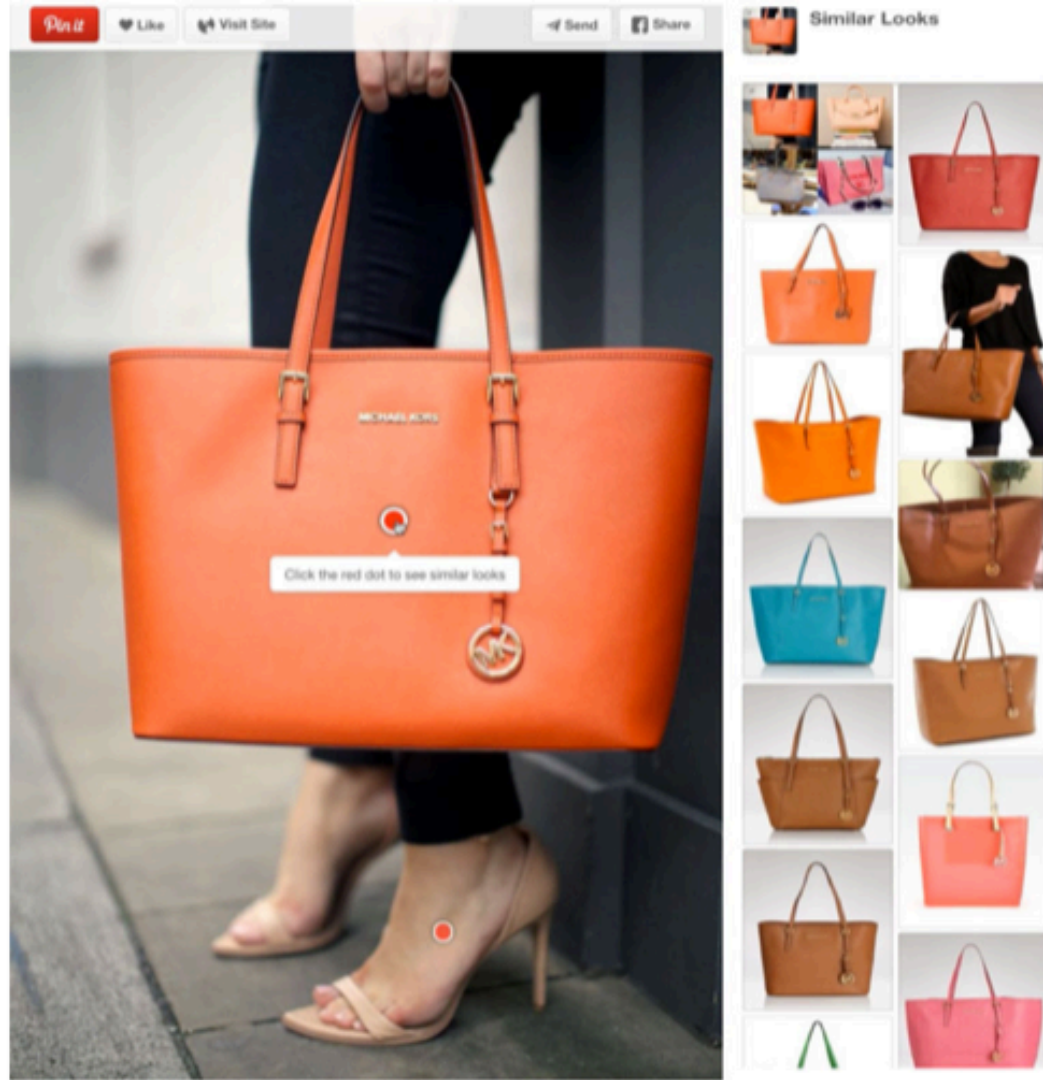
What can you do with automated interns?

Automation replaces humans, but it also gives us the equivalent of millions more



Automated recommendation?

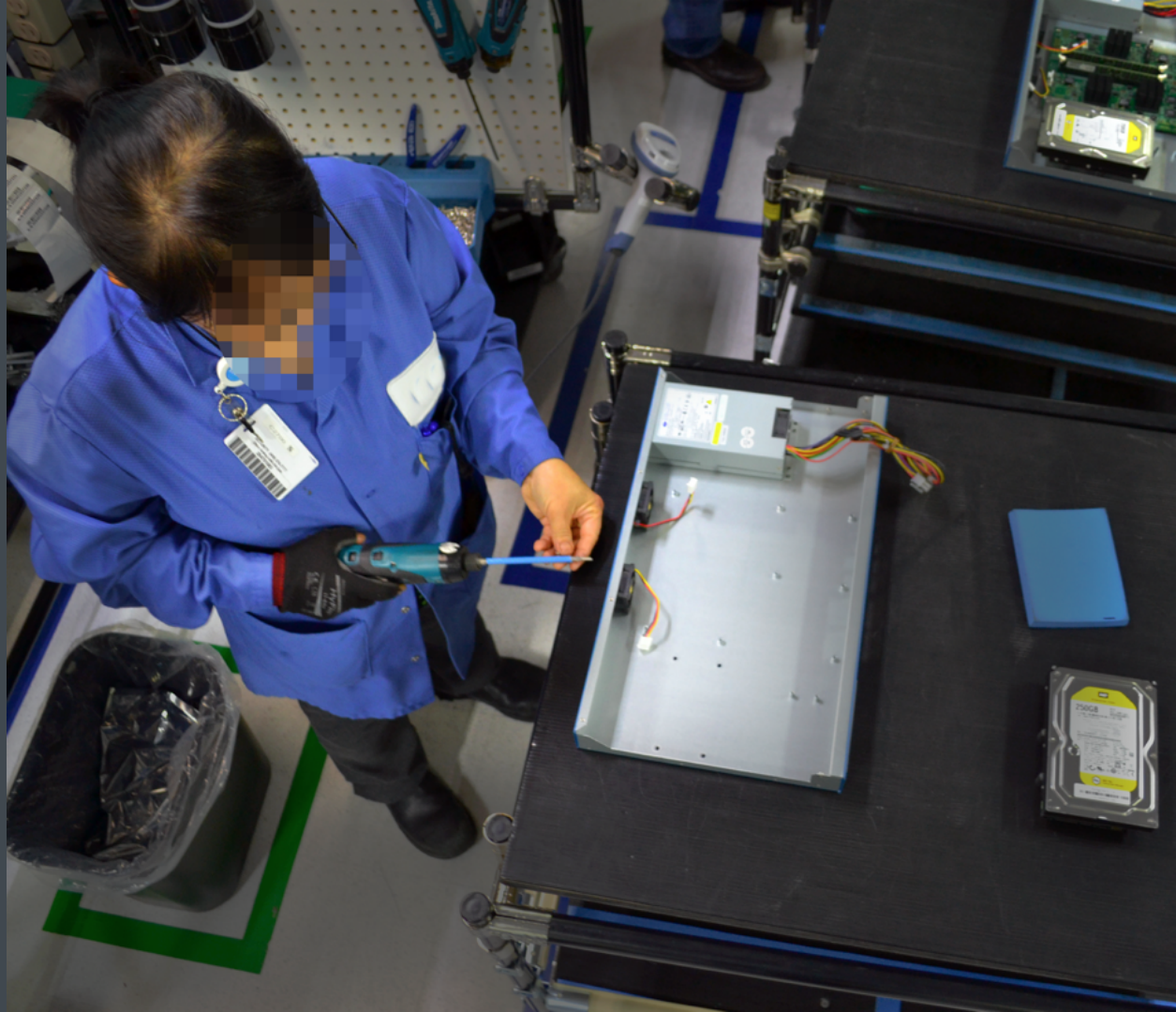
How does ecommerce change when computers can see what you like?



Automated trend analysis?



Automated process analysis?



Automated disease detection?

Ramcharan et al.

Transfer Learning for Cassava Disease Detection

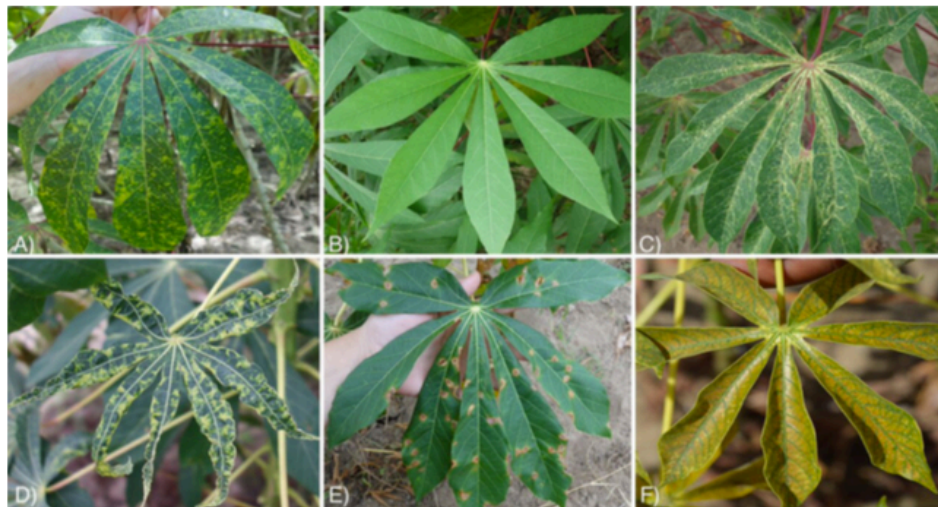


Figure 2. Examples images with in field backgrounds from 6 classes in the original cassava dataset. A) Cassava Brown Streak Virus (CBSD), B) Healthy, C) Green Mite Damage (GMD), D) Cassava Mosaic Virus (CMD), E) Cassava Brown Leaf Spot (CBLS), F) Red Mite Damage (RMD).

“Driverless car” =
“horseless carriage”

Getting rid of horses
changed everything



What do 'car' or
'bus' mean?

Removing drivers,
accidents and internal
combustion engines
changes all the
assumptions

Expect totally new vehicle
types

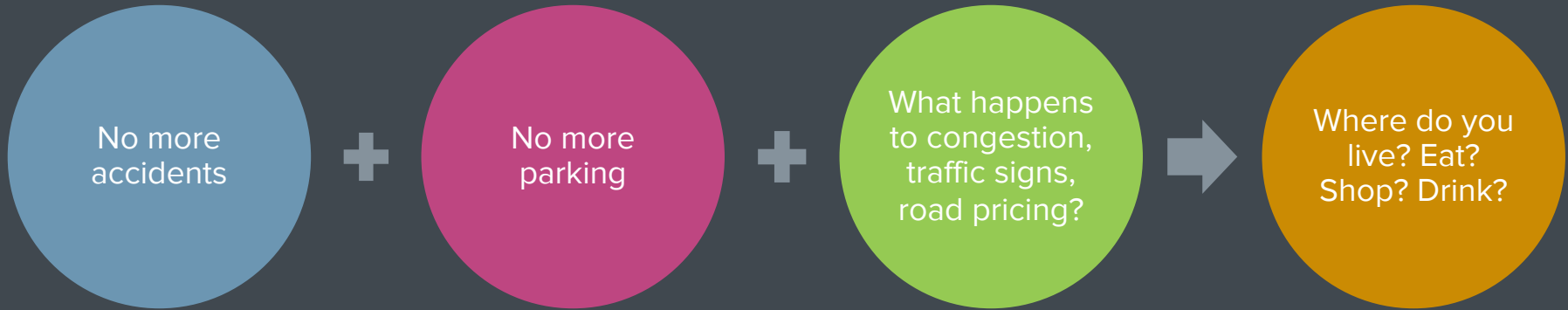


But we also change
roads – computers
can drive differently



How much does automated driving change cities?

What changes when we automate driving and packetise roads?



Automatic cars change cities as much as cars changed cities

“It was easy to predict mass car-ownership but hard to predict Wal-Mart”



Machine learning is such an enormous S Curve that ‘change entire cities!’ or ‘let computers see!’ are just applications

Mixed reality 2017 =
Multi-touch 2006

Primary technology

Working

Part of the future

Not a commercial
product - yet



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Multi-touch 2006

Primary technology

Working

Part of the future

Not a commercial
product - yet



If I could see anything, what should I see?

Add something to the world

Make every wall a screen

Put Minecraft on the table

Show me the recipe



Look at the world and tell me about it

Who is this person?

Is this cheaper on Amazon?

Where did I leave that?

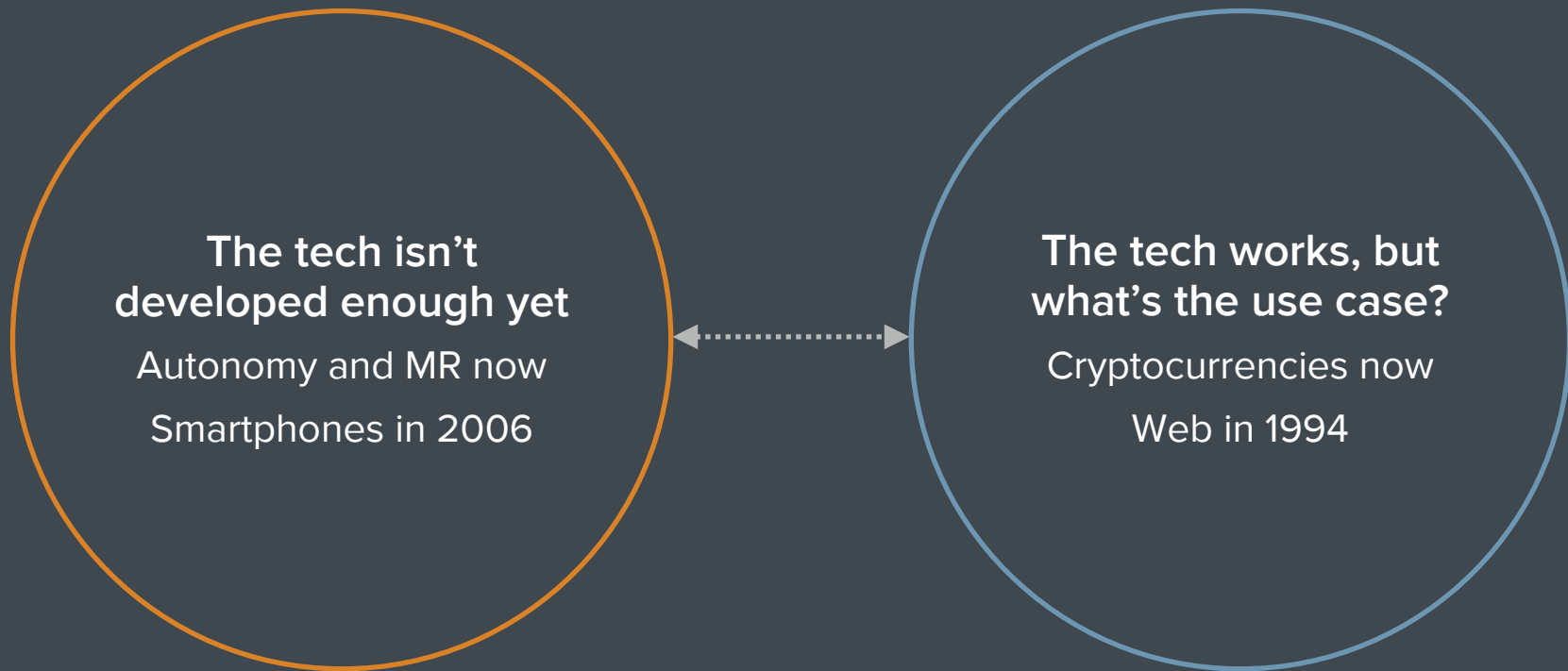
Crypto 2017 = HTML 1994?

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-Marc Andreessen

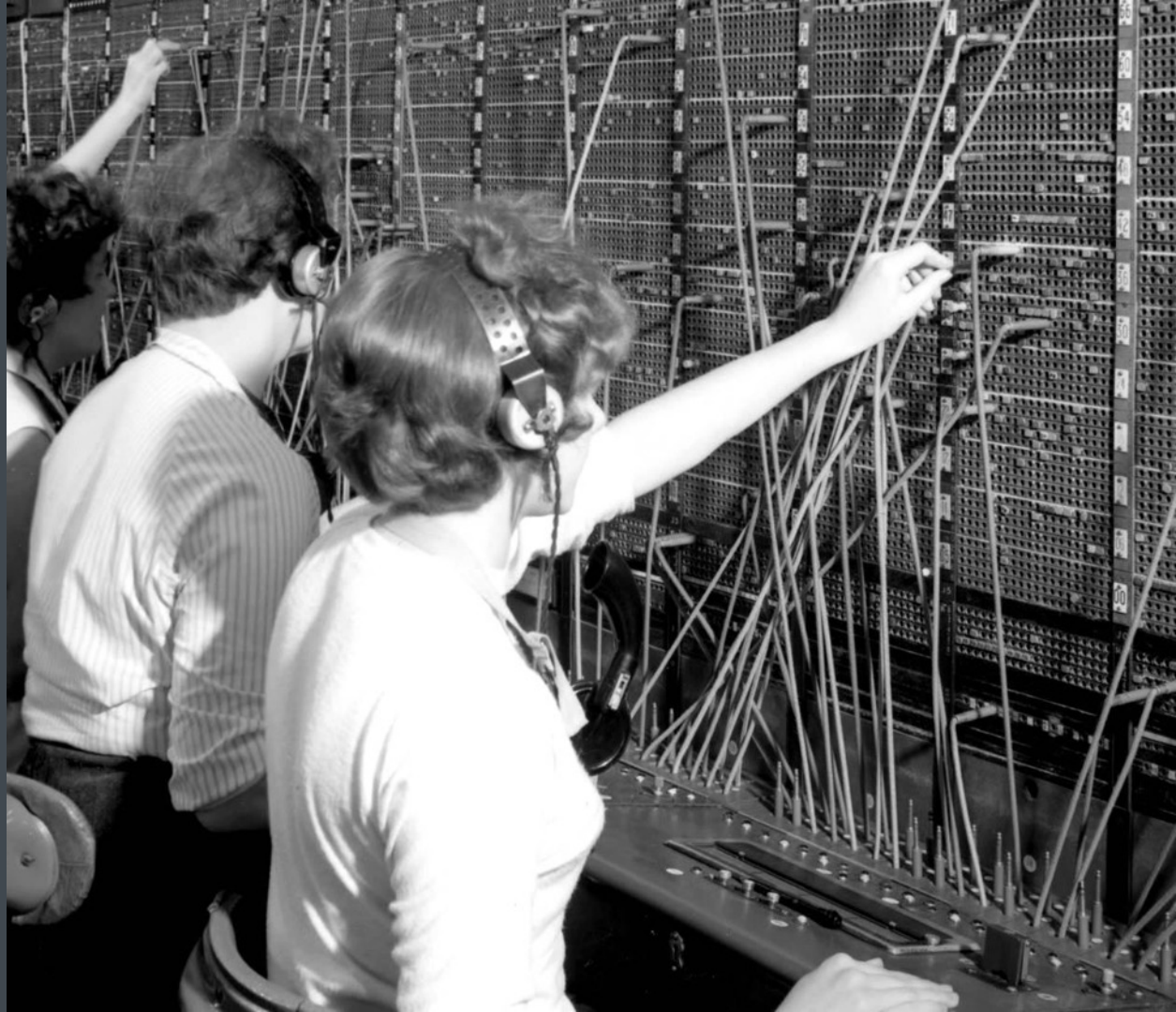
Two ways to be at the bottom of the S Curve



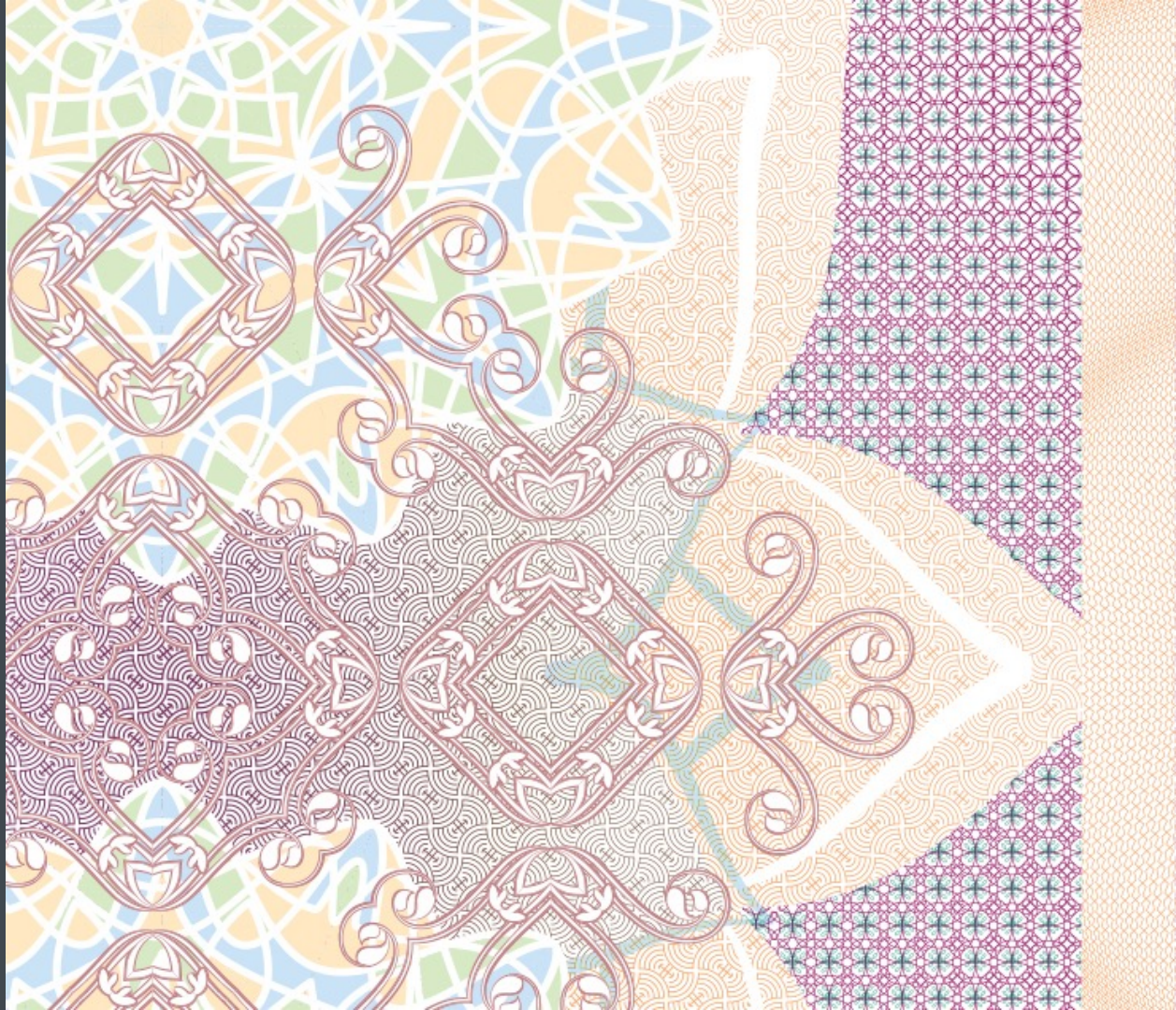
So, if the internet
automated this...



And this...



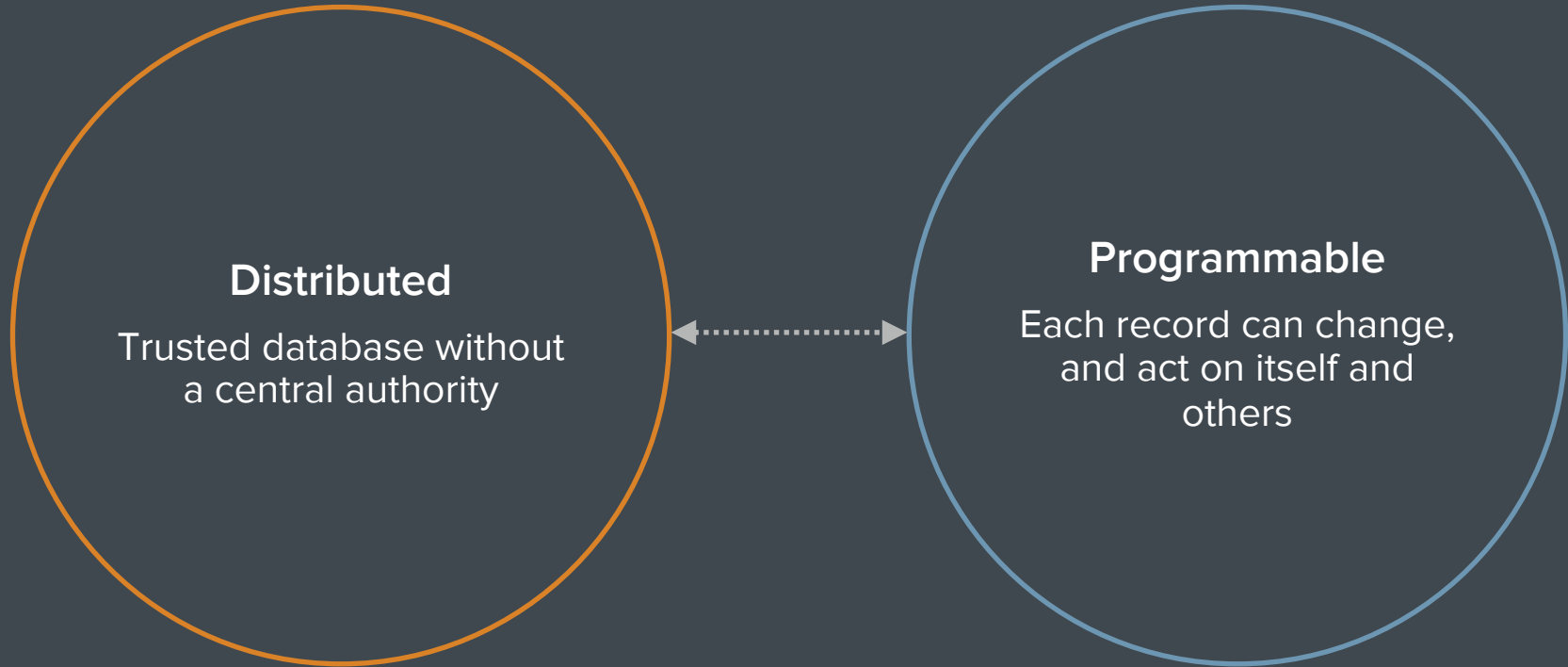
Now 'crypto'
automates another
analogue
technology



Money in the cloud for centuries, but it was never software



Two fundamental capabilities



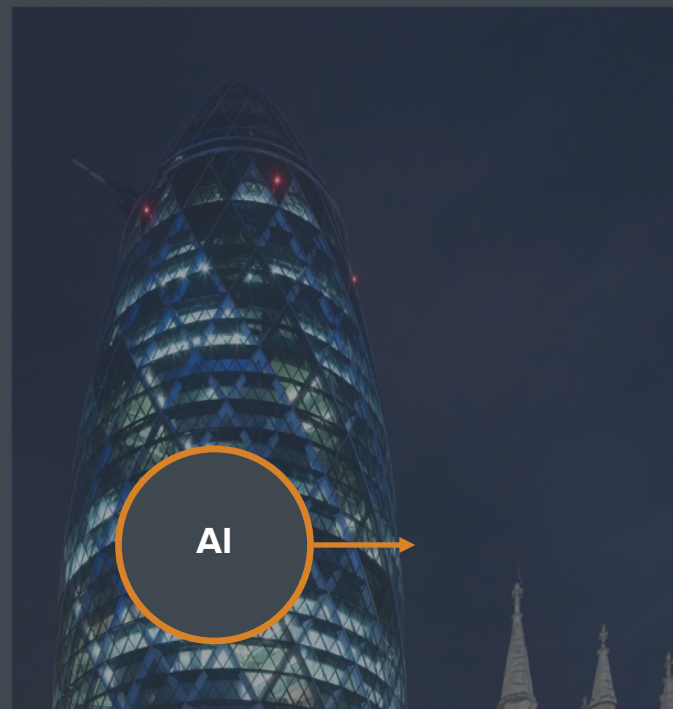


**Auton-
omy**

**Mixed
reality**



**Crypto-
currency**



AI

