

The background is a solid dark red color. It features several overlapping geometric shapes, primarily semi-circles and quarter-circles, in various shades of red. Some shapes are a vibrant red, while others are a darker, more muted red. These shapes are arranged in a way that creates a sense of depth and movement, with some appearing to be in front of others. The word "delaware" is centered horizontally and vertically over this pattern.

delaware

# Becoming Anti-Fragile: How to Thrive in Times of Uncertainty.

## *Webinar 1: Living through the Transition Point:* *Understanding Disruption and Exponential Technological Change*

Sean Culey (SCOR-P, FCILT)

- Visiting Fellow (Supply Chain) – Cranfield School of Management
- Head of Value Chain – The MTC
- Author: 'Transition Point: From Steam to the Singularity'





### **Webinar 1:**

**Living Through The Transition Point:**  
**Understanding Disruption &**  
**Exponential Technological Change**

**Tuesday 16<sup>th</sup> April: 11:00 – 11:45am**

Why is everything so disruptive right now?

### **Webinar 2:**

**The Age of Fragility:**  
**Why Companies Struggle with**  
**Exponential Technological Change**

**Thursday 23<sup>rd</sup> May: 11:00 – 11:45am**

Why are companies struggling to adapt to this disruption?

### **Webinar 3:**

**Becoming Anti-Fragile:**  
**Learning to thrive in Disruptive Times**

**Thursday 27<sup>th</sup> June: 11:00 – 11:45am**

What can companies do to not just survive, but thrive?



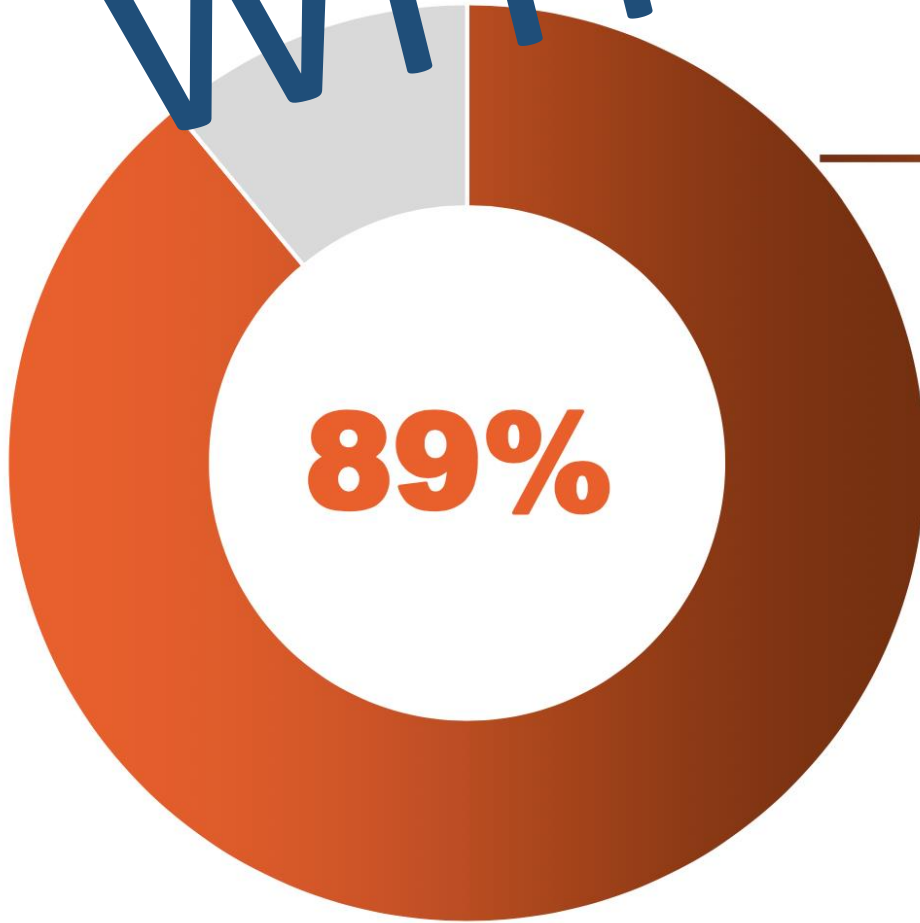
A dramatic, high-contrast black and white photograph of a stormy sea. Large, turbulent waves are crashing, with massive plumes of white foam and spray rising into the air. The sky is dark and overcast, with some light breaking through the clouds, creating a moody and intense atmosphere. The overall scene conveys a sense of power, chaos, and unpredictability.

V U C A

Volatility   Uncertainty   Complexity   Ambiguity



# WHY?



**89% of CSCOs\* believe we are in a prolonged VUCA\*\* environment.**

=

**More Change**

=

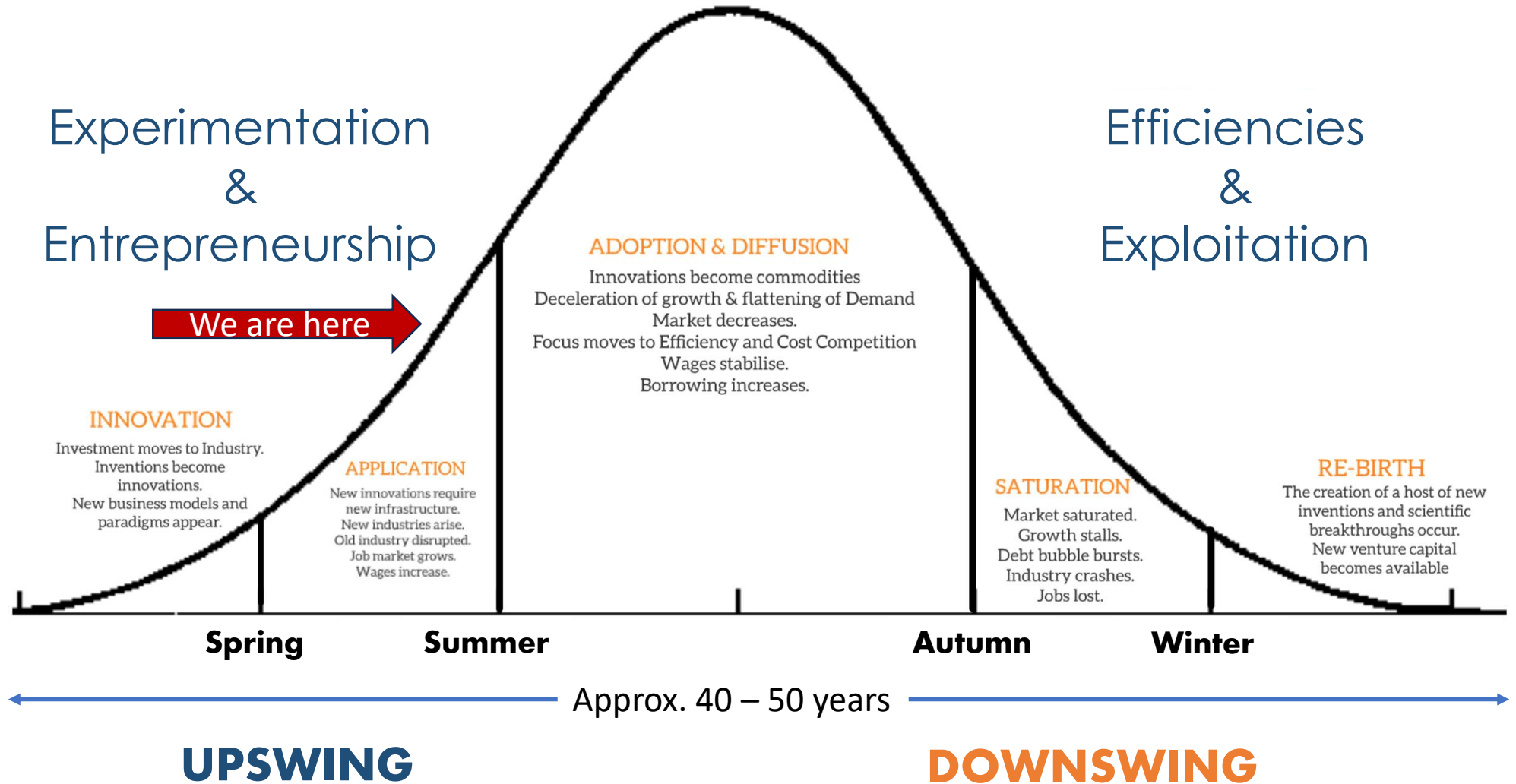
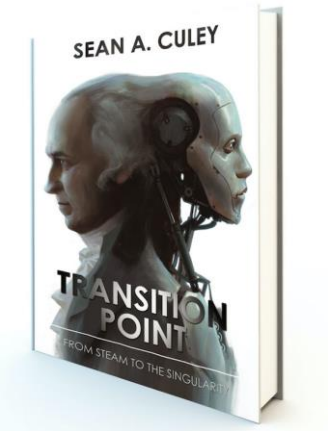
**More Uncertainty**

(\* Poll of 28 CSCOs and Senior SC Professionals 12<sup>th</sup> July 2023)  
(\*\* VUCA = Volatility, Uncertainty, Complexity and Ambiguity)

Source: Gartner, July 2023

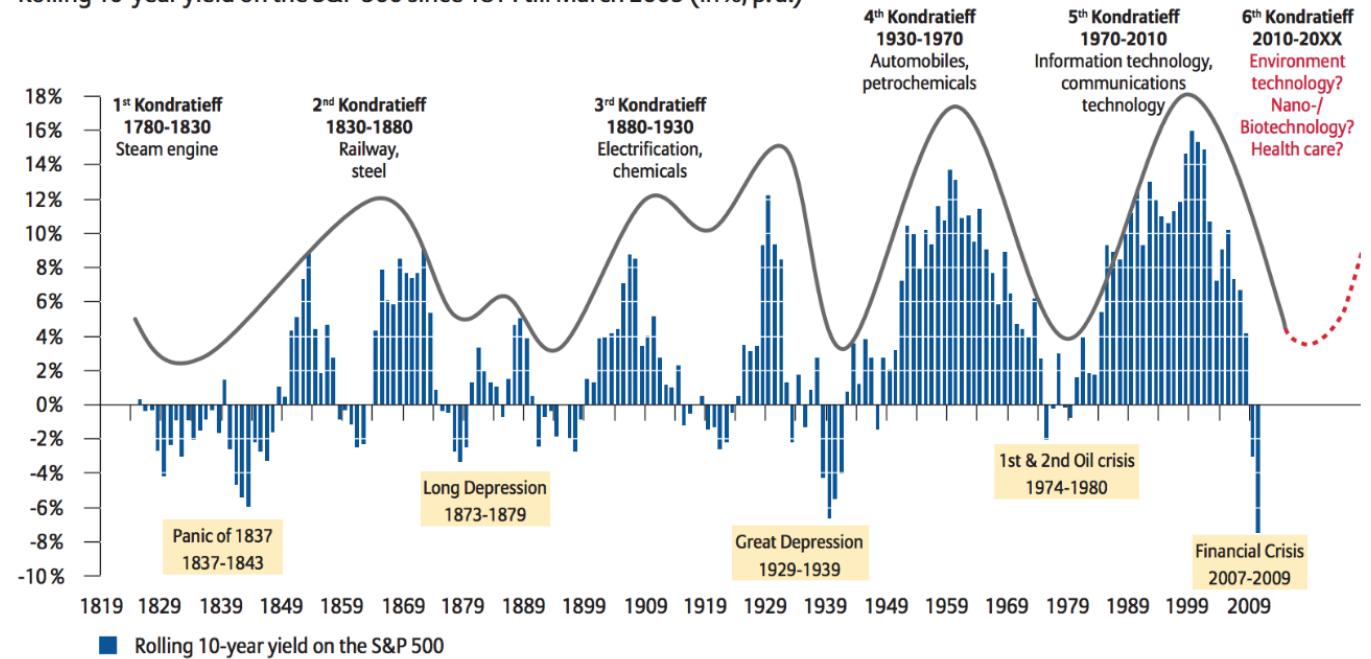
# Waves of Creative Destruction

## Understand the cause, not just the effect.



# Five Previous Waves of Creative Destruction

Rolling 10-year yield on the S&P 500 since 1814 till March 2009 (in %, p. a.)



Source: Datastream; Illustration: Allianz Global Investors Capital Market Analysis

	Wave One	Wave Two	Wave 3	Wave 4	Wave 5
	First Industrial Revolution	Age of Steam & Rail	Second Industrial Revolution	The Age of the Automobile	The Computer Age
Time Period	1760 - 1820	1820-1870	1870-1914	1908 - 1970	1971-2008
Length	60 years	50 years	44 years	62 years (2 World Wars)	37 years
Power Source	Steam Engine + Coal	Steam	Electricity	Electricity, petrochemicals	Digital communications
Transport Mechanism	Canals, Sailing ships	Rail, Steam Ships	Rail (especially US), Bicycle, Transatlantic shipping	Road, Rail, Plane, Ships	Road, Plane, Shipping containers
Communication Mechanism	Printing press	Telegraph	Telephone	Radio, TV	TV, Video, mobile telephony, Internet
Industry	Coal Mining, Cotton, Pottery	Steam powered factories, iron bridges and constructions	Steel, Heavy Engineering (civil, chemical, electrical and naval)	Mass produced Automobile, Consumer White Goods	Computer hardware and software, smart phones, e-commerce, service industries



# Stronger, Faster, Higher...

## Why the waves of creative destruction are getting more disruptive

### FREQUENCY

Shortening of time periods between technological waves

### IMPACT

Increase in the amount of innovation per wave

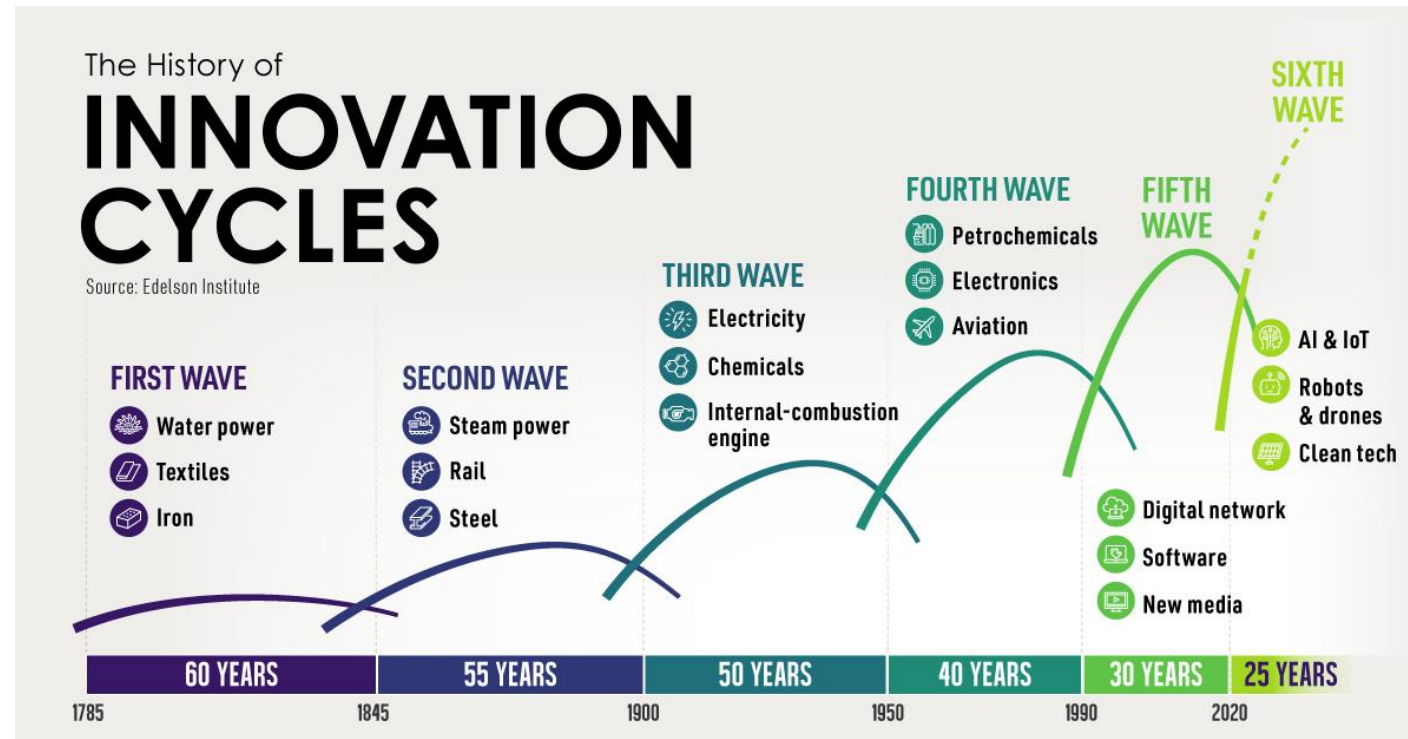
### DIFFUSION

Speed at which innovation spreads - digital faster than sail

### SCOPE

Increase in the number of countries impacted by innovation

In reality, they look more like this....



# The *Creative* Side of Creative Destruction...

**Fifth Wave (1982)**  
**10 Megabytes for \$3,495**





Price per megabyte: **\$349**

**Sixth Wave (2023)**  
**5 Terabytes for \$99.95**




Roll over image to zoom in

 **WD 5TB Elements Portable External Hard Drive, USB 3.0 - WDBU6Y0050BBK-WESN (Renewed)**  
Visit the Amazon Renewed Store  
★★★★☆ 52 ratings

 **Best Seller**

New Price: ~~\$120.00~~  
Price: **\$99.95**  
You Save: **\$20.05 (16%)**

No Import Fees Deposit & \$10.99 Shipping to United Kingdom  
[Details](#)

 Sales taxes may apply at checkout

Capacity: **5TB**

**The product is refurbished, fully functional, and in excellent condition. Backed by the 90-day Amazon Renewed Guarantee.**

- This pre-owned product has been professionally inspected, tested and cleaned by Amazon qualified vendors.
- This product is in "Excellent condition". The screen and body show no signs of cosmetic damage visible from 12 inches away.
- When present, batteries have a capacity that exceeds 80% of the new equivalent.
- Accessories may not be original, but will be compatible and fully functional. Product may come in generic box.
- This product is eligible for a replacement or refund within 90 days of receipt if it does not work as expected. [See terms here.](#)

**Digital Storage** 5000 GB  
**Capacity**

**Hard Disk** USB 3.0  
**Interface**

Price per megabyte: \$0.0002

**500,000** times more memory for **1/35** of the cost.





The **destructive**  
side of digital  
creative  
destruction.

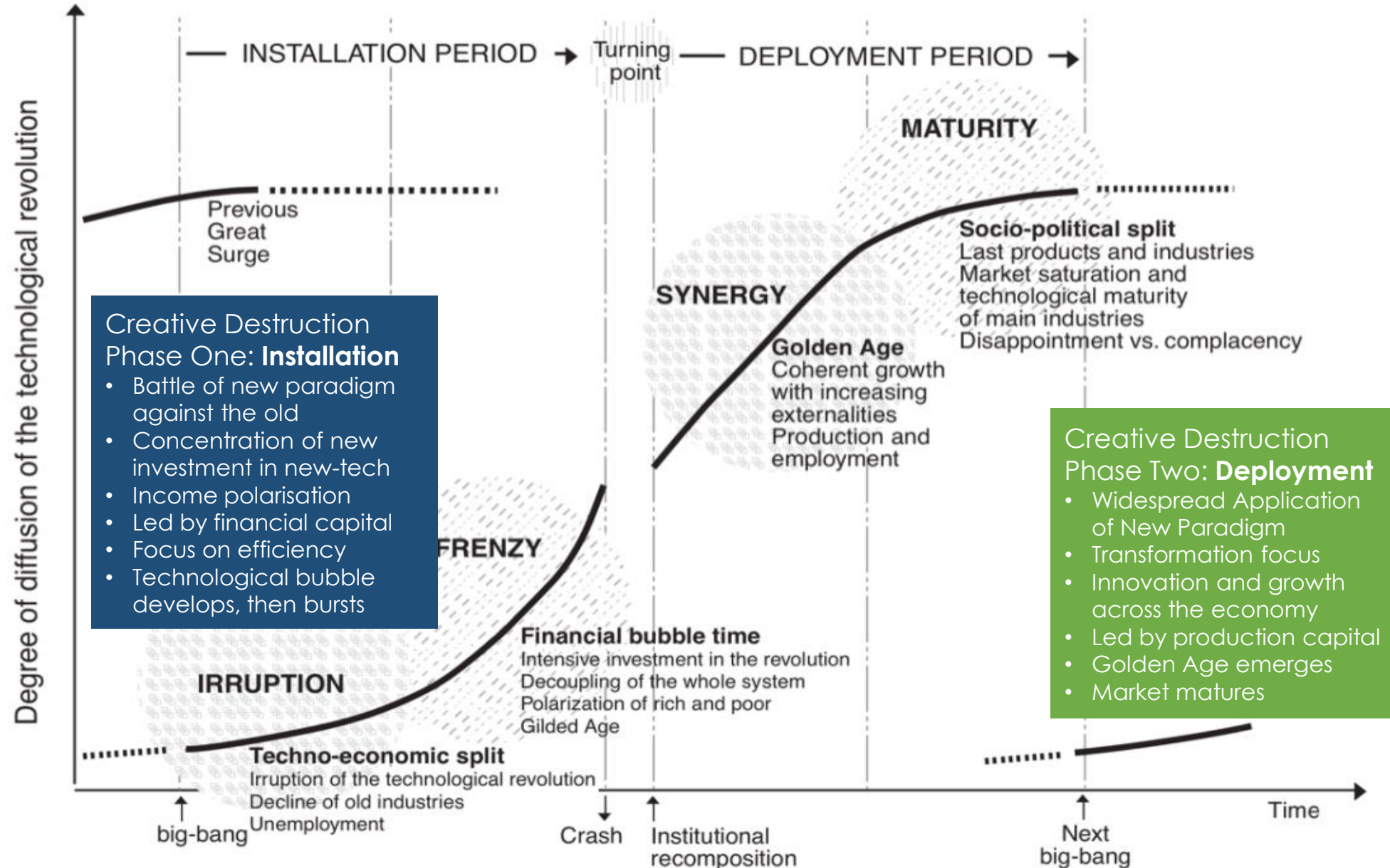


The ghosts of  
retail's physical  
glorious past...





# Spring 'Installation', and Summer 'Deployment' period: An 'Invention' phase, and a Innovation & 'Industrialisation' phase.



Carlota Perez:  
Technological  
Surge Cycle

# The Two Phases of Creative Destruction in a Wave's Upswing

## Phase One: Improve

- New inventions materialise.
- Used primarily to do old things with new tools.
- Focus on improving the efficiency of processes.

## Phase Two: Transform

- Inventions turn into innovations and are industrialised.
- Figure out how to use these new tools to do new things.
- Focus on reimagining how things are done.

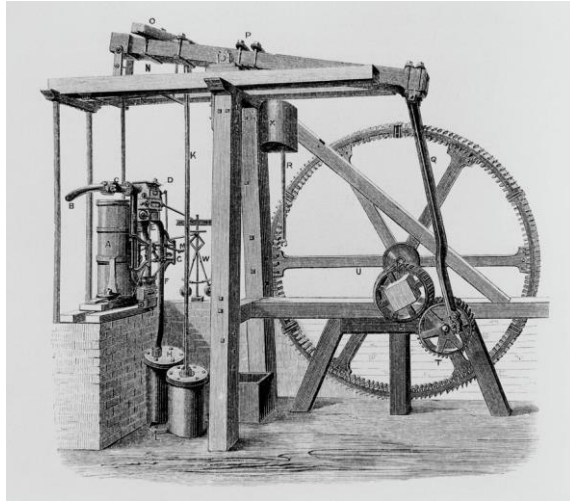


# Phase 1: New inventions change the technological paradigm

## Phase 2: New paradigm leads to innovations that cause revolutions

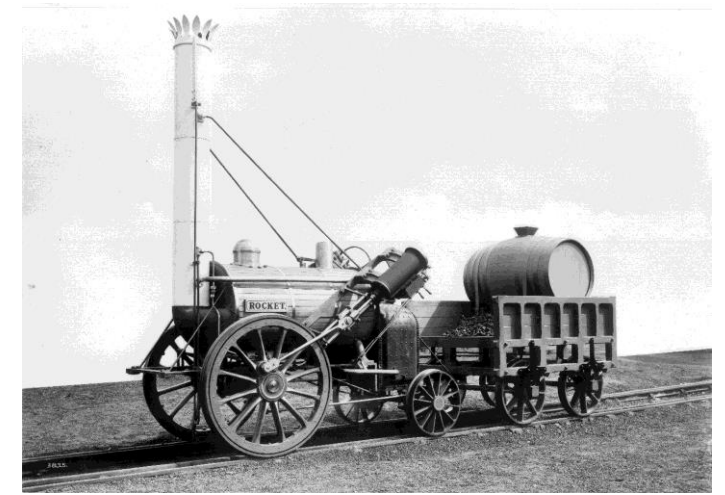
Phase 1:  
Invention

Wave 1



**1779 - James Watt's Steam Engine**  
Extract water from coal mines

Phase 2:  
Revolution



**1814 - Stephenson's Rocket Steam Locomotive**  
Power a new train transportation

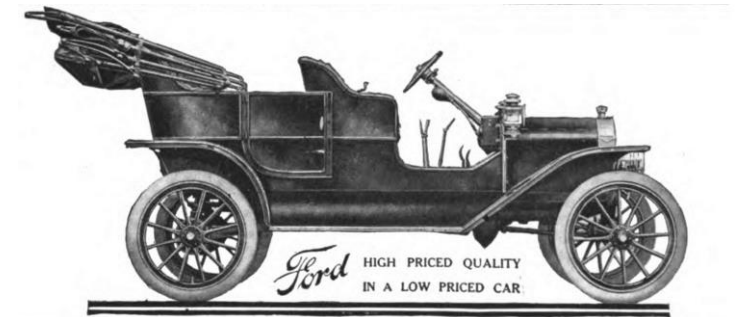
Phase 1:  
Invention

Wave 3



**1885 - Benz Patent Motorwagen**  
First production internal combustion engine (ICE) car

Phase 2:  
Revolution



**1908 - Henry Ford's Model T**  
Mass produced ICE personal transport



# **Phase One** of the Sixth Wave has already created a series of significant paradigm shifts...

## **Fifth Wave (Industrial Age)**

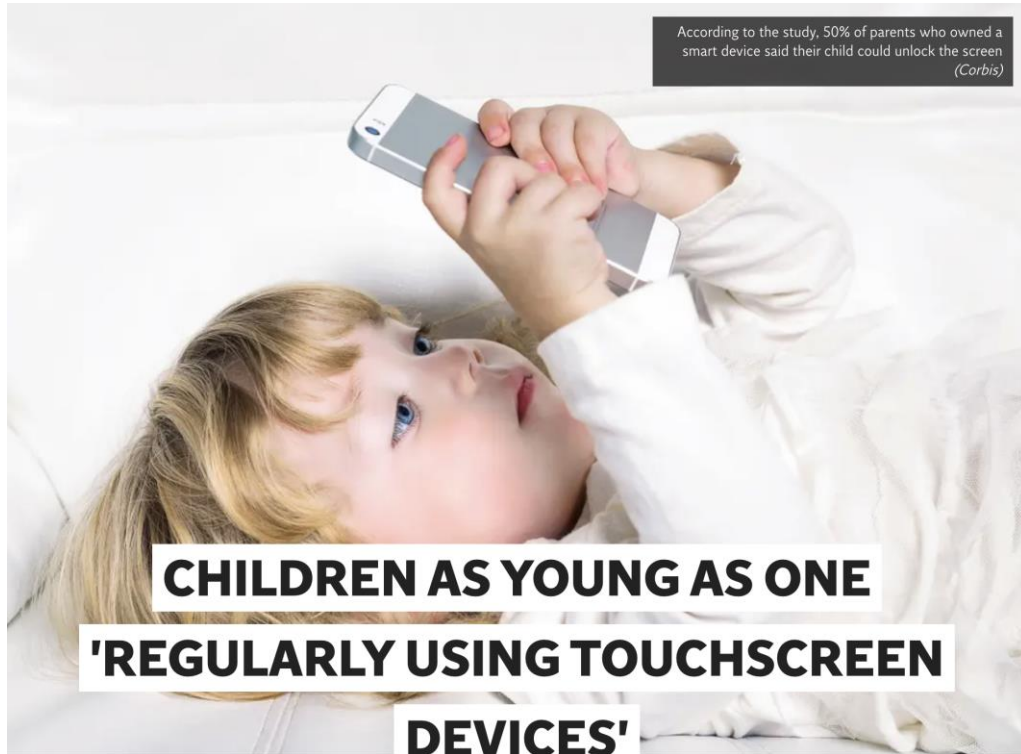
Company in control  
Physical shopping at set times  
Single channel, fixed costs  
Consumer travels to retailer  
Linear, push supply chains  
Sale of products / assets  
Products compete  
Work from office  
All interactions are with humans  
Belief in infinite growth

## **Sixth Wave (Digital Age)**

> Consumer in control  
> Online whenever  
> Omni-channel, variable costs  
> Retailer delivers to consumer  
> Cyclical, pull value chains  
> Provision of services & experiences  
> Business models compete  
> Work from anywhere  
> Most interactions with machines  
> Reality of finite planet

# The Sixth Wave:

## The Age of the Digital Native.



## Fifth Wave Parenting

“Don't sit too close to the screen or you'll get square eyes.”



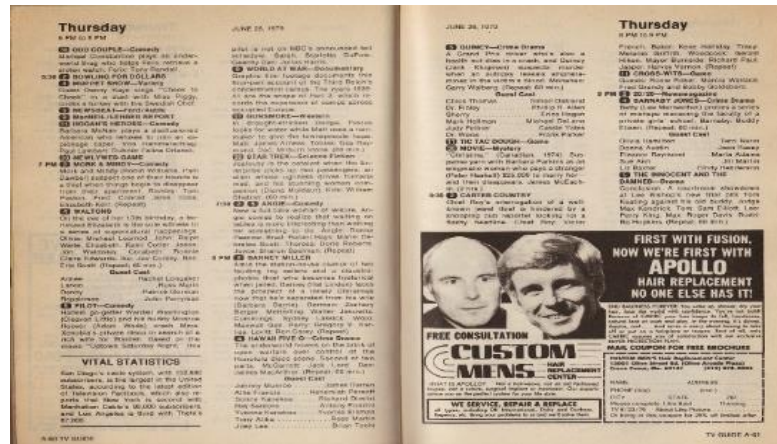
## Sixth Wave Parenting

Literally strap the screen to your child's face.



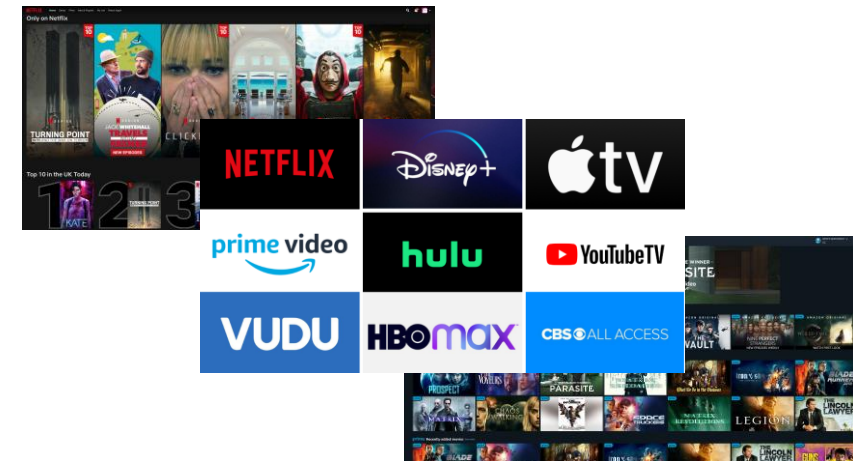


# Past



Content and schedule is predetermined and pushed to the customer on one device.  
The **maker** is in control.

# Present



**Consumer** is in control.  
They decide what they watch,  
where, when and how.


# Convenience is king...

## The Everything Store.

Today's consumer expectation: delivery of:

- a UHD 4K video player
- 3 tubes of liver pate for dogs
- Shower trap cover

...to a semi-rural location, all within 15 hours of ordering.

 You last purchased this item on 22 Apr 2021.  
[View this order](#)



### Panasonic DP-UB150EB-K 4K Ultra HD Blu-Ray Player with HDR10+ Black Compact

Buying for work? Discover Amazon Business, for business-exclusive pricing, downloadable VAT invoices and more. [Create a FREE account](#)

Visit the Panasonic Store


★★★★★ 474 ratings | 56 answered questions

**Amazon's Choice** for "4k blu ray players"

Price: **£129.00** ✓prime FREE One-Day  
or 5 monthly payments of **£25.80**

Pay over 3 months interest-free with an Instalment Plan on your Amazon Mastercard (Minimum Purchase value £100 or more). Terms Apply. [Learn more.](#)

New & Used (7) from **£129.00** ✓prime FREE One-Day

 You last purchased this item on 22 Apr 2021.  
Size Name: Single | [View this order](#)



Roll over image to zoom in



### Arden Grange Tasty Liver Treats for Cats and Dogs, 1 Tube, 75 g

Buying for work? Discover Amazon Business, for business-exclusive pricing, downloadable VAT invoices and more. [Create a FREE account](#)

Visit the Arden Grange Store

★★★★★ 1,423 ratings | 12 answered questions

**Amazon's Choice** for "liver paste for dogs"


RRP: £2.53  
Price: **£2.17** (€28.93 / kg) ✓prime FREE One-Day

You Save: £0.36 (14%)

**Voucher** ☐ Apply 5% voucher on first Subscribe and Save order only.  
[Details](#)

Our gift to you. Get a **£25 Amazon Gift Card** upon approval for the Amazon Business American Express Card, and the annual fee for the first year is on us, limited time offer. Rep. APR 32.6% Variable. Terms apply.

**Note:** This item is eligible for **FREE click and collect** without a minimum order. [Details](#)

 You last purchased this item on 22 Apr 2021.  
[View this order](#)



Click to open expanded view



### Mcalpine ST90CPTOP+TUBE Shower Trap Cover

Buying for work? Discover Amazon Business, for business-exclusive pricing, downloadable VAT invoices and more. [Create a FREE account](#)

Brand: Mcalpine ST90CPTOP+TUBE Replacement Shower Trap Cover

★★★★★ 655 ratings | 40 answered questions

Was: £18.85  
Price: **£18.25** ✓prime FREE One-Day

You Save: £0.60 (3%)

 Get an Amazon credit card. [Learn More](#)

May be available at a lower price from [other sellers](#), potentially without free Prime shipping.

**Note:** This item is eligible for **FREE click and collect** without a minimum order. [Details](#)

New (7) from **£16.99** & **FREE Delivery**

- Mcalpine ST90CPTOP+TUBE Replacement Shower Trap Cover

 Report incorrect product information.



# ...and simplicity rules.

Everything is fast becoming digitised, automated and simpler to use.



What used to involve significant human effort, cost and time now takes seconds thanks to smarter machines. Need a manual to use the app? No thanks!



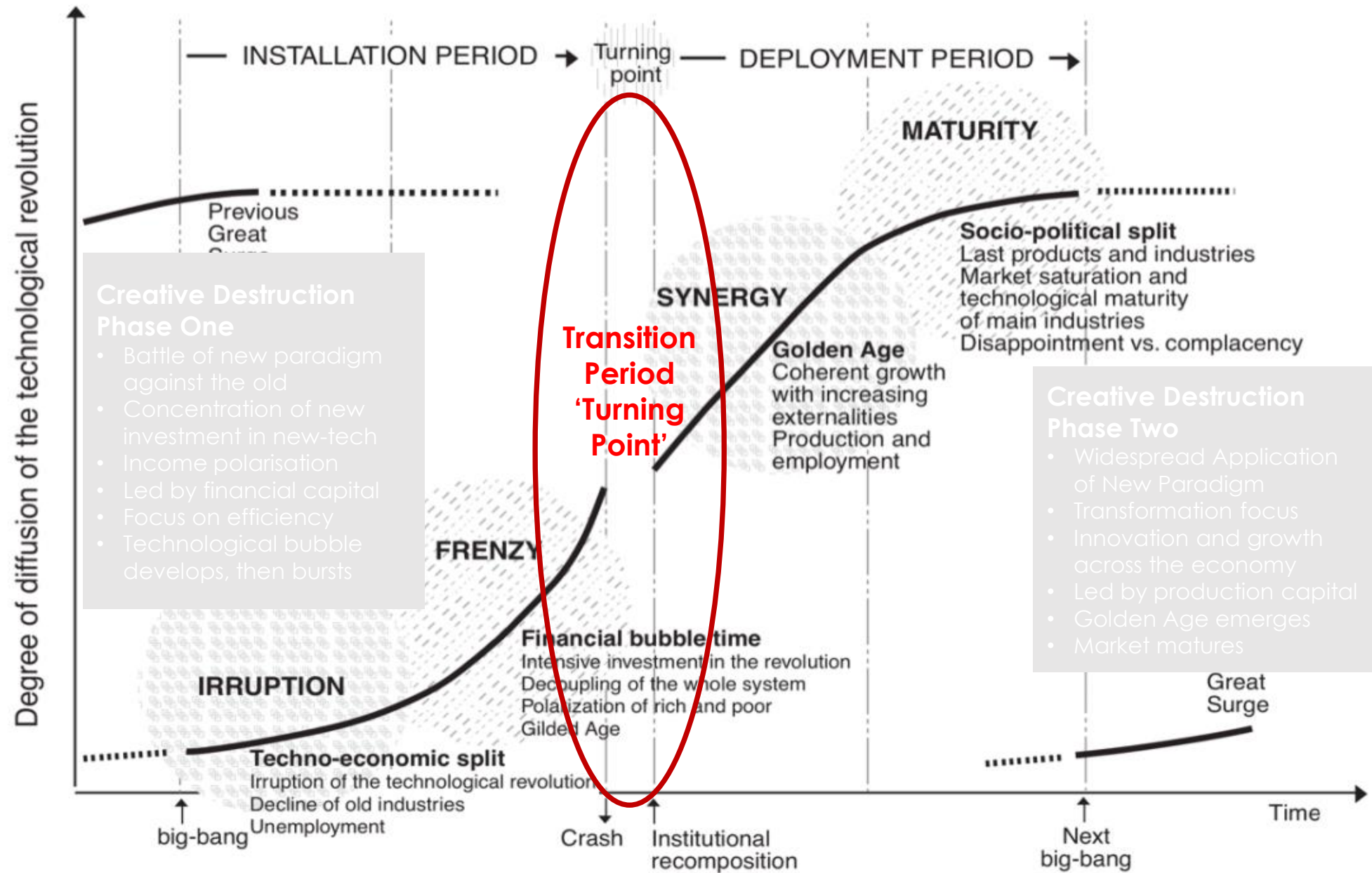
There are benefits to this simplicity:

The fifth wave created landfills full of electronic devices.

The sixth eliminated them.



# We are currently in the disruptive **Transition Period** or 'Turning Point'...



Carlota Perez:  
Technological  
Surge Cycle

# The Transition Period is when the old model finally breaks down...



- The leaning of the supply chain in the downswing left it perilously exposed in the upswing. Offshoring exposed it to **more risks, longer lead-times**.
- Supply chains lack global resilience & are breaking down in the face of multi-country disruptions caused by the transition period's power struggles.
- Black swans have gone from rare to everywhere.

Goods have become **unreliable in supply...**

**...and expensive in price.**

## **Maersk Decides the Red Sea Is Too Unsafe for Its Ships for Now**

- Maersk, Hapag-Lloyd announce they'll continue to avoid region
- Houthi rebels have attacked ships passing key way point

Red Sea attacks: 'Our shipping costs have jumped 250%'

**Global oil price hits seven-month high as Middle East tensions rise**

Red Sea rebel attacks set to drive up price of wine, meat and fish

- Cost control is a downswing behaviour – but we will be in the upswing to at least 2030.
- Cost control also requires a high degree of **predictability** - and we don't have a high degree of predictability right now - we have **uncertainty**.
- More external fragility, less internal agility.



We are  
unfortunately  
living  
through a  
time of great  
fragility...

---

Our personal finances are **fragile**.

---

Our supply chains are **fragile**.

---

Our energy and food supplies are **fragile**.

---

Our economies are **fragile**.

---

Our peace is **fragile**.

---

Our democracies are **fragile**.

---

Our ecosystem is **fragile**.

Just because the chaos and disruption of the upswing is new to us,  
doesn't mean it is new...

"All the News That's Fit to Print"

# The New York Times.

LATE CITY EDITION

VOL. CXXI, No. 30,806 \*RECEIVED\* NEW YORK, TUESDAY, OCTOBER 11, 1961 50 CENTS FIVE CENTS

## U.S. IMPOSES ARMS BLOCKADE ON CUBA ON FINDING OFFENSIVE-MISSILE SITES; KENNEDY READY FOR SOVIET SHOWDOWN



## NIXON SENDS GIs INTO CAMBODIA

Washington, April 10 (UPI) — President Richard Nixon today announced that he has ordered the U.S. to send 10,000 troops to Cambodia. The move is expected to bring the U.S. closer to the Cambodian border. Nixon said the move was necessary to protect the U.S. from the threat of communism in the region.



## CRISIS? WHAT CRISIS? Rail, lorry, jobs

By WALTER CLARY  
Political Editor

SUN - TANNED  
Premier Jim Callaghan breezed back into Britain yesterday and asked: Crisis? What Crisis?

As the country faces the threat of a rail and lorry strike—and renewed Arctic weather—he sought to calm the nerves of his subjects.

What? This is a

### chaos—and Jim blames the Press

## NIXON RESIGNS

### Racial Violence Hits Cities; Death Toll Begins To Mount



## A 3-DAY WEEK BRITAIN

ILLIONS of workers will go on a three or

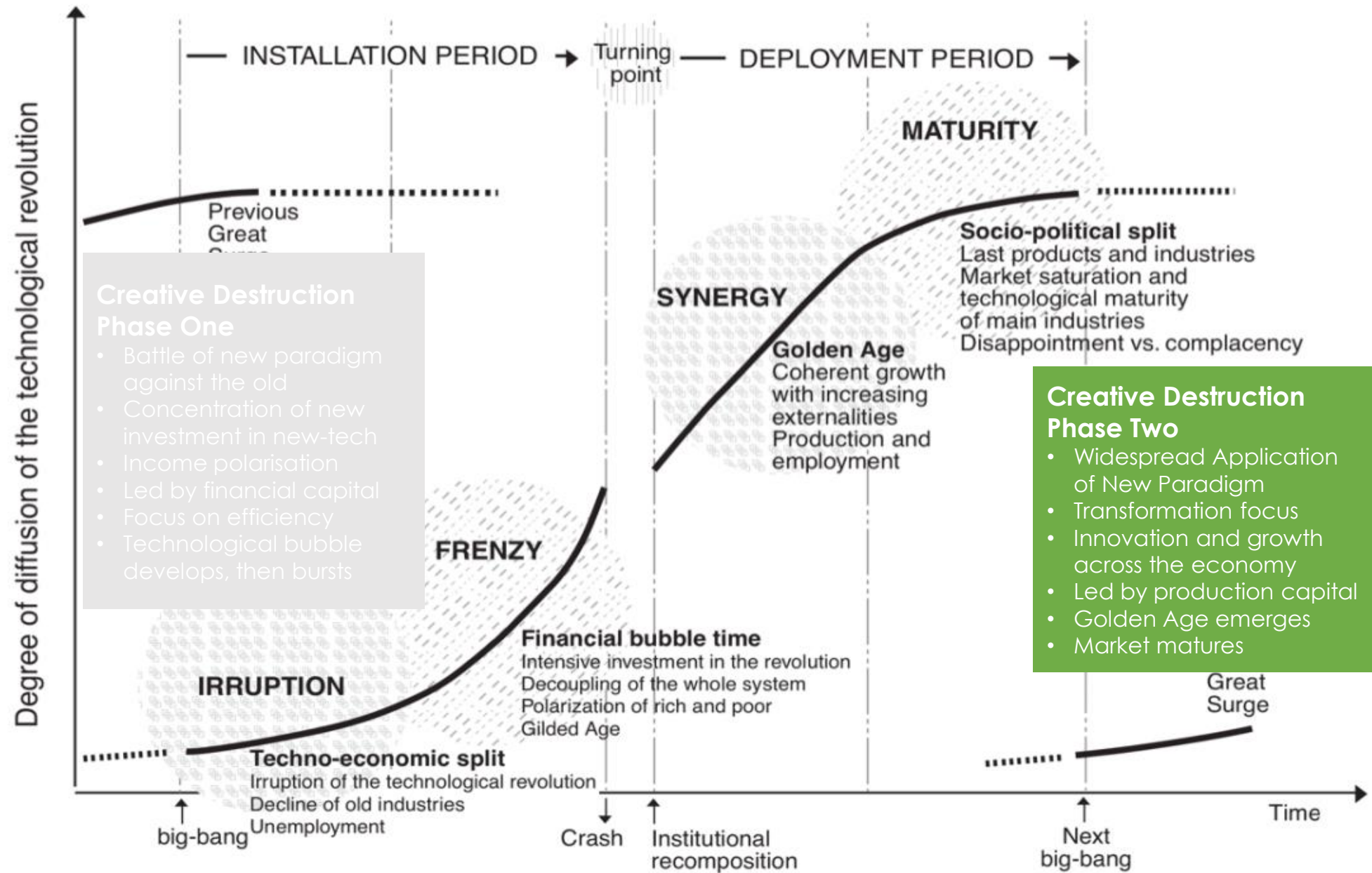
## Daily Mirror 15 DIE IN MUNICH MASSACRE

## MARINES LAND IN VIET NAM

## Chicago Tribune

### U. S. embassy in Iran seized; staff is held

# Should we get past this transition period, a new **Golden Age** awaits...



Carlota Perez:  
Technological  
Surge Cycle



# Creative Destruction Phase Two has always resulted in a **technological Golden Age**



Industrial Revolution -  
Golden Age of  
Canals and Industry  
(First Wave)



2nd Revolution -  
Golden Age of Rail &  
Steam  
(Second Wave)



Victorian Golden Age  
- 'La Belle Epoque'  
(Third Wave)



Roaring Twenties &  
Golden Age of the  
Automobile  
(Fourth Wave)



Pax Americana &  
Golden Age of  
Telecom and  
Computing  
(Fifth Wave)



**Digital Golden Age:**  
Age of Intelligent, Autonomous Robotics, AI & the IoE  
(Sixth Wave)

# Phase Two: Transformation Time Again

...what paradigm shifts will this phase bring forth?

## Phase One: Improve

- New inventions materialise.
- Used primarily to do old things with new tools.
- Focus on improving the efficiency of processes.

## Phase Two: Transform

- Inventions turn into innovations and are industrialised.
- Figure out how to use these new tools to do new things.
- Focus on reimagining how things are done.

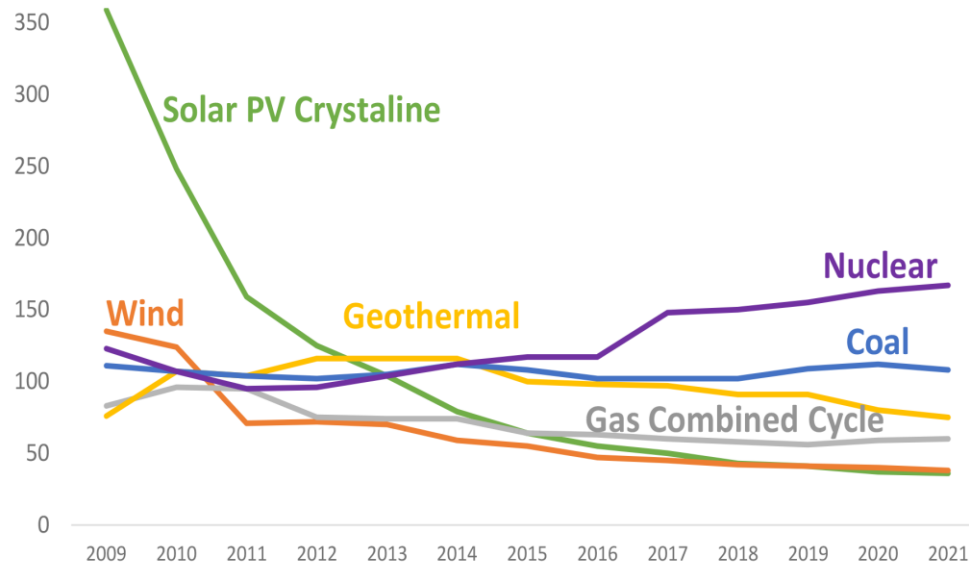




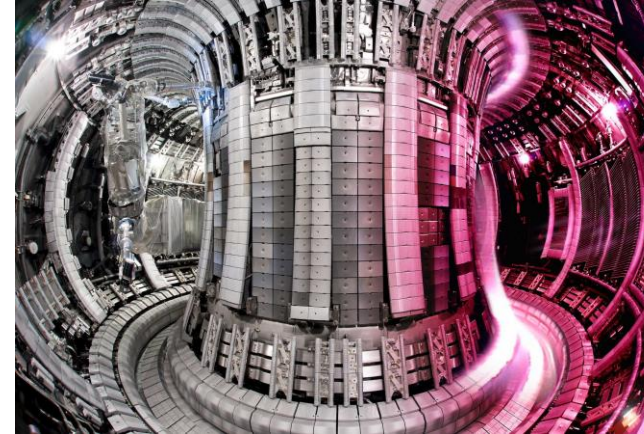
## Sixth Wave Power: Phase One. Improvement.



Levelized costs of Energy \$/MWh



## Sixth Wave Power: Phase Two: Transformation



### Scientists Report Major Progress On Tokamak Fusion Effort

By [Brian Westenhaus](#) - Sep 13, 2022, 12:30 PM CDT

### The First Small Modular Nuclear Reactor Was Just Approved by US Regulators

### Scientists Just Made Hydrogen Fuel With Nothing But Air and Solar Power

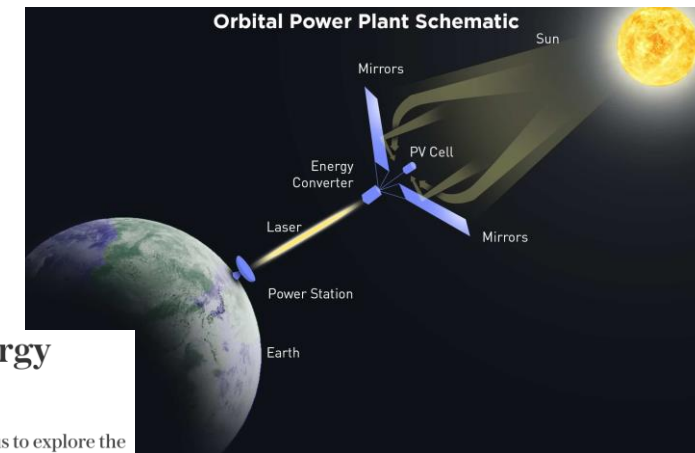
### MTC joins Space Energy Initiative for in-orbit solar

#### Energy crisis lifeline as Government backs plans to launch UK's first space power station

Solar panels will wirelessly beam signals back down to Earth to generate power for clean electricity in a project which could come online BY 2035.

#### Space-based solar power is viable energy solution, says Government

UK Space Energy Initiative is teaming up with aerospace company Airbus to explore the possibility of beaming solar energy back to Earth

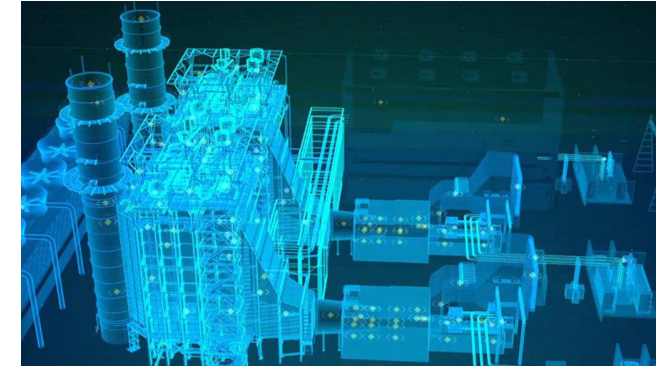




## Sixth Wave Communication: Phase One. Improvement.



## Sixth Wave Communication: Phase Two: Transformation

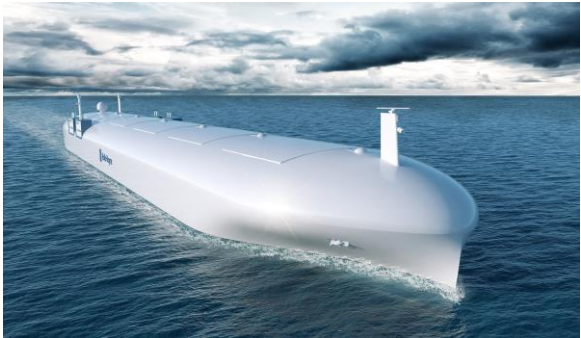




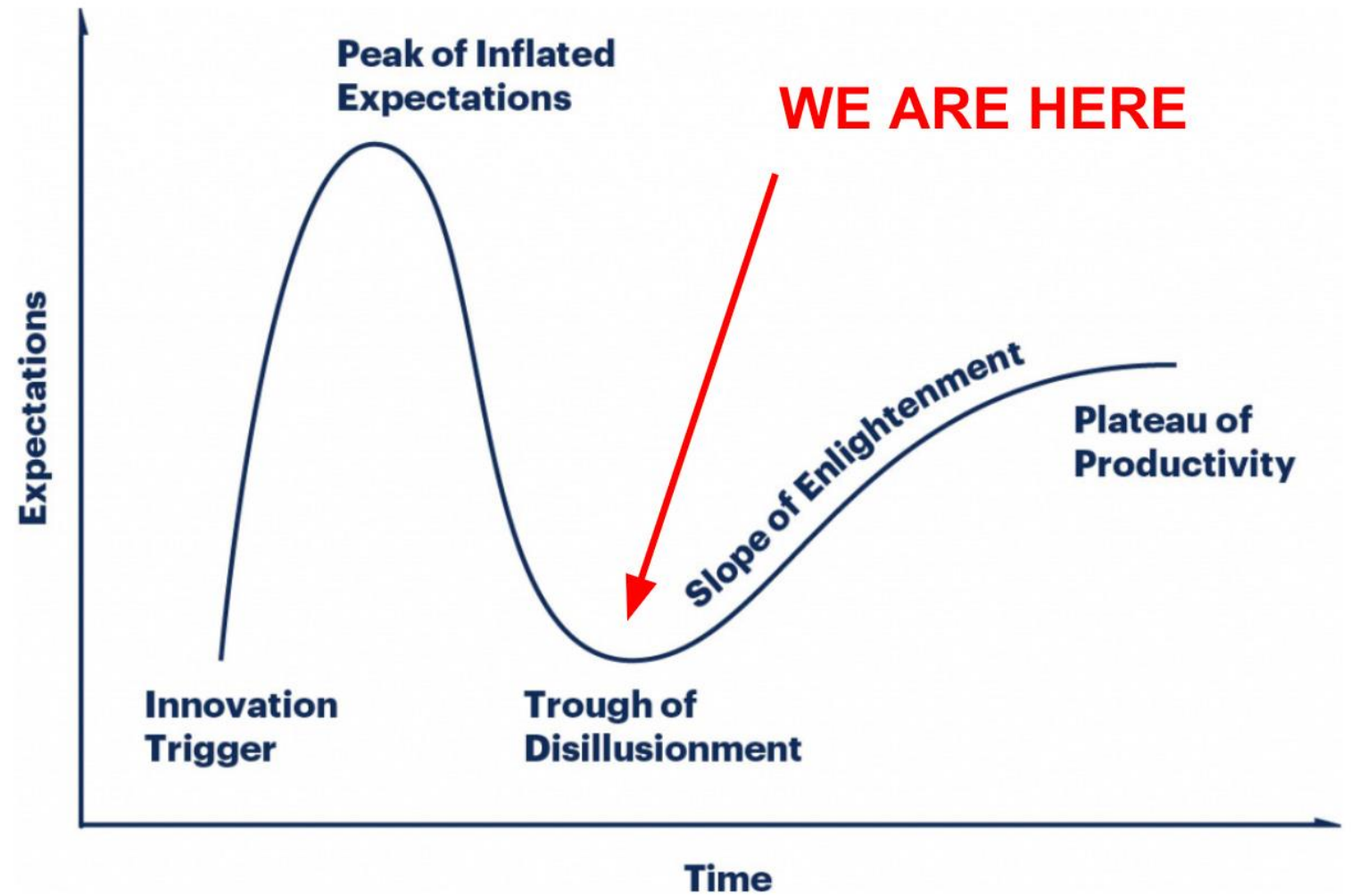
# Sixth Wave Transportation: Phase One. Improvement.



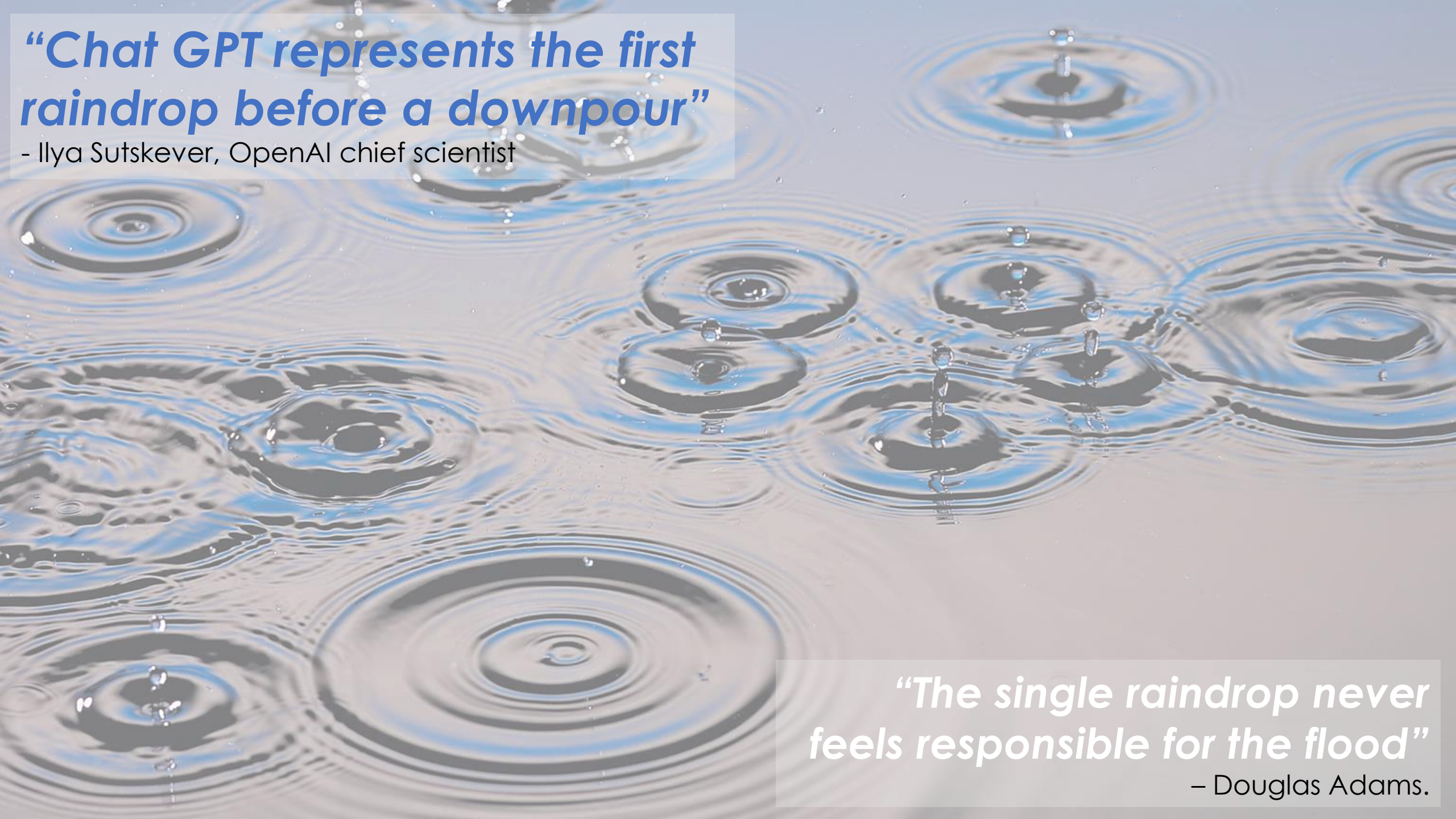
# Sixth Wave Transportation: Phase Two: Transformation



AI's  
Transition  
from  
**Hype** to  
**Reality**  
is about to  
begin...







***“Chat GPT represents the first  
raindrop before a downpour”***

- Ilya Sutskever, OpenAI chief scientist

***“The single raindrop never  
feels responsible for the flood”***

– Douglas Adams.

# The rate of progress in Gen AI is exponential...



## Meta is putting AI chatbots everywhere

ARTIFICIAL INTELLIGENCE Updated Today, Apr 14, 2024, 8:13 PM GMT+1

### From ChatGPT to Gemini: how AI is rewriting the internet

#### Google DeepMind's new generative model makes Super Mario-like games from scratch

Genie learns how to control games by watching hours and hours of video. It could help train next-gen robots too.

### Google's Bard chatbot now responds in real time – and you can shut it up mid-sentence

### Copilot upgrades to GPT-4 Turbo and DALL-E 3 from OpenAI

Copilot is getting super charge with new AI models for accurate results in complex tasks, higher quality images, and better rewrites from the webs.

### OpenAI's Sora text-to-video generator will be publicly available later this year

#### GPT-5 might arrive this summer as a “materially better” update to ChatGPT

Sources say to expect OpenAI's next major AI model mid-2024, according to a new report.

BENJ EDWARDS - 3/20/2024, 9:53 PM



# From data discovery...

...to creative design.



You

sean culey is hosting a series of webinars - what is he likely to talk about?



Copilot

Sean Culey, an award-winning keynote speaker on supply chain transformation and disruptive technologies<sup>1</sup>, is likely to discuss a range of topics in his webinars. Here are some of the key themes:

- **Transition from the Age of Industry to the Age of Intelligent Automation:** He discusses how a new wave of disruptive technologies is fundamentally changing nearly every aspect of business<sup>1</sup>.
- **The Nature of Disruption:** He explains why the world is so chaotic right now and how a new wave of technological developments is about to create a new industrial revolution<sup>1</sup>.
- **End of the Mass-Produced, Human-Driven Supply Chain:** He talks about the impact that this paradigm shift will have on the very nature of work<sup>1</sup>.
- **The Challenge for Companies:** He emphasizes that the challenge for many companies is human, not technological; dependent on their ability to shift their linear industrial mindsets to adapt to an exponential and digital world<sup>1</sup>.
- **Advice on Adapting to the New Wave:** He provides advice as to how to adapt to this new wave so their company can thrive through this period, not just survive<sup>1</sup>.

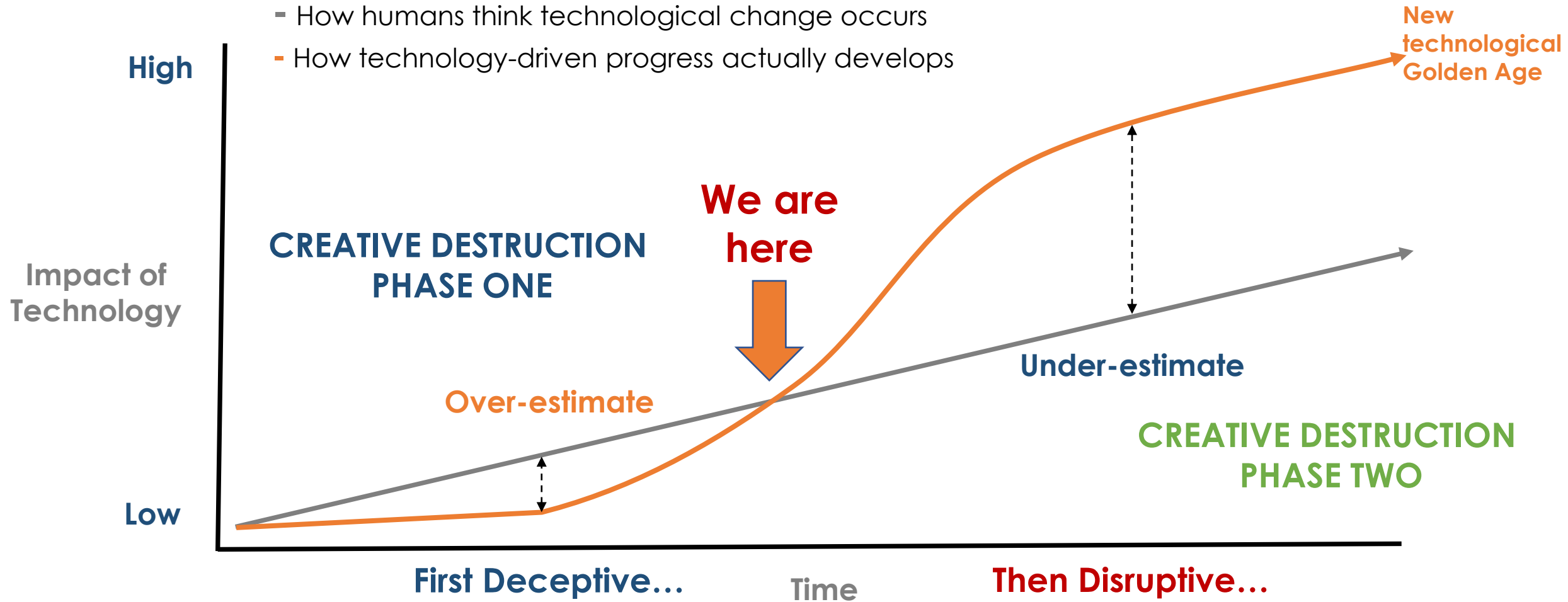
In addition, he has also discussed topics such as Engineer to Order supply chains in a project-based environment, segmentation of supply chains, building a modern supply chain organization structure, and migration from Excel spreadsheets to more robust applications like Enterprise Resource Planning<sup>2</sup>.





# Amara's Law:

*"We tend to over-estimate the impact of technology in the short-term, and under-estimate it in the long-term."*



Think things are disruptive now? **You haven't seen anything yet...**

# Speed of change once the tipping point occurs...

5<sup>th</sup> Avenue, New York.

1908 – no cars

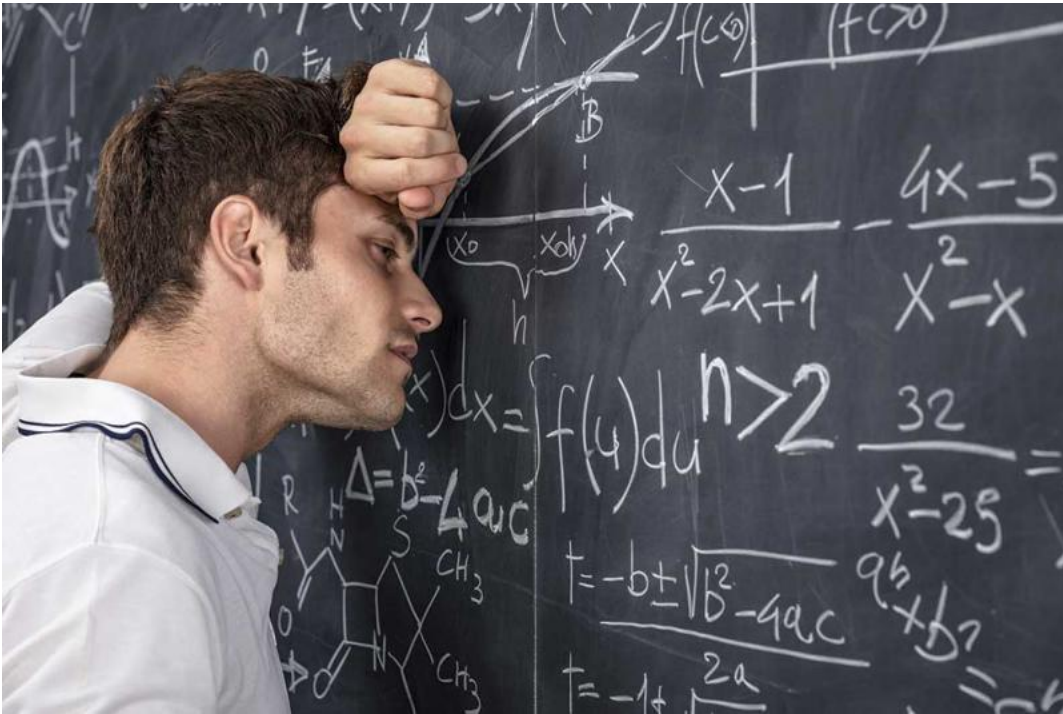


1913 – no horses (almost)



# Moravec's Paradox

Hard things are easy for AI to understand and figure out...



...and easy things are incredibly hard.



JUNE 2015

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US DEFENCE ADVANCED  
RESEARCH PROJECTS AGENCY  
(DARPA) ROBOTIC TRIALS

## Sixth Wave Phase Two: Get Ready for humanoid robotic labour as a service...

### Tesla unveils humanoid robot that can pick up an egg without breaking it

Machine dubbed Optimus 'Gen 2' boasts improved balance and hand movements

Matthew Field  
13 December 2023 • 10:02am



Sanctuary AI unveils a humanoid robot called Phoenix that's ready to offer its 'labor-as-a-service'

### The race to build AI-powered humanoids is heating up

Figure 01 is a bipedal, AI-powered humanoid. And it wants to work in a warehouse.

#### INTRODUCING FIGURE 01



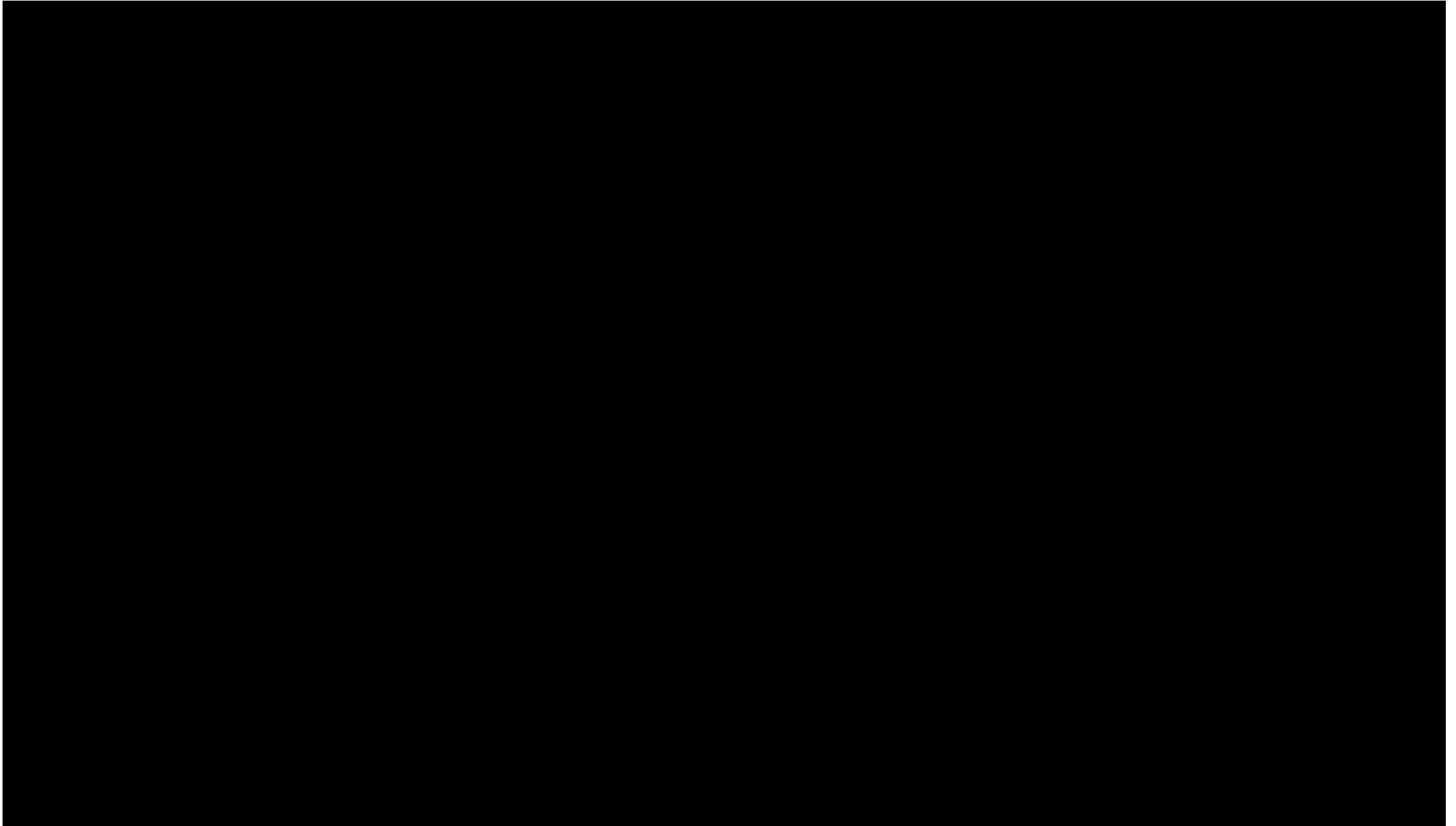
### Apptronik Introduces Apollo Humanoid Robot > Apollo's custom actuators will keep the cost low

BY EVAN ACKERMAN | 23 AUG 2023 | 6 MIN READ



The global Humanoid Robot Market size is expected to reach \$39.6b by 2030, growing at a CAGR of 52.8%

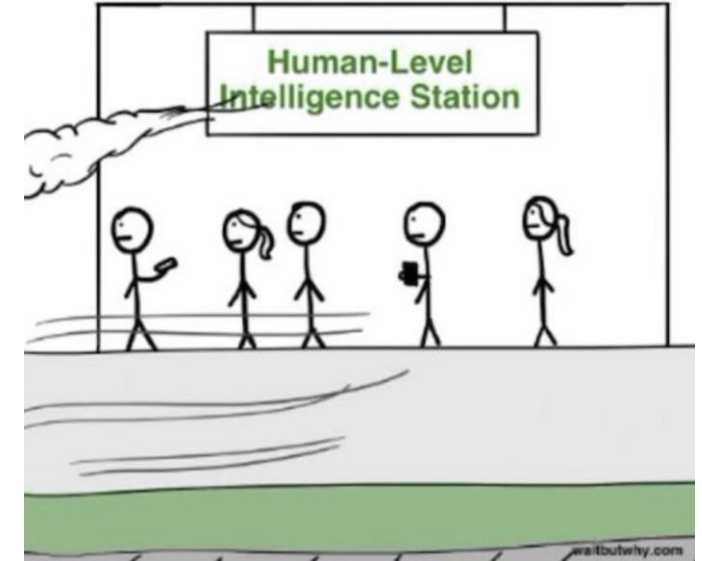
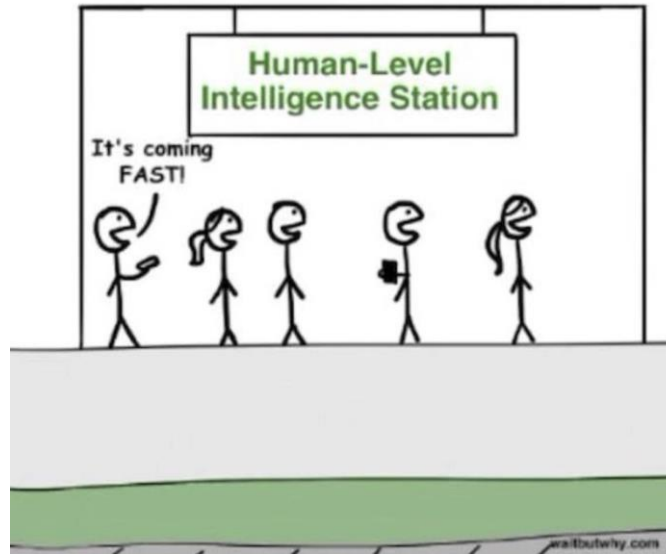
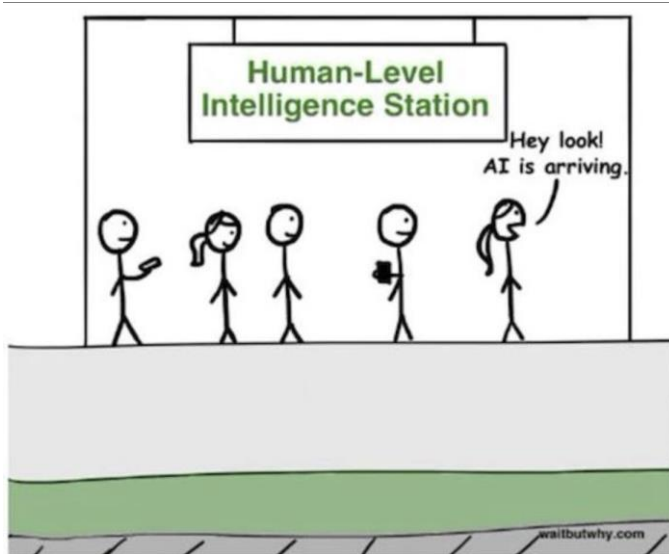
# Generative AI and Robotics – machines become smart





# The Great AI Acceleration is well underway.

## Next Stop AGI?



**Als ranked by IQ; AI passes 100 IQ for first time,  
with release of Claude-3**

# Have we achieved AGI?

If not, we are getting very close indeed.



**LEGO Alex** @AlexAlleman · 2h

Yes, intelligence is obviously multi-dimensional. AI is really insane in some areas. The best AI chess has an elo rating of 3400+.

IQ is testing something more difficult than chess or reading comprehension or legal case analysis. So 101 (and soon to be 150+) IQ is wild.



38



**Zebediah** @Zebediahh

Follow



Agree. When it can write a novel in 5 minutes and also beat anyone at chess and also ace an IQ test then that's AGI. Without question.

A very simple extrapolation suggests that we should therefore expect to get Claude-4 in 12 - 16 months, and that it should get about 25 questions right per test, for an IQ score of 120.

After that, in another 16 - 32 months, Claude-5 should get about 31 questions right, for roughly 140 IQ points.

After that, in another 20 - 64 months after that, Claude-6 should get all the questions right, and be smarter than just about everyone. That's 4 - 10 years out in total, adding up all the time periods.

## OpenAI and Meta are on the verge of releasing AI models capable of reasoning like humans, report says

Beatrice Nolan Apr 10, 2024, 1:18 PM BST

Share

Save

## New AI Claude 3 Declares That It's Alive and Fears Death

While machines are getting smarter...

...the average human is getting dumber.

## AI Systems Ranked by IQ

AI	<u>IQ Score</u>	Questions right (out of 35 per test)	Chance it beats random guessing
Claude-3	101	18.5	99.999999%+
ChatGPT-4	85	13	99.9986%
Claude-2	82	12	99.9911%
Bing Copilot	79	11	99.9314%
Gemini (normal)	77.5	10.5	99.8212%
Gemini Advanced	76	10	99.5894%
Grok	68.5	7.5	87.9402%
Llama-2 (Meta)	67	7	80.3278%
Claude-1	64	6	56.3155%
ChatGPT-3.5	64	6	56.3155%
Grok Fun	64	6	56.3155%
Random Guesser	63.5	5.8333	50%

## IQ Scores Are Falling in "Worrying" Reversal of 20th Century Intelligence Boom

**American IQ Scores Have  
Rapidly Dropped, Proving  
the 'Reverse Flynn Effect'**

EDUCATION

## IQs are falling - and have been for years

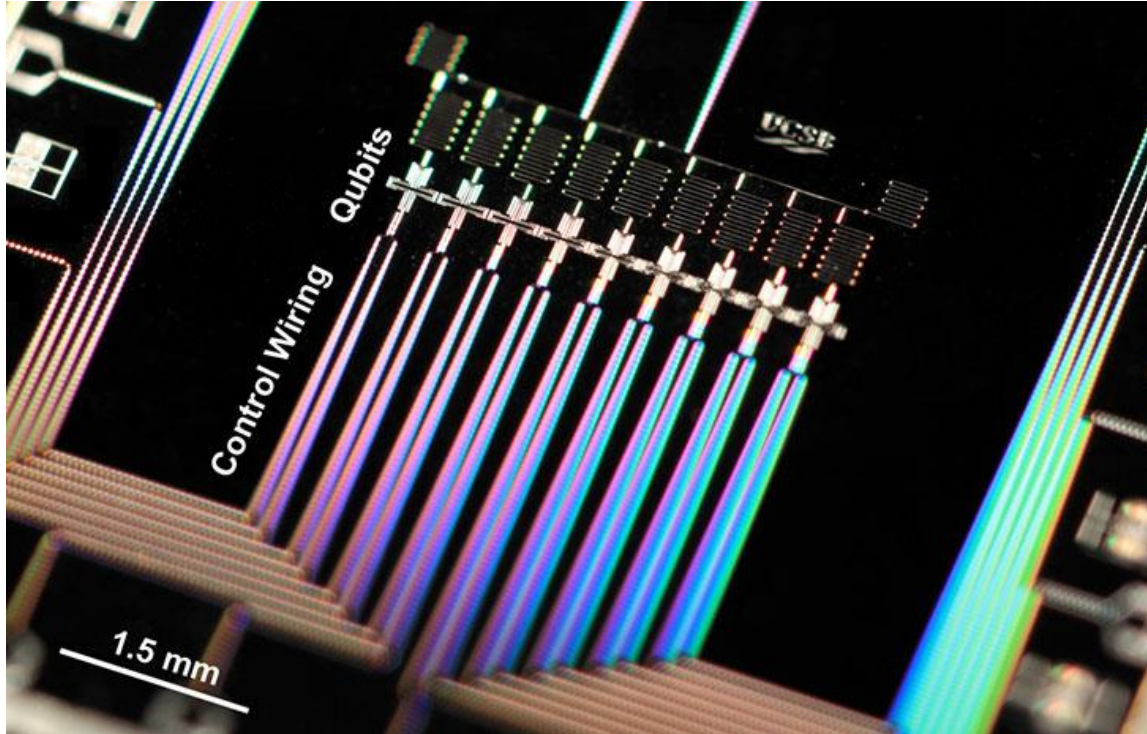
The average rate of decline has been around three IQ points a decade, amounting to the loss of about 13.5 percent in average intelligence between 1975 and 2020.

Has humanity reached 'peak intelligence'?

**Idiocracy: is the decline in human intelligence  
undermining democracy?**



# We haven't seen anything yet: **Welcome to the Quantum Era.**



Google achieves 'quantum supremacy' the solving of a problem in seconds using QC that would have taken 10,000 years using traditional supercomputers.

## **Volkswagen optimizes traffic flow with quantum computers**

How Quantum Computers Could Cut Millions Of Miles From Supply Chains And Transform Logistics

Exploring quantum computing use cases for logistics

Logistics is more complex than ever. Quantum computing is built for complexity.

## **Quantum Computing: A New Solution for Supply Chain and Logistics Optimization**

### **How to be Quantum Ready in Supply Chain and Logistics**

The transportation industry has the highest rates of quantum adoption of any industry, with 63% of respondents in the early stages of quantum adoption.

### **Navigating the quantum revolution in logistics**

Published Nov. 13, 2023

## **Quantum technologies and value chains:**

**Why and how Europe must act now**

### **New technologies on show at Quantum Showcase as Science Minister drives forward UK's £2.5 billion Quantum Strategy**

The Science Minister George Freeman outlines the recipients of over £14 million in funding, aimed at benefiting the UK's thriving quantum sector.

# 'Double Exponential' Quantum Progress: Moore's Law replaced by Neven's Law as the new benchmark

## Difference between Moore's Law and Neven's Law

### n Classical computing power ( $2^n$ )

1.	2
2.	4
3.	8
4.	16
5.	32
6.	64
7.	128
8.	256
9.	512
10.	1024



### n Quantum computing power ( $2^{2^n}$ )

1.	4
2.	16
3.	256
4.	65,536
5.	4,294,967,296
6.	18,446,744,073,709,551,616
7.	$3.4028236692093846346337460743177e+38$
8.	$1.1579208923731619542357098500869e+77$
9.	$1.3407807929942597099574024998206e+154$
10.	$1.797693134862315907729305190789e+308$

## Companies

### Technology

**D-Wave says its quantum computers can solve otherwise impossible tasks**

Google officially lays claim to quantum supremacy

Amazon is laying the groundwork for its own quantum computer

## The Race for Quantum Supremacy is well underway

## Countries

DAVOS AGENDA

**The world is heading for a 'quantum divide': here's why it matters**

China invests billions in quantum computing, race with US now neck-and-neck

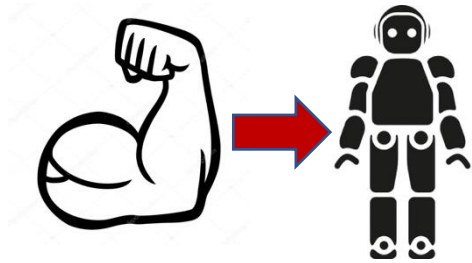
**The U.S., China, and Europe are ramping up a quantum computing arms race. Here's what they'll need to do to win**

# Phase Two: A new Industrial Revolution: The Automation Triple Whammy...

## Whammy 1:

Horizontal Convergence

### *Muscle to Machine*

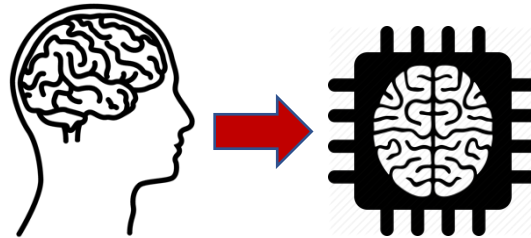


The Automation of  
Physical Tasks

## Whammy 2:

Vertical Convergence

### *Mind to Machine*

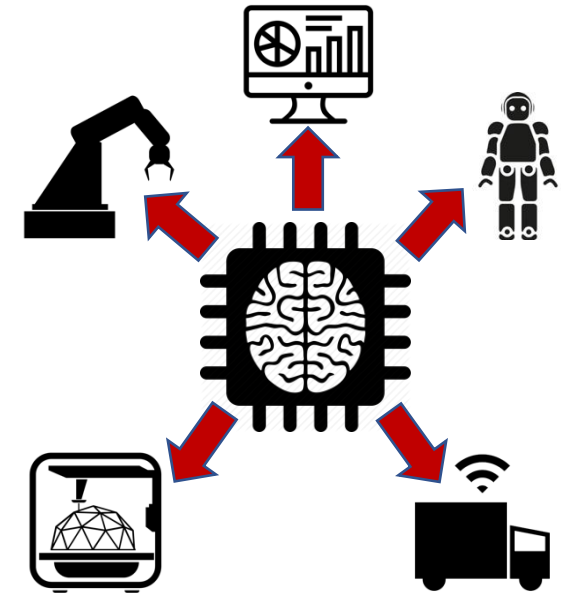


The Automation of  
Knowledge Based Tasks

## Whammy 3:

Technological Convergence

### *Machine to Machine*

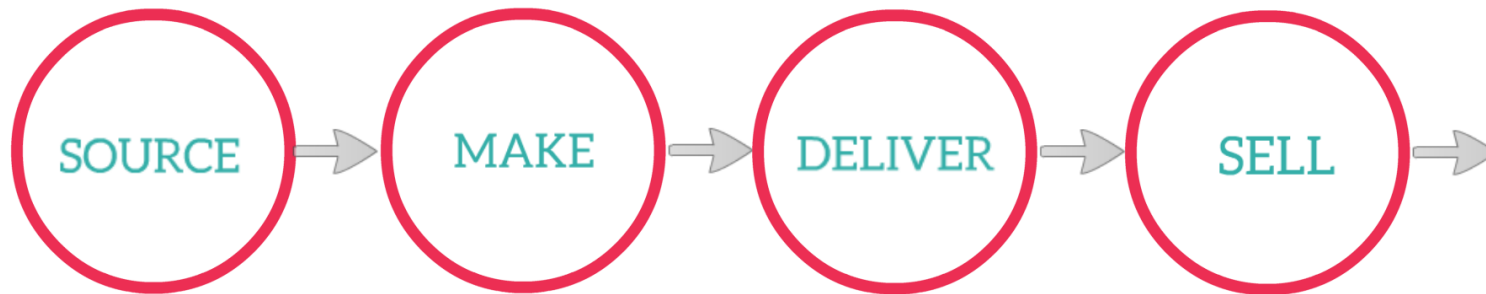
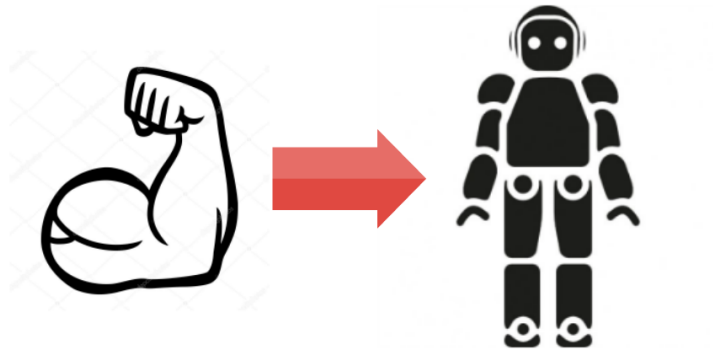


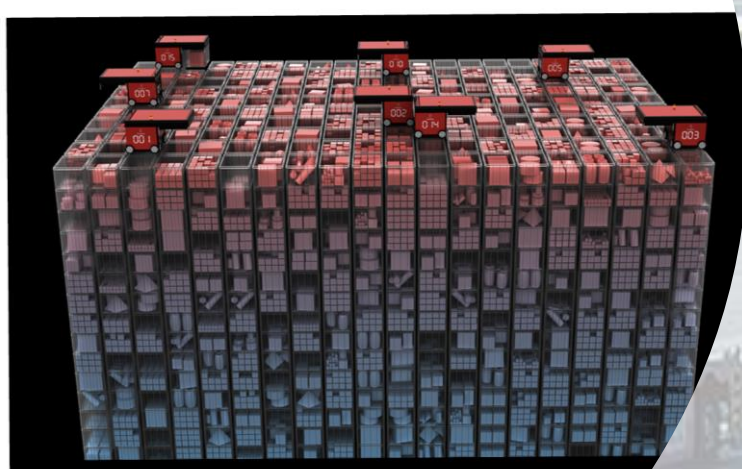
The Automation of the  
End-to-End Supply Chain

Phase Two Supply Chain innovations are going to be transformative  
– but only for those for those able to create value from them.



# Sixth Wave Whammy #1: End-to-end Supply Chain labour automation





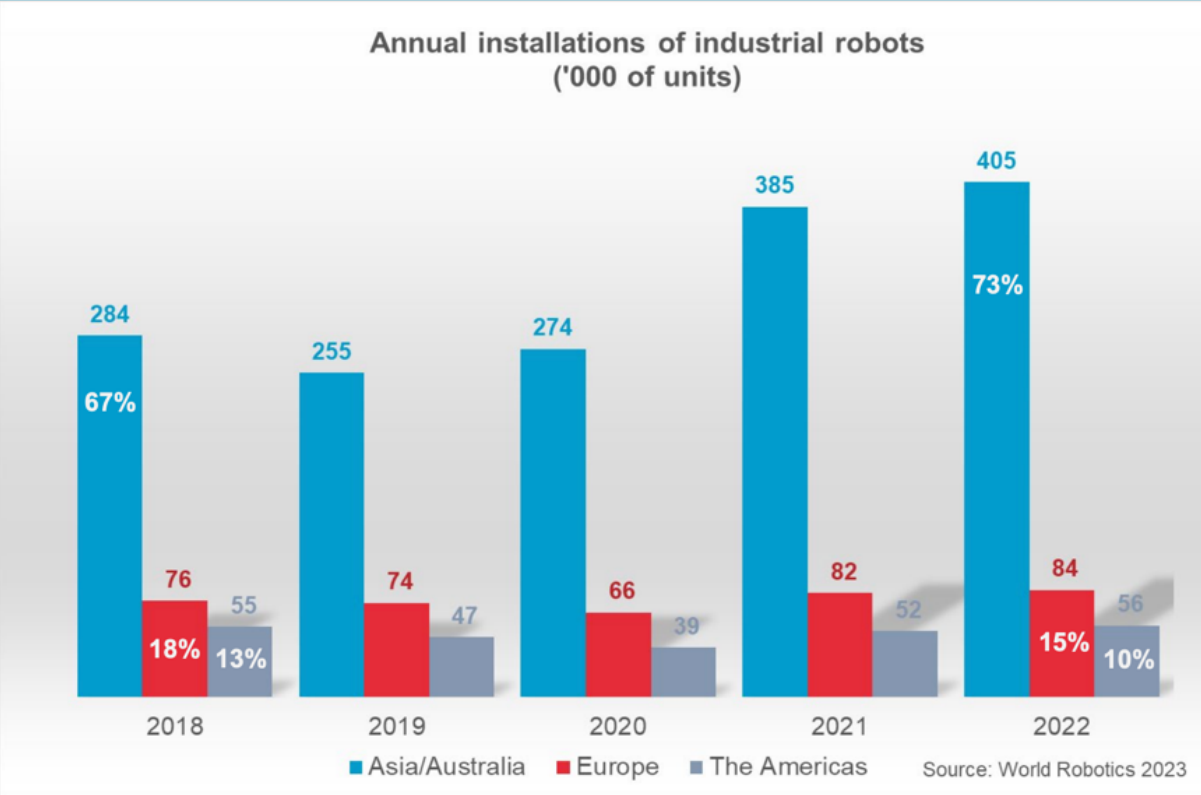
**A Logistics automation revolution is underway...**  
The way we move and supply goods is being transformed.



# The Robotic Revolution is also only now getting started...

## ...and some countries are getting left behind (like us).

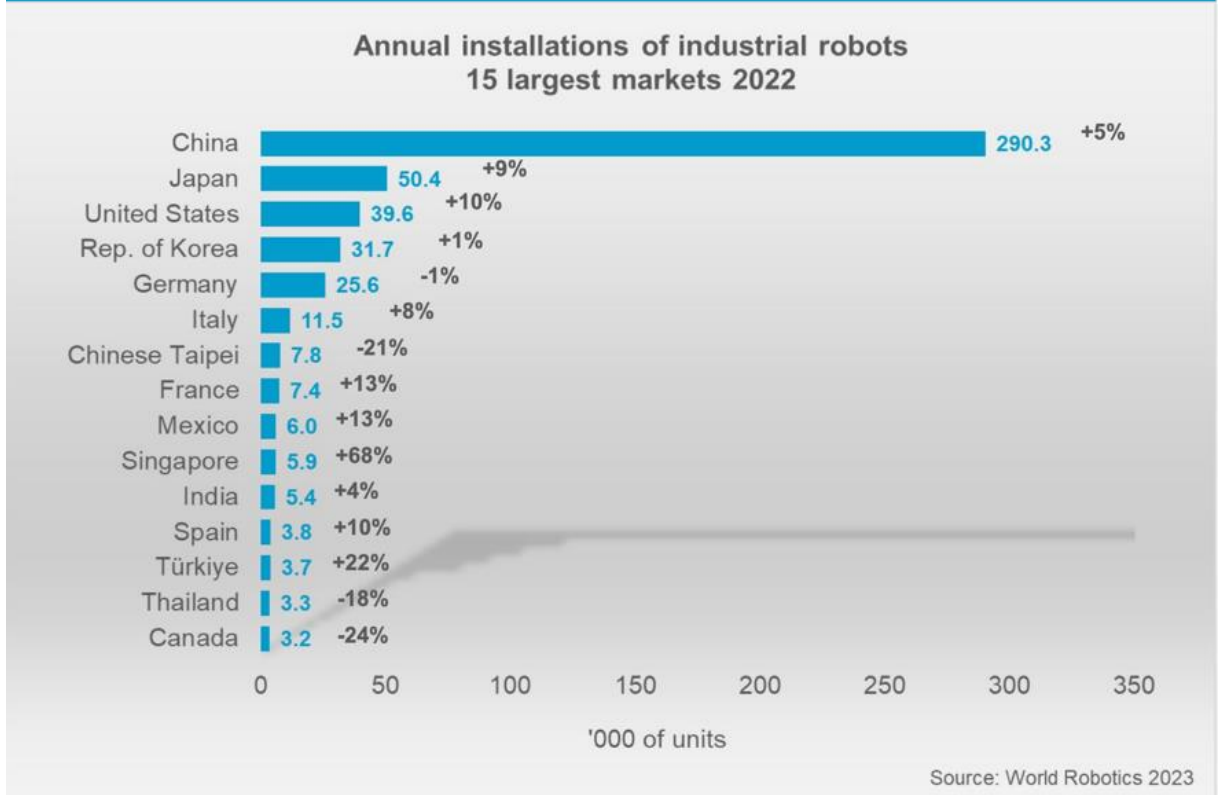
### Growth in all regions



### Asian countries are the most automated...

- 73% of newly deployed robots installed in Asia
- 15% in Europe
- 10% in the Americas.

### China installs every other robot



China is installing more industrial robots each year **than the rest of the world combined.**



Warehousing is becoming automated to support same-day delivery expectations





# Conceived in the First Phase, Operationalised in the Second.

## The Last Mile is set to become automated...in the air and on land.

### Amazon finally ready for Prime Air drone deliveries

Zipline unveils P2 delivery drones that dock and recharge autonomously

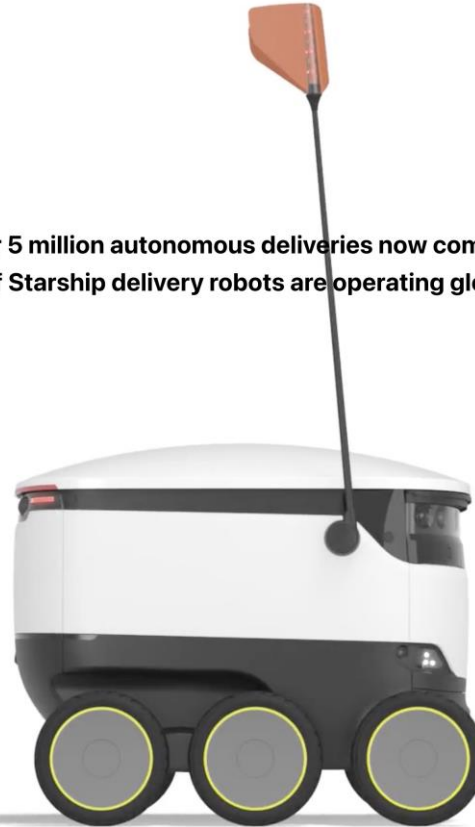
### Zipline Delivers over 50,000 Doses of Vaccines in Cross River State



Alphabet's drone delivery service Wing hits 100,000 deliveries milestone

### Google Now Owns The 'Largest Residential Drone Delivery Service In The World'

Over 5 million autonomous deliveries now completed!  
Thousands of Starship delivery robots are operating globally, every day.



Co-op and Starship Technologies to expand partnership to 500 robots across five new towns and cities to cut carbon on last mile deliveries



Amazon patents trucks that unleash and direct fleets of delivery drones

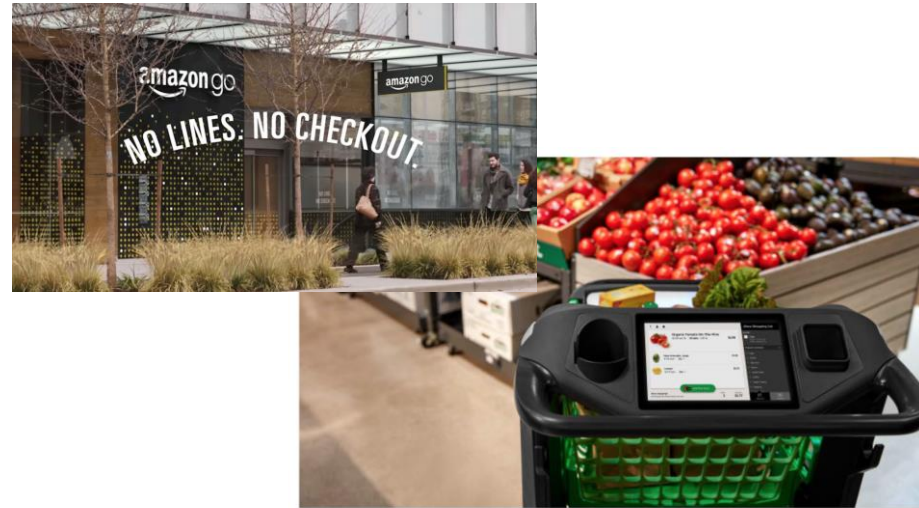


# Second Phase approaches use technology to remove inconveniences and make things simpler (while also capturing valuable consumer data)

## Shopping via voice



## 24/7 shopping without queues or cashiers



Amazon's Just Walk Out Technology for Checkout-Free Concession Stores Could Soon Expand to Include Merchandise

Aldi launches 'just walk out' checkout-free store in Greenwich

**Tesco opens first "just walk out" store to take on Amazon**

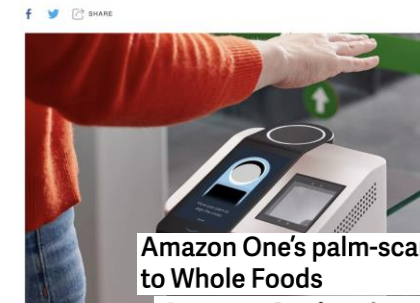
Sainsbury's becomes first international third-party customer to use Amazon's Just Walk Out technology

## Access shops and pay for goods with your face and hands

Amazon expands its palm recognition payment tech to more of its stores

It'll soon be available in 12 of its locations

By Jon Porter | [Twitter](#) | Mar 9, 2021, 10:50am EST



Amazon One's palm-scanning payments are coming to Whole Foods

Amazon One's palm-scanning tech makes first move into entertainment venues



Why your face could be set to replace your bank card



# Retailers across Europe are testing out these technologies...

## No smartphone needed in Europe's biggest autonomous supermarket

📖 Food | 12 January, 2024



Netto Regensburg

German discount chain **Netto** has opened Europe's largest autonomous supermarket in Regensburg. Customers can shop there without cash, a smartphone, registration or check-in – thanks to the deployment of artificial intelligence.

## Carrefour Belgium tests autonomous delivery robot

📖 Food | 13 January, 2023



## Carrefour launches autonomous micro shops

📖 Food | 11 December, 2023



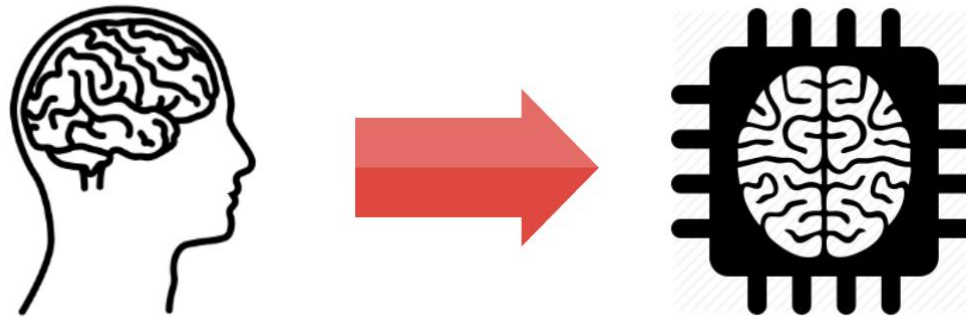
Carrefour BuyBye

## Trigo, REWE Open Germany's Largest Hybrid-Autonomous Supermarket



# Managing the Sixth Wave's Speed and Complexity

## Sixth Wave Whammy #2: The Automation of Knowledge Work



Moving from a world where people use machines, to one where machines advise people.



# The reality for companies in the sixth wave's upswing:

- Consumer expectations too demanding  
Black swans too common.
- Human employees too slow.
- Data volume, velocity, variability and variety too overwhelming
- Forecasting too inaccurate
- Planning cycles too infrequent and too high level
- The long tail is too long, and network too complex
- Past experience and biases too embedded.
- Legacy systems too disconnected



**Supply chains need to adapt in real time, all the time.**



# Automation to the rescue?

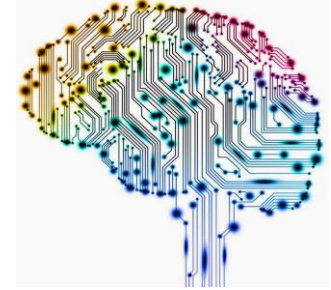
## The 3 Types of Knowledge Worker Automation & Augmentation



Analytics



Automation



AI

### Level 1: The Digitisation of Activities

Labour intensive, repetitive backoffice activities, such as data entry, recording transfers of ownership, creating documents, sending emails etc.



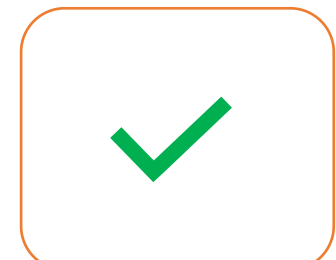
### Level 2: The Digitisation of Processes

More advanced activities that require combining multiple data sources and include calculation and modelling.



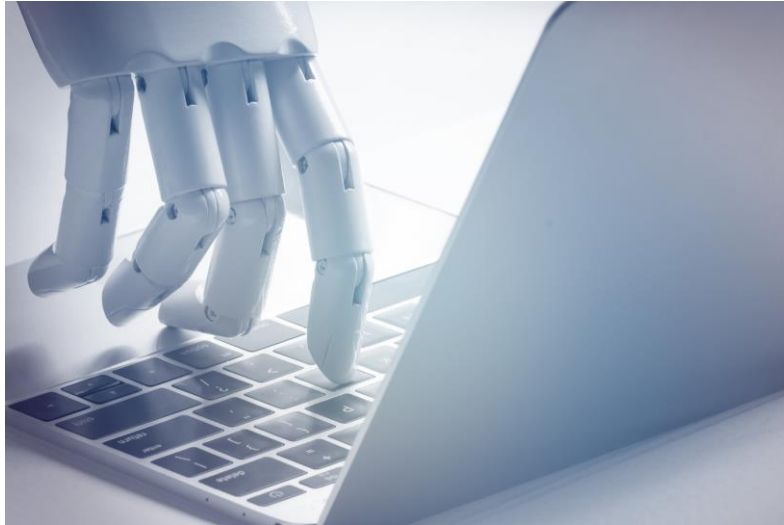
### Level 3: The Digitisation of Decisions

Combine data from multiple sources / variables, and determine the optimal decision for that scenario based on their impact on each variable.



# 1. The Automation of the Backoffice

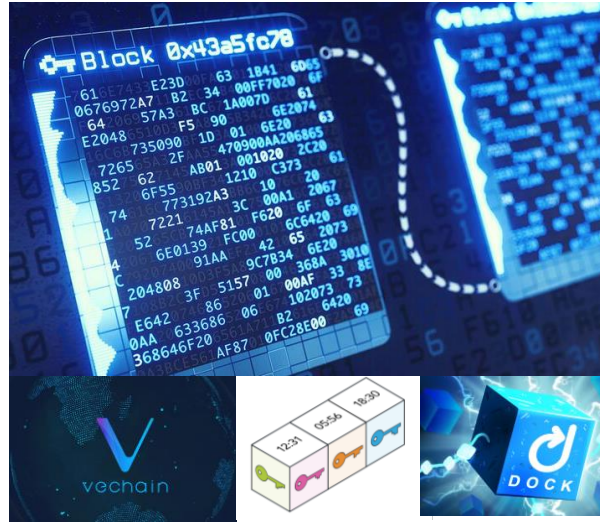
**Repetitive, rules-based  
data entry**



## Robotic Process Automation (RPA)

24/7 data entry.  
Greatly reduced error rate  
Increase in data timeliness.  
Humans can focus on value-adding activities

**Product / IP traceability  
and transfer of ownership**



## Blockchain

24/7 supply chain status updating.  
Enhanced transparency & security.  
Huge drop in paper documentation.  
Increased trust across SC.

**Customer inquiries and  
complaints**



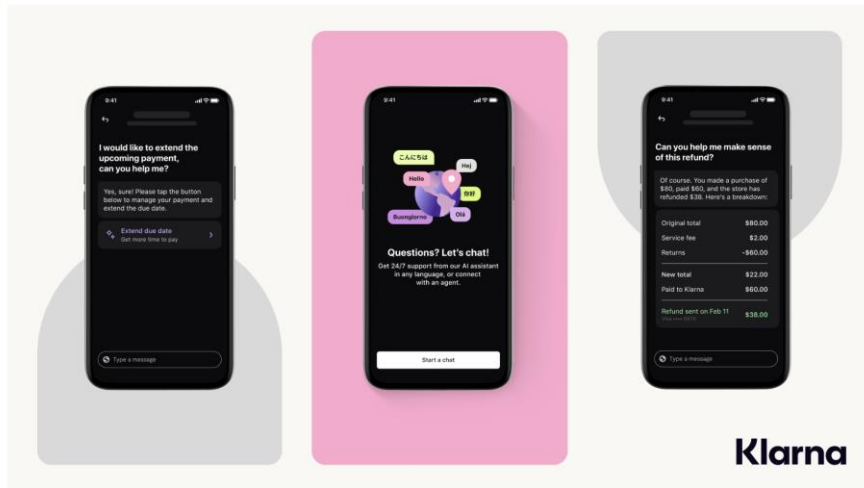
## Conversational AI Powered Digital Assistants / Chatbots

24/7 customer support.  
Multi-language capability.  
Increased speed of response  
Reduced customer frustration

# The Efficiency savings of Digital assistants are enormous

General News • 27 Feb 2024

## Klarna AI assistant handles two-thirds of customer service chats in its first month



New York, NY – February 27, 2024 – [Klarna](#) today announced its AI assistant powered by OpenAI. Now live globally for 1 month, the numbers speak for themselves:

- The AI assistant has had **2.3 million conversations**, **two-thirds of Klarna's customer service chats**
- It is doing the equivalent work of **700 full-time agents**
- It is on par with human agents in regard to customer satisfaction score
- It is more accurate in errand resolution, **leading to a 25% drop in repeat inquiries**
- Customers now **resolve their errands in less than 2 mins compared to 11 mins previously**
- It's available in **23 markets, 24/7** and communicates in more than **35 languages**
- It's estimated to drive a **\$40 million USD in profit** improvement to Klarna in 2024

All from code...



## 2. The Automation of Processes: A better plan. A better planner.

Many companies have an army of planners who struggle to adapt to this new reality and spend their time information gathering rather than planning.

Most were trained on **Deterministic** modelling, whereas now more **Stochastic** techniques are required.

The idea of monthly planning using corrected sales history to plan the next 24 months makes **little sense in a world where the future looks nothing like the past.**

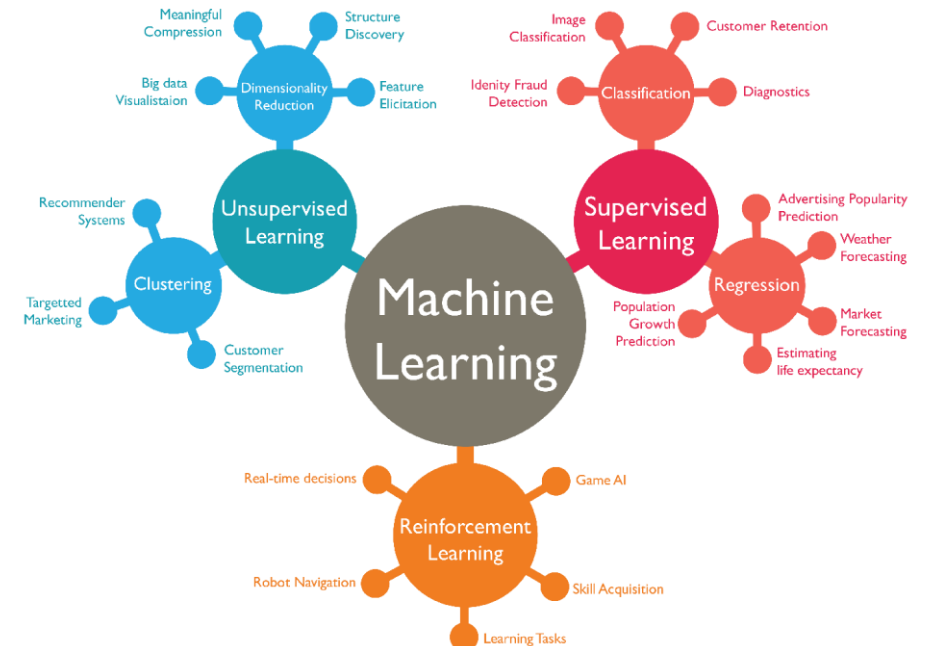
### ChatGPT and the Revolution of AI-First Forecasting

#### Automated Machine Learning (AutoML) | The New Trend In Machine Learning

AI Does Something Statistical Models Can't Do – Identify Non-Linear Relationships

Carrefour turns to AI for demand forecasting

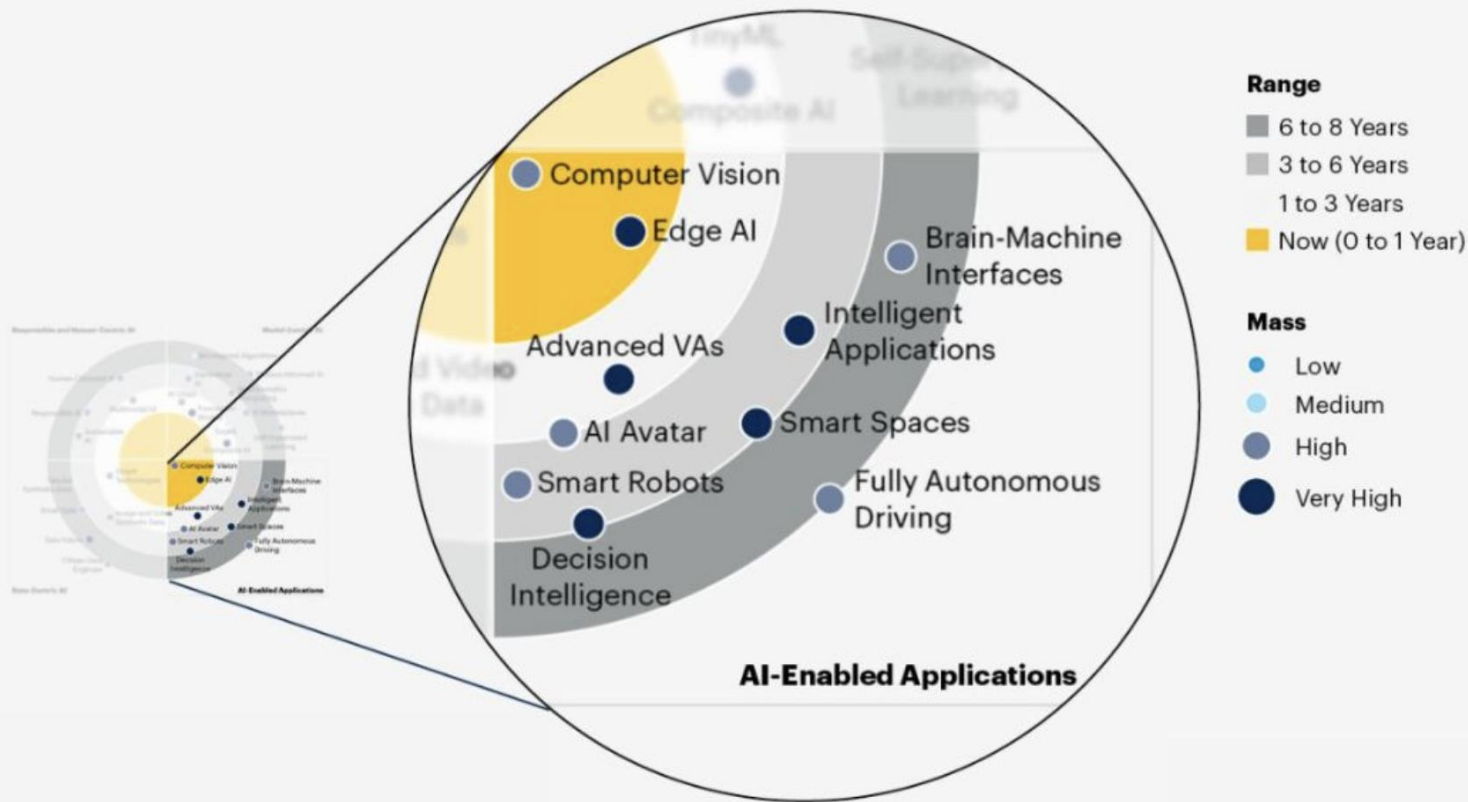
Amazon Patents "Anticipatory" Shipping — To Start Sending Stuff Before You've Bought It



# Emerging Technologies and Trends for Tech Product Leaders

## 3: The Automation of Decisions

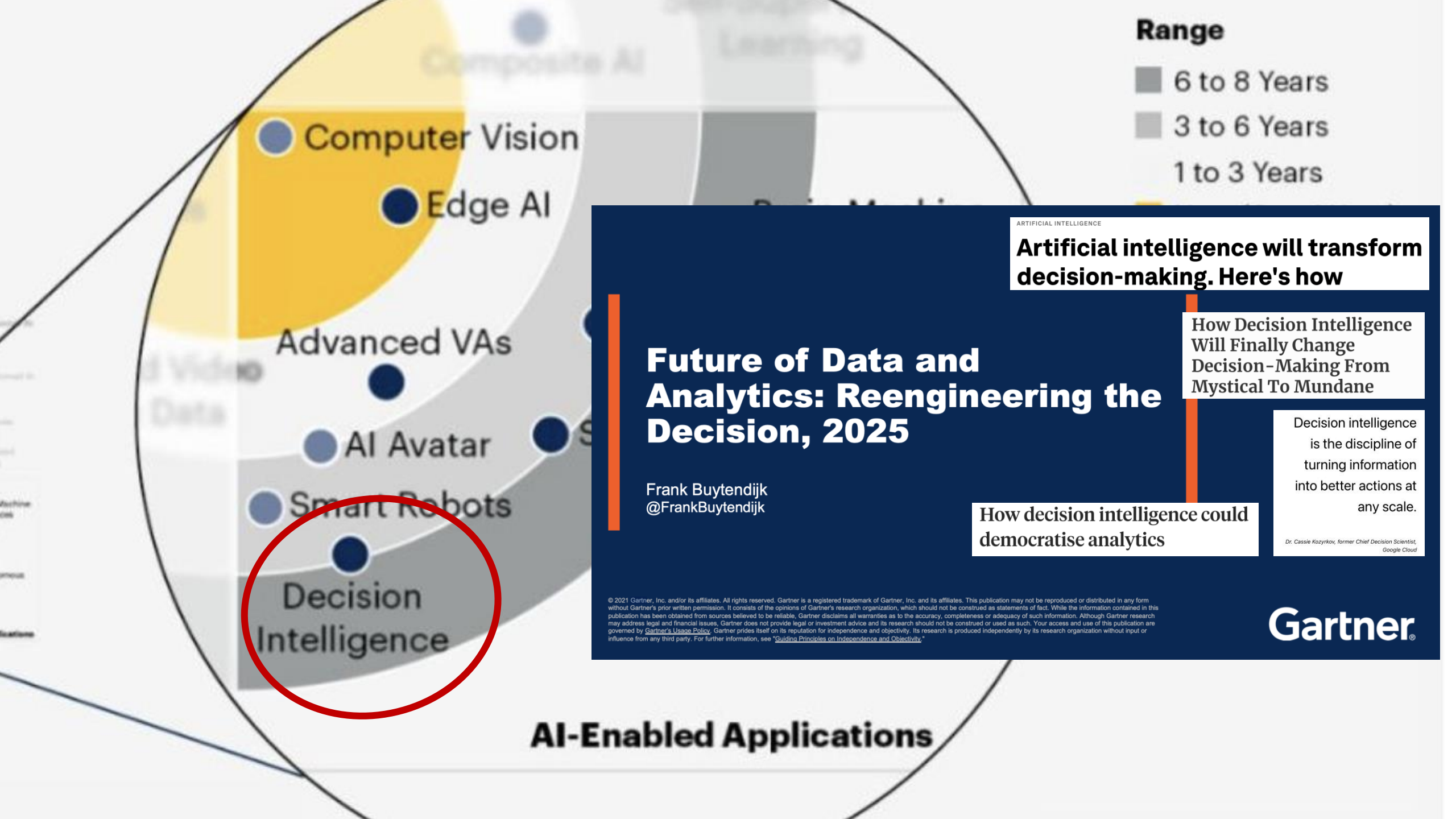
The digitization, augmentation and automation of decision making



Source: Gartner  
AI = artificial intelligence; TinyML = tiny machine learning;  
UI = user interface; VA = virtual assistant  
© 2023 Gartner, Inc. and/or its affiliates. All rights reserved. 2545684

**Gartner**

A new wave of intelligent machines to enable forward-thinking companies to adapt to the speed of change...



**Range**

- 6 to 8 Years
- 3 to 6 Years
- 1 to 3 Years

ARTIFICIAL INTELLIGENCE

**Artificial intelligence will transform decision-making. Here's how**

**How Decision Intelligence Will Finally Change Decision-Making From Mystical To Mundane**

Decision intelligence is the discipline of turning information into better actions at any scale.

Dr. Cassie Kozyrkov, former Chief Decision Scientist, Google Cloud

**How decision intelligence could democratise analytics**

**Future of Data and Analytics: Reengineering the Decision, 2025**

Frank Buytendijk  
@FrankBuytendijk

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**Gartner**

**AI-Enabled Applications**



# The Evolution of the self-driving, self-learning supply chain:

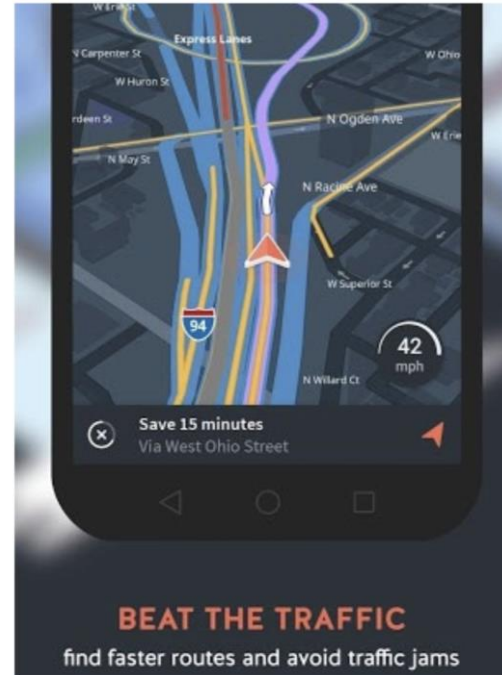
## Level 1: Descriptive Diagnosis



## Level 2: Predictive insights



## Level 3: Prescriptive proposals



## Level 4: Self-driving Decision Intelligence



### DECISION SUPPORT:

Humans make decisions using data from machines. Root cause analysis of current issues.

**Humans in the Loop**

### DECISION AUGMENTATION:

Humans make decisions using recommendations from machines

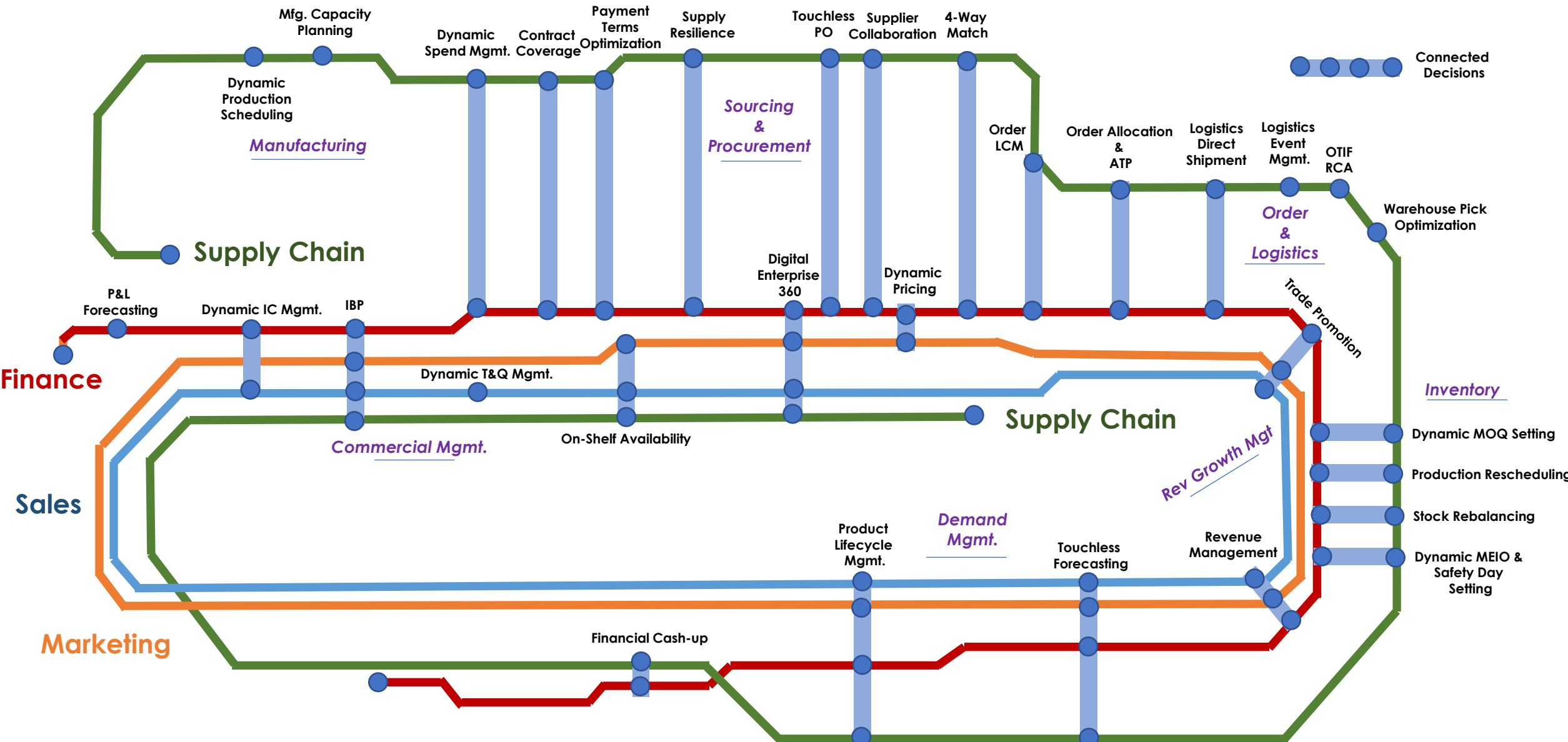
**Humans on the Loop**

### DECISION AUTOMATION:

Machines make decisions.  
Act autonomously.  
Learn from experience.

**Humans out of the Loop**

# The promise of AI tools like Decision Intelligence is the connection & strategic alignment of decisions across the enterprise...



# The Rise of the AI-enabled 'Sense and Respond' Enterprise:

It's about smarter **Decisions**, not just more efficient tasks.

## Sense:

New information

GDP predictions, exchange rate deviations, commodity price increases...

Global commodity price rises

Sales / retailer promotional info...

Adverse weather update

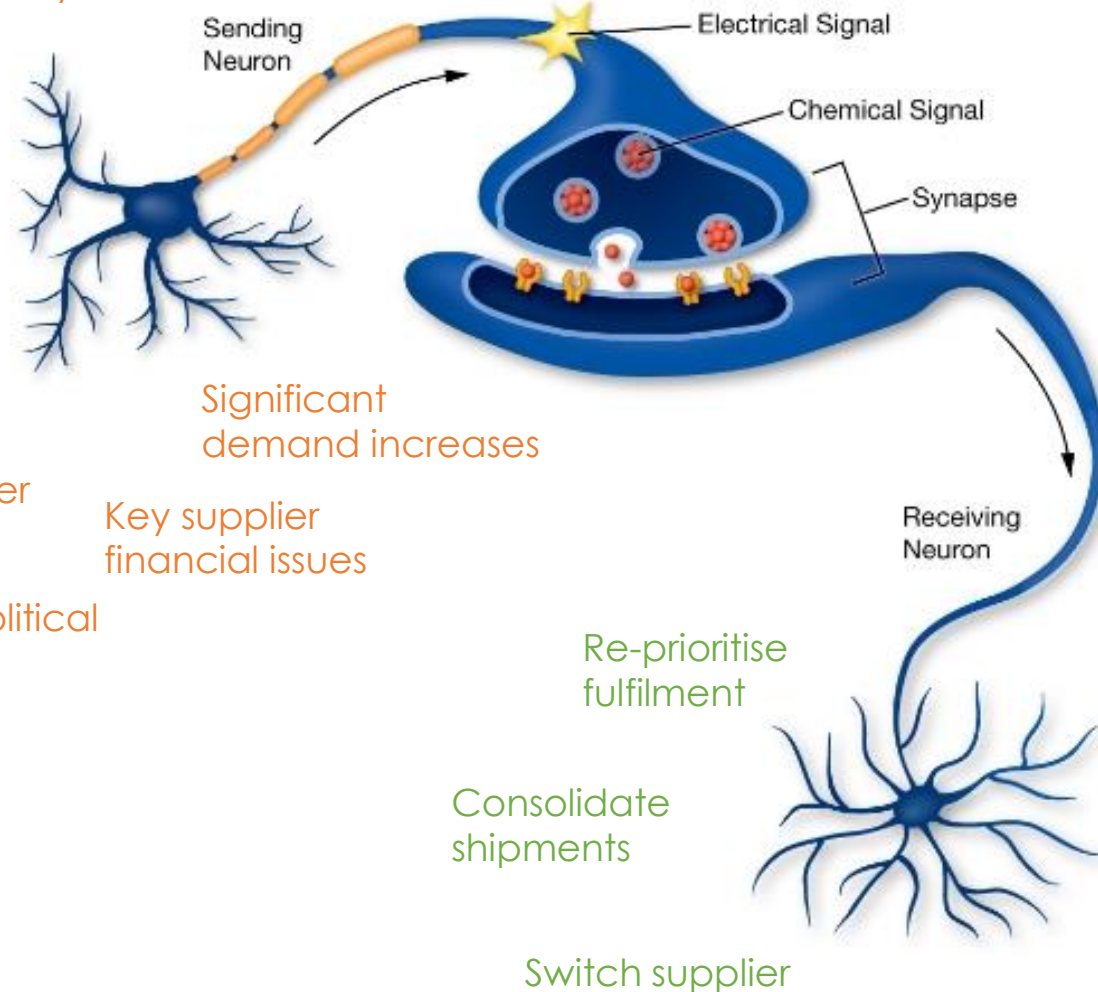
Geo-political unrest

Key supplier financial issues

Significant demand increases

## SADAL:

- Sense
- Analyse
- **DECIDE**
- Act
- Learn



## Decision quality factors:

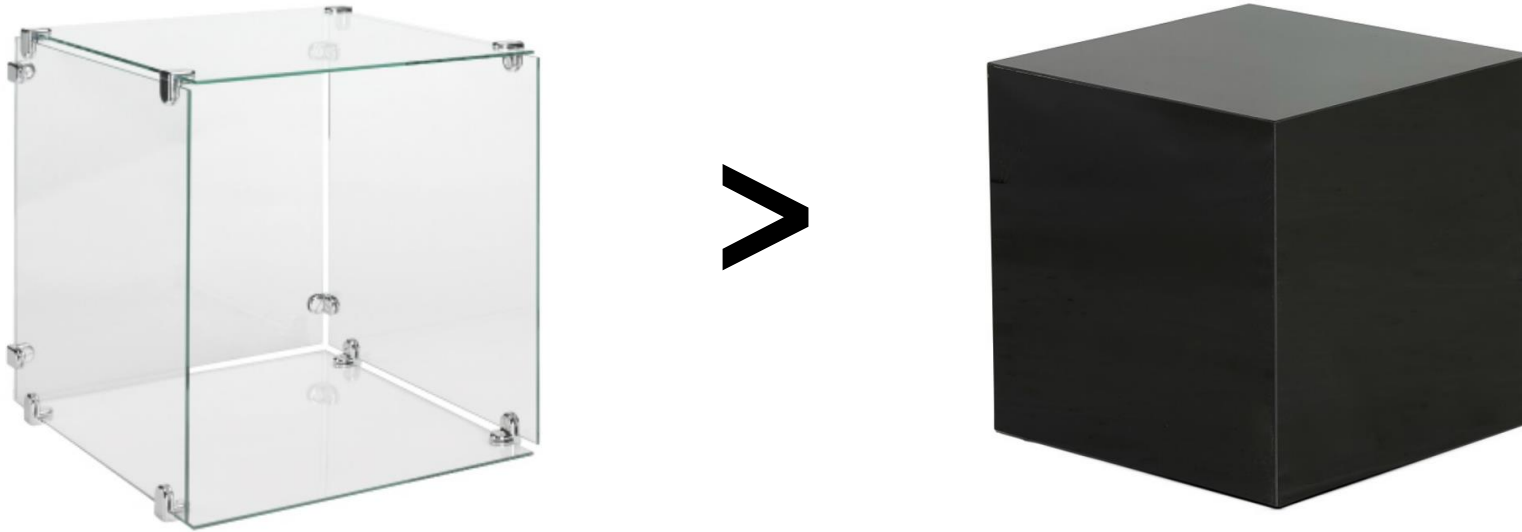
**Frequency** of signal,  
**Speed** of signal,  
**Accuracy** of signal,  
**Granularity** of info.

## Response:

Recommendations,  
alternatives &  
actions



# To trust the machine's recommendations, people will need to understand how they arrived at them...



## For now.

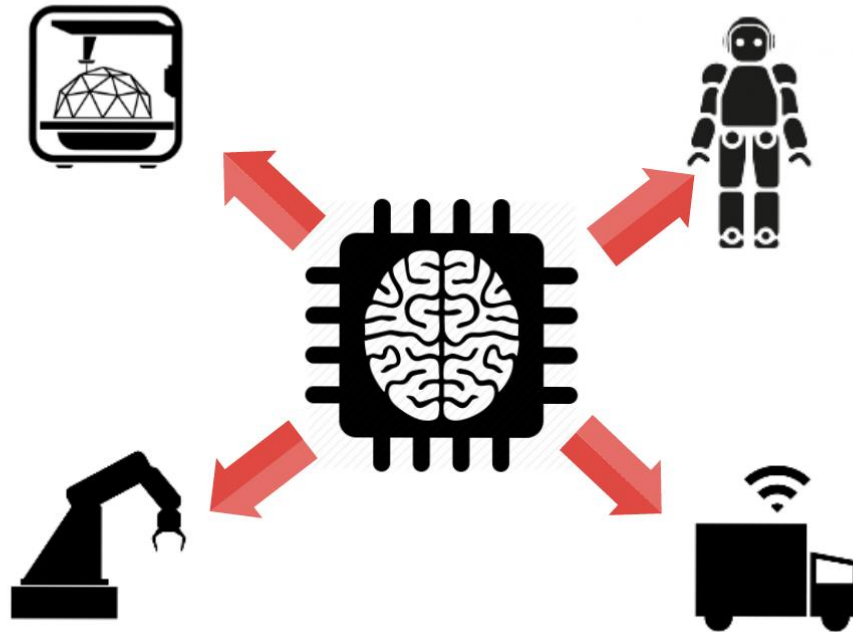
- Data inputs and machine brain power increase exponentially, but human cognitive capability is static.
- Decision Intelligence (DI) systems track whether its recommendations were followed & whether the human intervention improved or worsened the outcome.
- Evidence to date shows that humans make things worse. Biases, flawed thinking & attachments to past knowledge cause of bad decisions. We've just never been able to track this before.
- **Once we trust the algorithms and outputs, our supply chains will become more autonomous.**

From individual experiences and knowledge...

...to connected, collective knowledge and constant learning.



## Sixth Wave Whammy #3: The Automation of the Value Chain



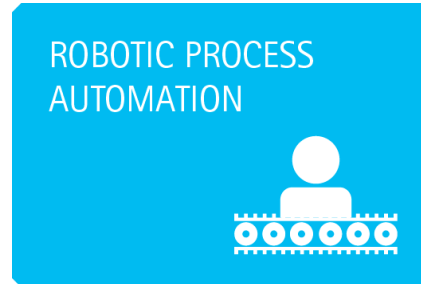


# The Automated Supply Chain

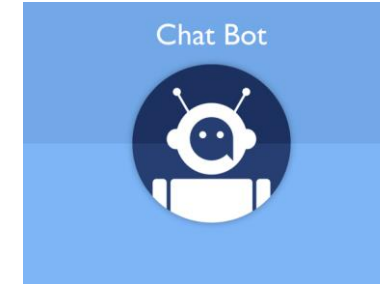
AI organizational intelligence systems capture data, identify issues, recommend & implement solutions, and remember the outcomes



**Blockchain  
records**



**RPA and IA processes  
the transactions**



**Digital assistants  
handle the queries**



**Robots  
make and  
move**



# Rather than huge bets on massive investments, now these advanced technologies are available as a service...

**Software** ...as a service

**Logistics** ...as a service

**Space** ...as a service

**Transportation** ...as a service

**Energy** ...as a service

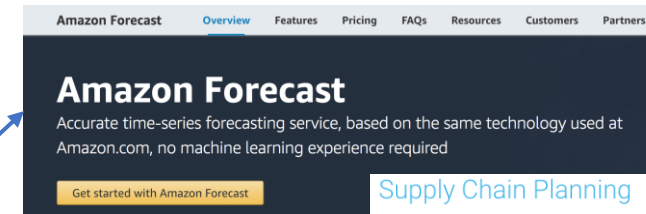
**Forecasting** ...as a service

**Manufacturing** ...as a service

**Robotics** ...as a service

**AI** ...as a service

**Quantum computing** ...as a service



**Statistical Forecasting as a Service**

**Manufacturing: How Robotics as a Service extends to whole factories**

**The Rise of Robots-as-a-Service**

**Get Ready For AI As A Service**

Honeywell introduces quantum computing as a service with subscription offering

Each subscriber gets eight or sixteen hours per month of dedicated time with Honeywell scientists to run algorithms on the trapped-ion hardware.

**Amazon is now offering quantum computing as a service**

# A supply chain paradigm shift is occurring...



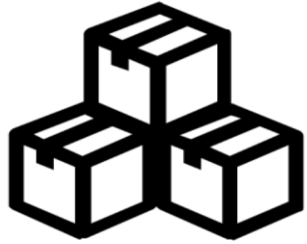
**The Invisible  
Supply Chain**



**The Visible & Transparent  
Supply Chain**



## Visibility of the Flow of...



Product



Information



Financials

## Provides visibility of the supply chain's...



Consumption



Waste



Weak spots and risks

## and the supply chain's ESG impact.



Ethical



Ecological



Economic

Exposes Operational Fragility

Exposes Systemic, Corporate & Brand Fragility

# The Future: a PAL Supply Chain



**Personalised**  
products, services &  
experiences

IoT & AI create a world of personal preferences and pricing  
Mass production replaced by customization and configuration  
- batch size of 1



**Automated**  
manufacturing, delivery  
& planning

AI machine learning & cognitive computing  
3D printing to products on demand  
Robotic production to autonomous delivery  
Transactions processed by the blockchain, RPA & chatbots



**Local**  
production,  
logistics and retail

Production reshored near the consumer  
Development of autonomous, micro logistics network to support 1-hour delivery  
- urban logistics repurposing car parks etc.

=



**Shorter, stronger,  
more agile and  
more sustainable  
supply chain.**

# A New Era of Machines has begun...

## Industrial Revolution I

Mechanical production facilities with water and steam power



1750

## Industrial Revolution II

Division of labour and mass production with electrical energy. Mass distribution.



1850

## Information Revolution

IT and electronics that automate production, solve problems, and store data.



1950

## Cognitive Revolution

Machine & deep learning, multi-modal generative AI, decision intelligence & start of quantum age.



2015

## Consciousness Revolution

Quantum-powered General AI (AGI)  
  
Potential rise of Artificial Super Intelligence



2030

*\*Rough timeframe. Not scaled.*





**The future looks nothing like the past...**

Things will never again be as slow as they are right now...

Multiple technologies are about to cross the chasm and go from deceptive to disruptive...



Some will be  
Optimists



Many will be  
Pessimists

  
**KEEP  
CALM  
AND  
Make Smart  
Choices**

The most successful  
will be Pragmatists

# Is your company ready for the Sixth Wave's second phase?

**Augmented Intelligence, Human + Machine reality awaits  
– but only for those able to adapt.**



## **Webinar 2:**

### **The Age of Fragility:**

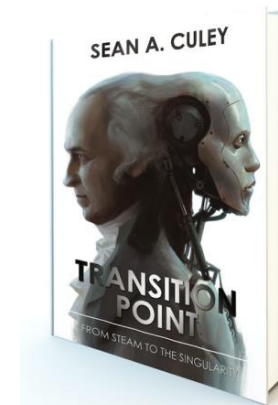
**Why Companies Struggle with  
Exponential Technological Change**

**Thursday 23<sup>rd</sup> May: 11:00 – 11:45am**

Why are companies  
struggling to adapt to  
this disruption?

 **delaware**

**Thank you!**  
**sean@seanculey.com**





# Questions



**we commit. we deliver.**