

# Digital messed up Society

Understanding the (future) digital era





FHV  
Vorarlberg University  
of Applied Sciences

KdG  
Karel de Grote  
University College



creating value in a digital world

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31/3/2020 - Introduction, understanding digital society

28/4/2020 - Trends, trendwatching & trends-lating

26/5/2020 - **Digital evolution**

16/6/2020 - Group & individual coaching

22/6/2020 - Final presentation & evaluation

Today's timing

- 9h00 - welcome & kick-off
- 9h10 - Digital Evolution
- 10u15 - Assignment introduction
- 10u30 - Work Time
- 14u30 - Q&A

# Digital evolution

Past, Present & Future Outlook

It's not the destination that's important, it's the process.





Phase 0

Developing  
the  
Internet

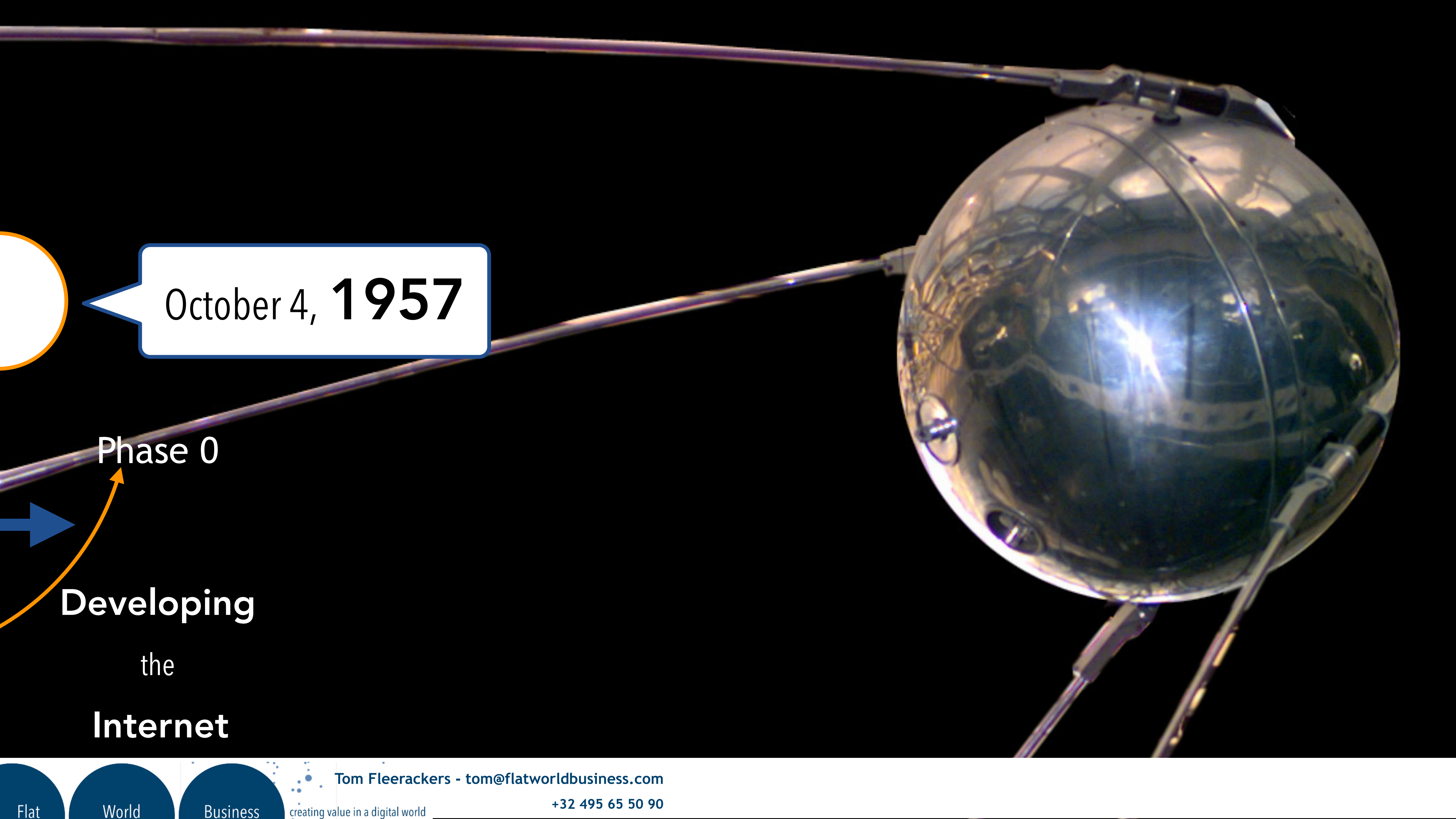


Developing the internet was more a strategic exercise in (cold) warfare than it was to help people connect.



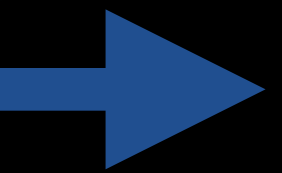
Phase 0

Developing  
the  
Internet



October 4, **1957**

Phase 0



Developing  
the  
Internet

October 7, 1957

Phase 0

Developing  
the  
Internet





October 7, 1957

Phase 0

Developing  
the  
Internet



October 7, 1957

Phase 0

Developing  
the  
Internet



October 7, 1957

Phase 0

Developing  
the  
Internet





February 7, **1958**

February 7, 1958  
NUMBER 5105.15



## Department of Defense Directive

SUBJECT Department of Defense Advanced Research Projects Agency

### I. PURPOSE

The purpose of this directive is to provide within the Department of Defense an agency for the direction and performance of certain advanced research and development projects.

Phase 0

Developing  
the  
Internet



February 7, **1958**



Phase 0  
Developing  
the  
Internet



# DARPA

**1962** - Information Processing Techniques Office (IPTO)

Phase 0

Developing

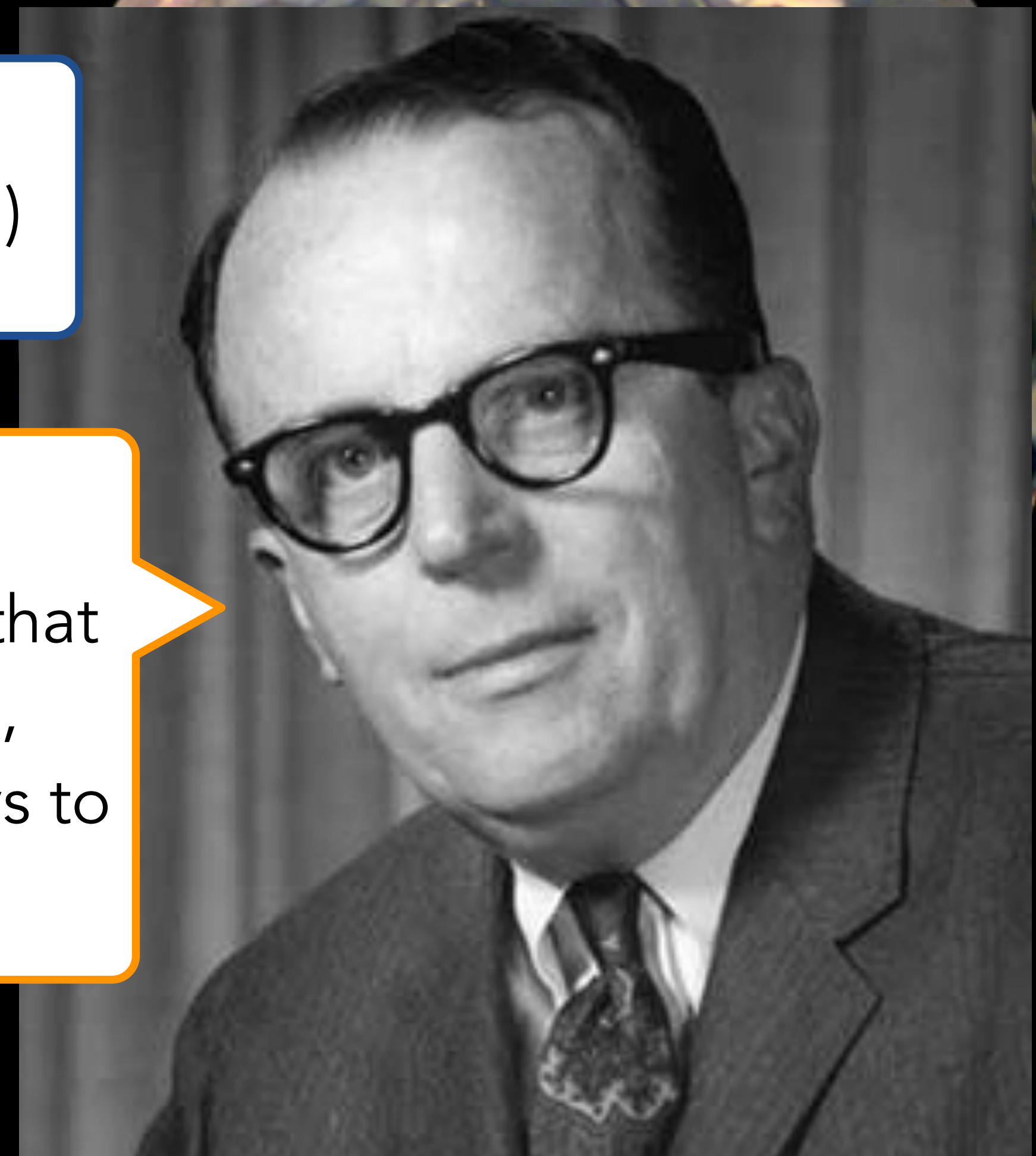
the

Internet

"...not just superfast calculating machines, but joyful machines: tools that will serve as new media of expression, inspirations to creativity, and gateways to a vast world of online." information.

J.C.R. Licklider, DARPA - IPTO

source: [www.darpa.mil](http://www.darpa.mil)

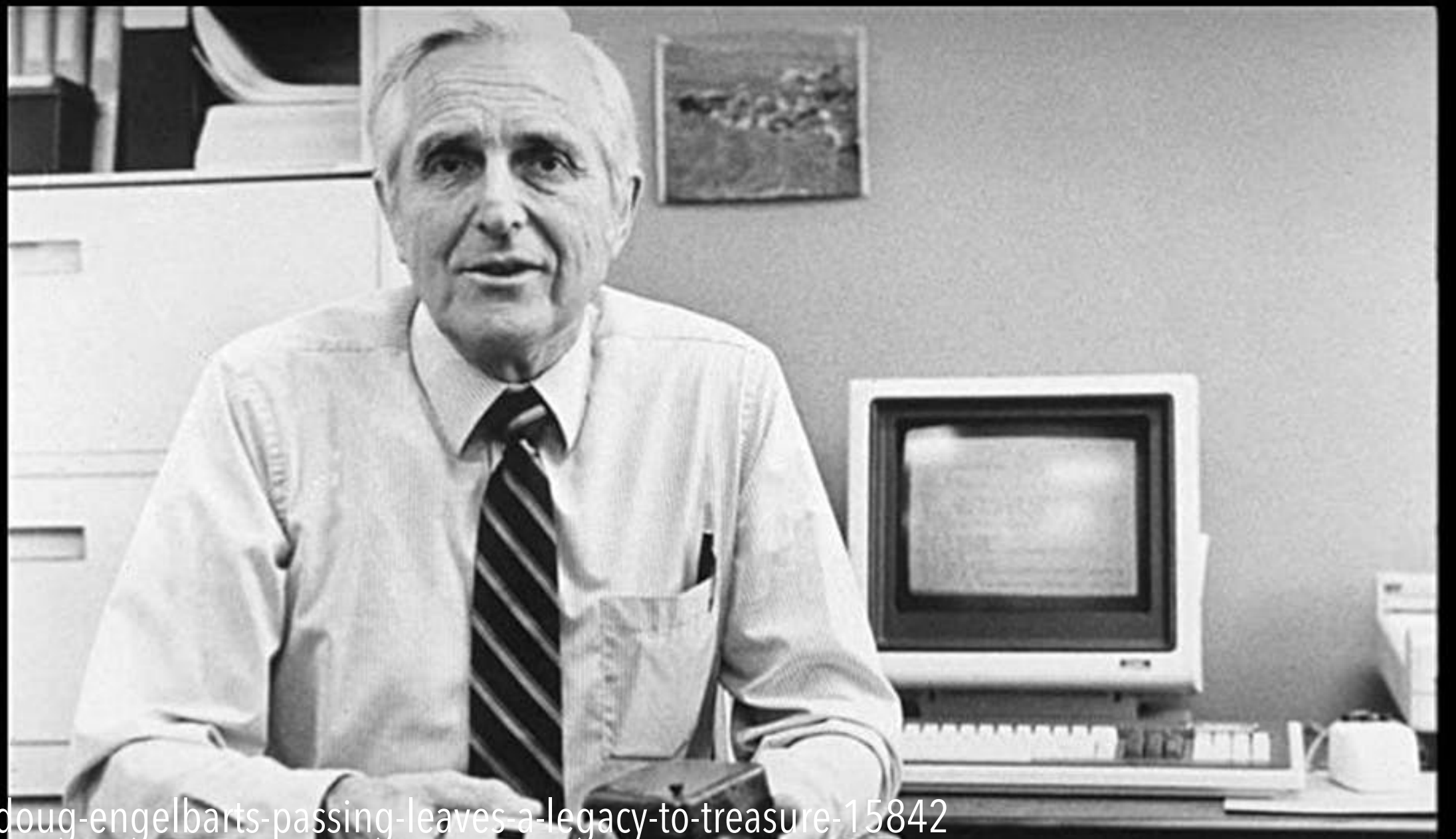


# DARPA

**1968** - oN-Line System (NLS)  
connects San Francisco with Menlo Park (SRE)

Phase 0

Developing  
the  
Internet



source: [www.darpa.mil](http://www.darpa.mil) , <http://theconversation.com/doug-engelbarts-passing-leaves-a-legacy-to-treasure-15842>

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# DARPA

1969 - ARPA-net is born

Phase 0

Developing  
the  
Internet



source: www.darpa.mil

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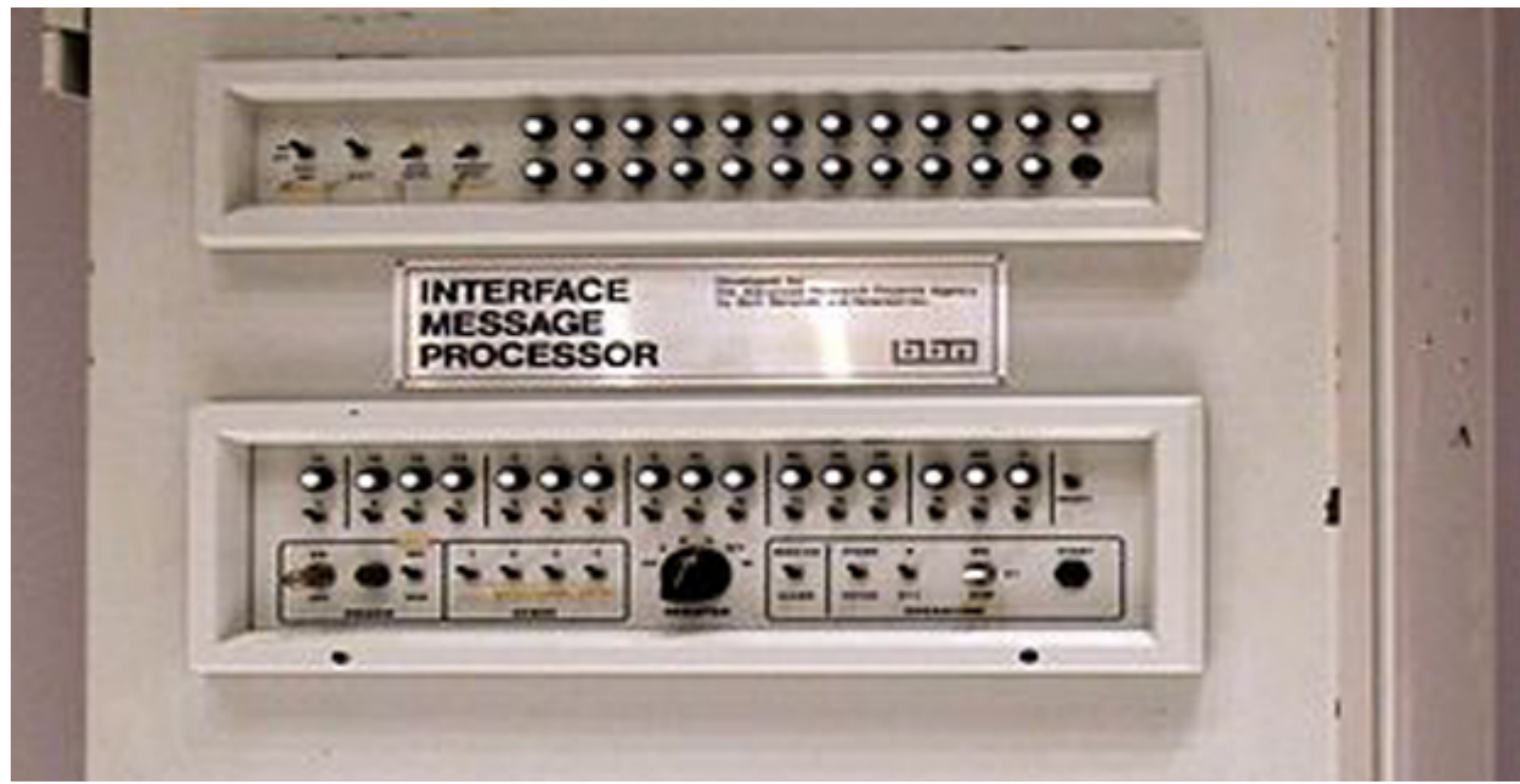


1969 - ARPA-net is born



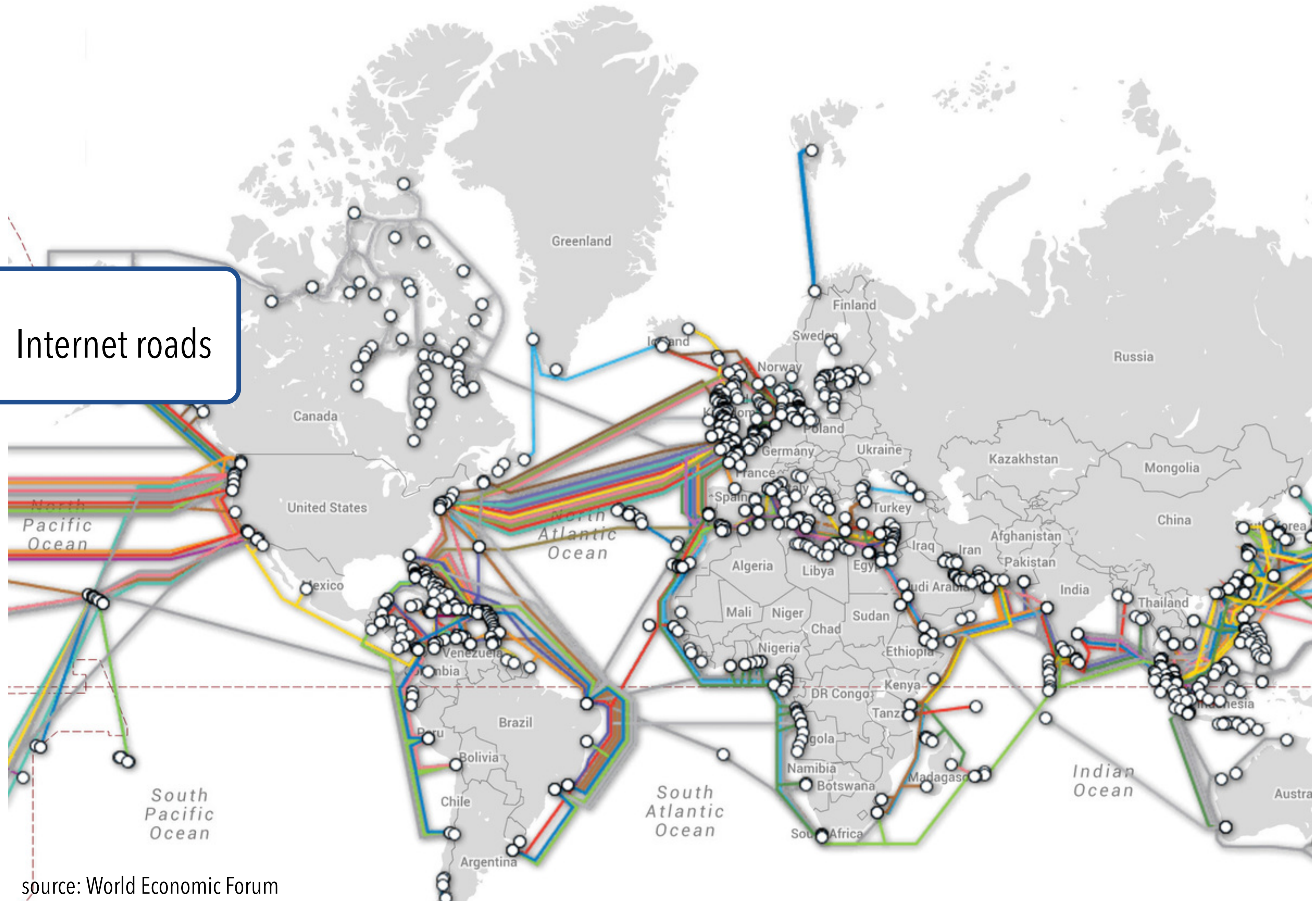
Connection with Europe

Phase 0  
Developing  
the  
Internet



source: www.darpa.mil

**Today** - Internet roads



Phase 0

Developing  
the  
Internet

source: World Economic Forum

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# Google Network

The largest cloud network, comprised of more than 100 points of presence

**Today** - Internet roads

Phase 0

Developing

the

Internet



**Google reveals plan to build THREE new undersea internet cables and add five regions to its expanding cloud service**

- Netherlands and Montreal will open first, followed by LA, Finland, Hong Kong
- Google plans to commission the three subsea cables in 2019, internet giant said
- Includes: Curie, connecting Chile to LA; Havfrue, for US to Denmark and Ireland
- Will also be Hong Kong-Guam Cable system, interconnecting major Asian hubs

source: Daily Mail, 2018

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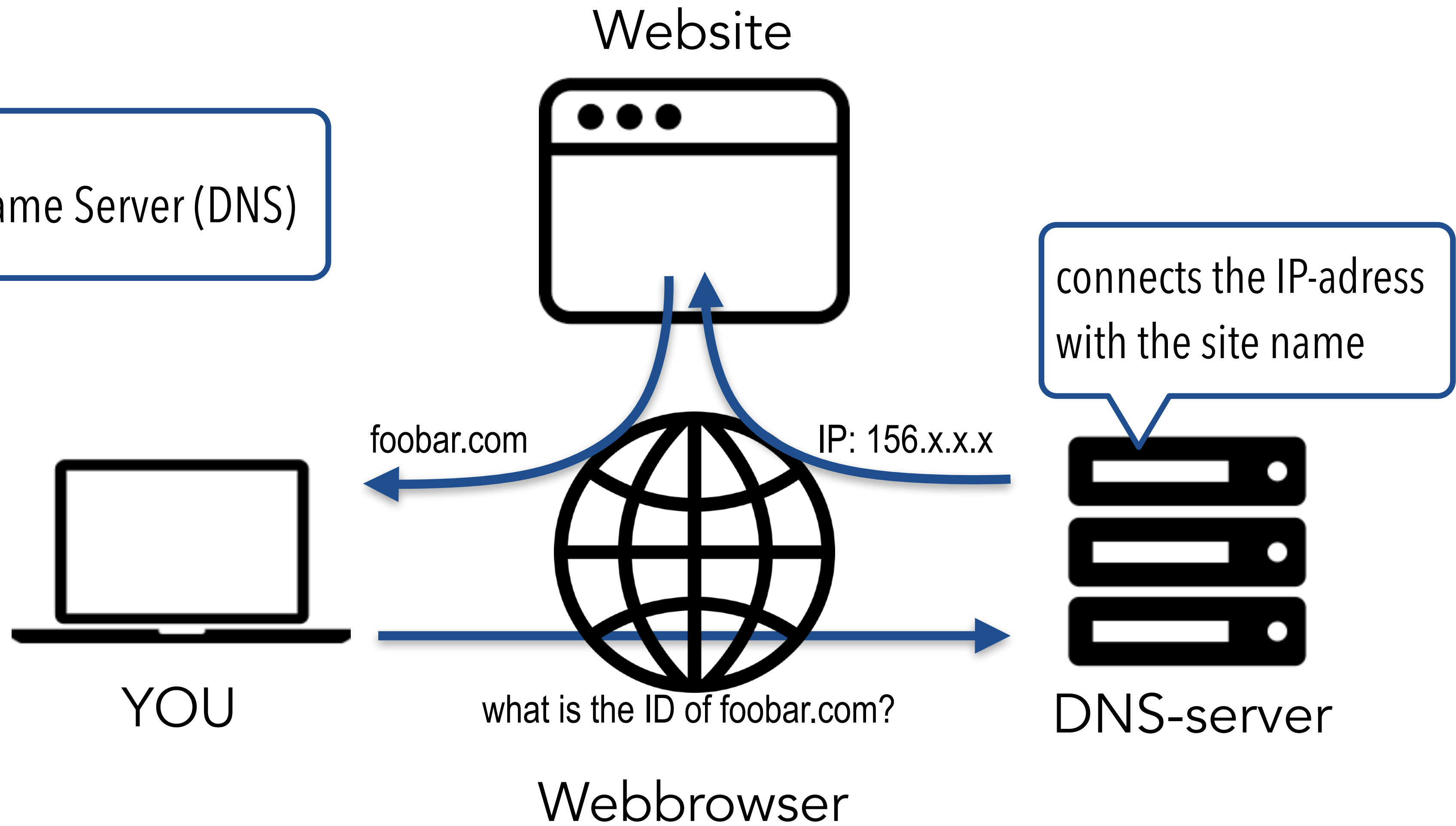
**1984** - Domain Name Server (DNS)

Phase 0

Developing

the

Internet



source: Wikipedia, KeyCDN.com

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Phase 1



**World Wide Web**

Web 1.0

**Internet**

Alan Emtage, Post Graduate student at McGill University




PC

1990 - the first web browser

Phase 1

Welcome to [archie.icm.edu.pl](http://archie.icm.edu.pl)

Archie Query Form 

Search for:

Database:  Worldwide Anonymous FTP  Polish Web Index

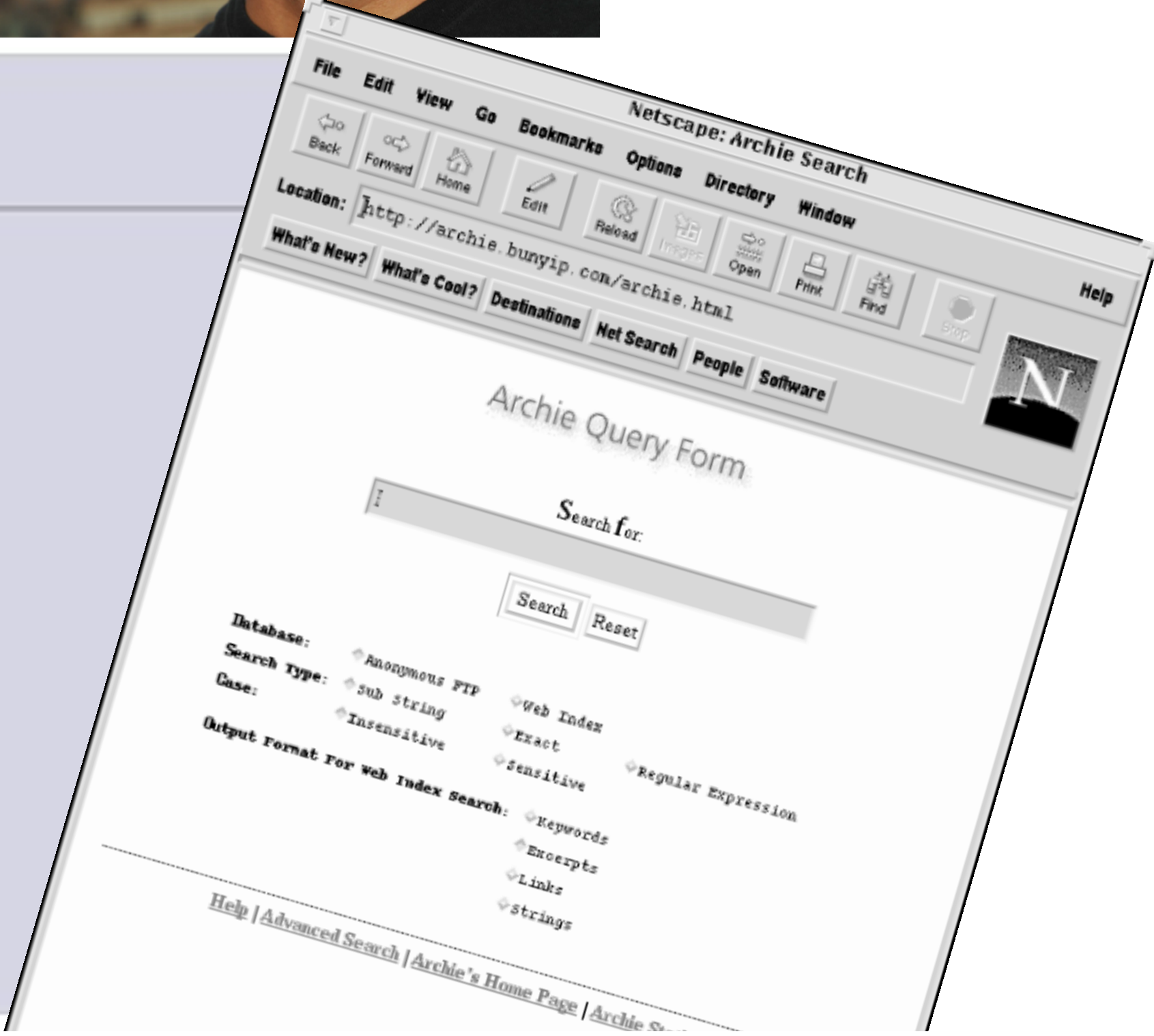
Search Type:  Sub String  Exact  Regular Expression

Case:  Insensitive  Sensitive

Do you want to look up strings only (no sites returned):  
 NO  YES

Output Format For Web Index Search:  Keywords Only  Excerpts Only  Links Only

source: Wikipedia, University of Warsaw, [www.cs.ait.ac.th](http://www.cs.ait.ac.th)



World Wide Web

Web 1.0

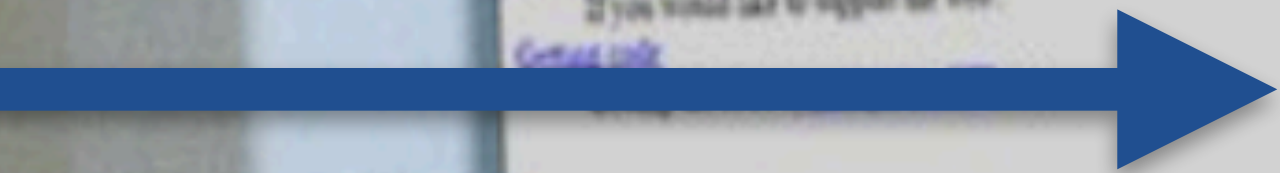
Internet



PC

1991 - World Wide Web (www) is born.

Phase 1



World Wide Web

Web 1.0

Tim Berners Lee - CERN

Internet

source: [webfoundation.org](http://webfoundation.org)

PC

Phase 1

## World Wide Web

The WorldWideWeb (W3) is a wide-area [hypermedia](#) information retrieval initiative aiming to give universal access to a large universe of documents.

Everything there is online about W3 is linked directly or indirectly to this document, including an [executive summary](#) of the project, [Mailing lists](#), [Policy](#), November's [W3 news](#), [Frequently Asked Questions](#).

### [What's out there?](#)

Pointers to the world's online information, [subjects](#), [W3 servers](#), etc.

### [Help](#)

on the browser you are using

### [Software Products](#)

A list of W3 project components and their current state. (e.g. [Line Mode](#), [X11 Viola](#), [NeXTStep](#), [Servers](#), [Tools](#), [Mail robot](#), [Library](#))

### [Technical](#)

Details of protocols, formats, program internals etc

### [Bibliography](#)

Paper documentation on W3 and references.

### [People](#)

A list of some people involved in the project.

### [History](#)

A summary of the history of the project.

### [How can I help?](#)

If you would like to support the web..

### [Getting code](#)

Getting the code by [anonymous FTP](#), etc.

World Wide Web

Web 1.0

Internet

The world's first web page.  
worldwideweb.app

source: [webfoundation.org](http://webfoundation.org)

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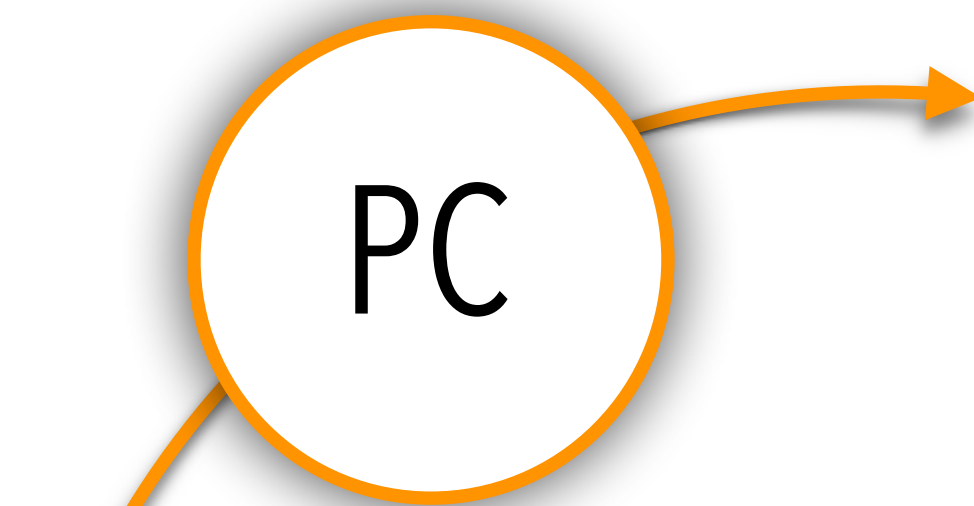
Flat

World

Business

creating value in a digital world





Phase 1

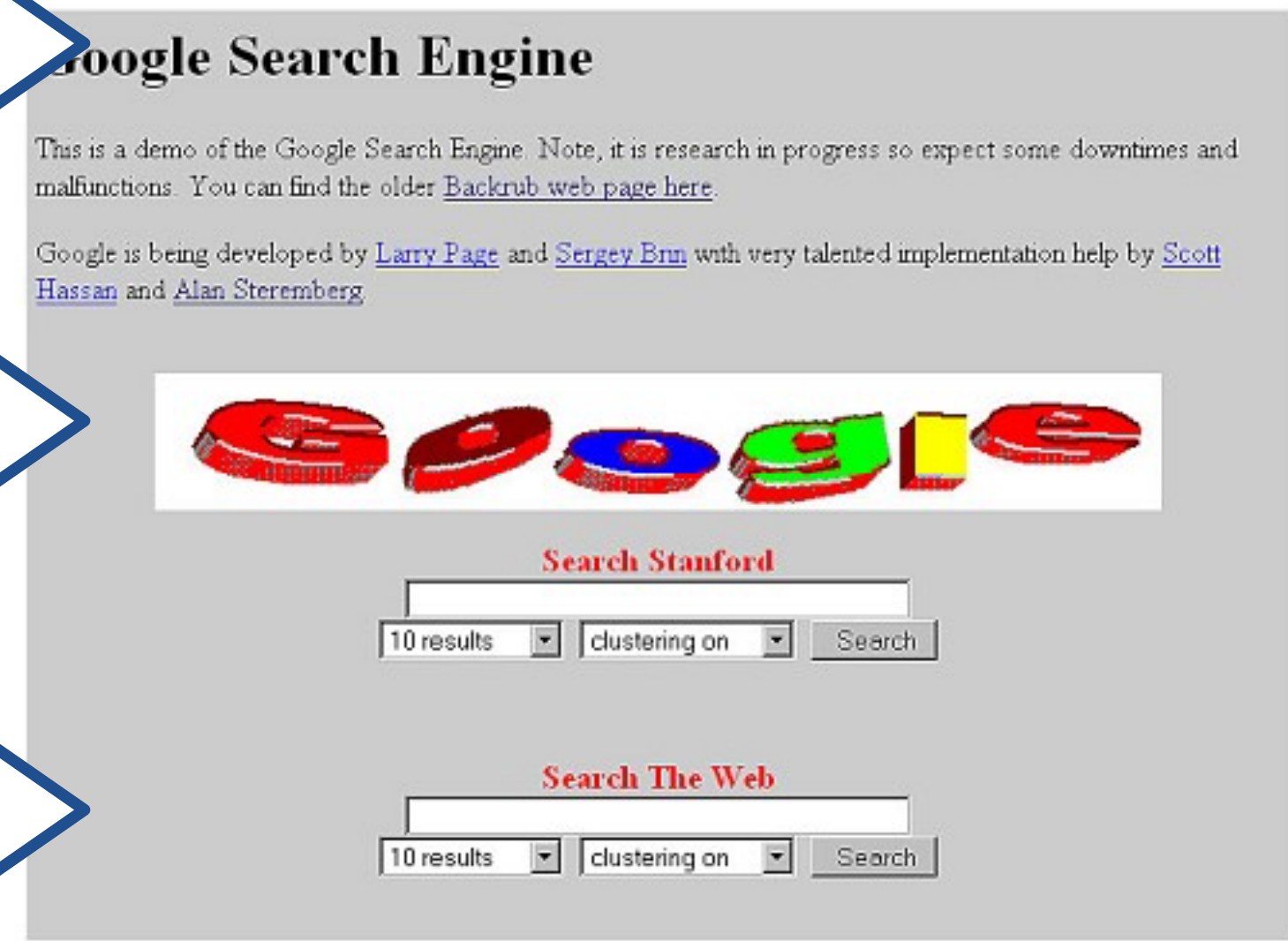
Less or no interaction

Search for information

Read only



1994



1996

# World Wide Web

Web 1.0

# Internet

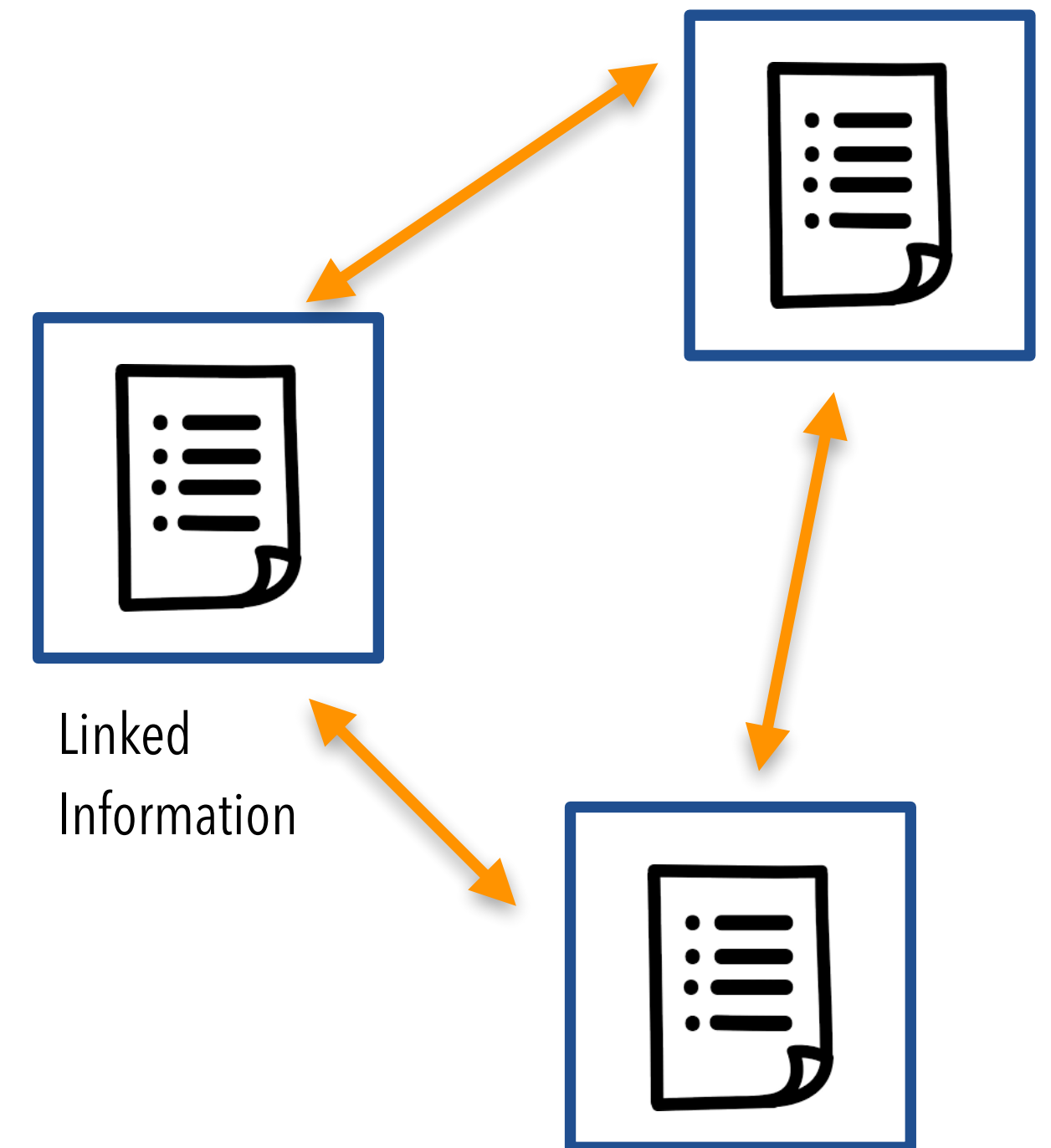
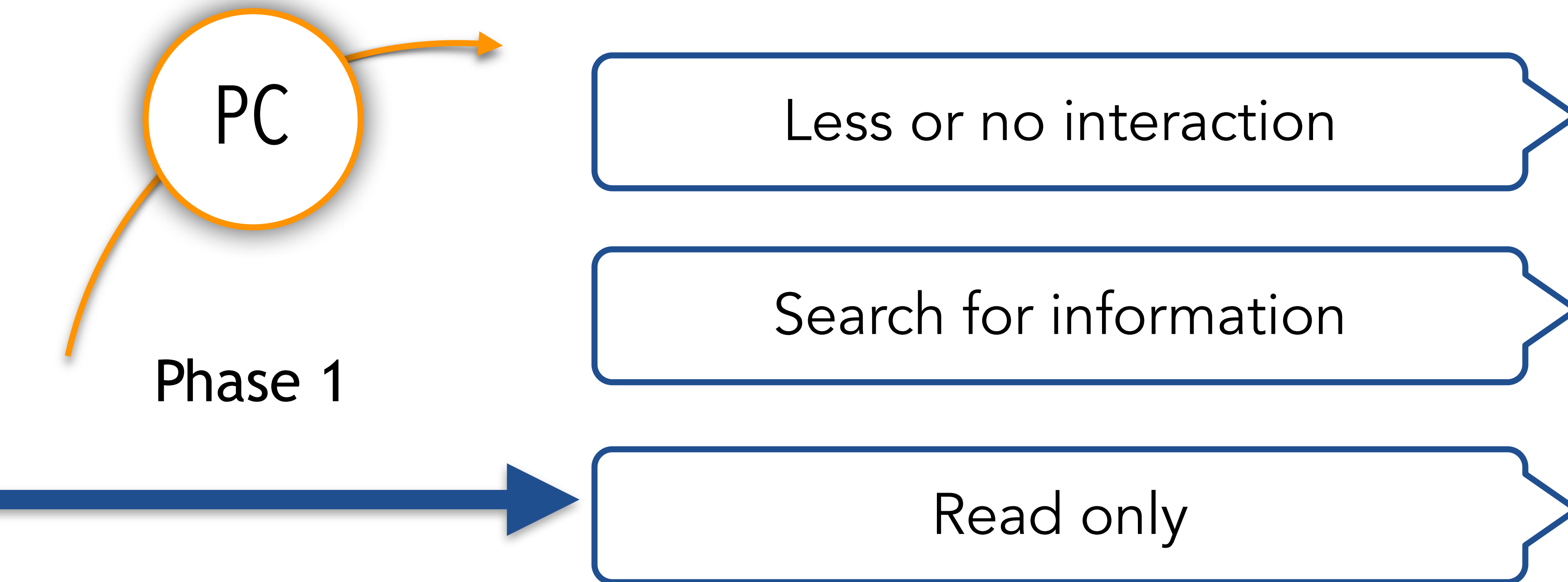
source: www.telegraph.co.uk



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**World Wide Web**

Web 1.0

**Internet**

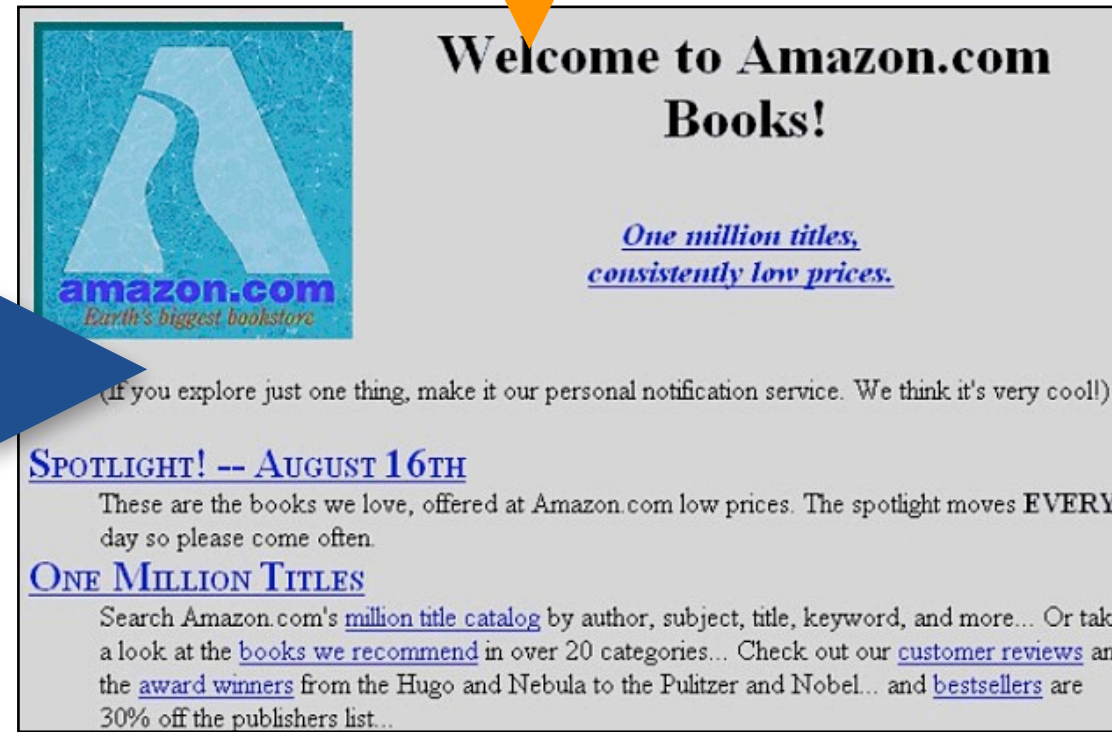
PC

1995

Big Internet brands are born

1998

Phase 1



source: wikipedia

World Wide Web

Web 1.0

Internet



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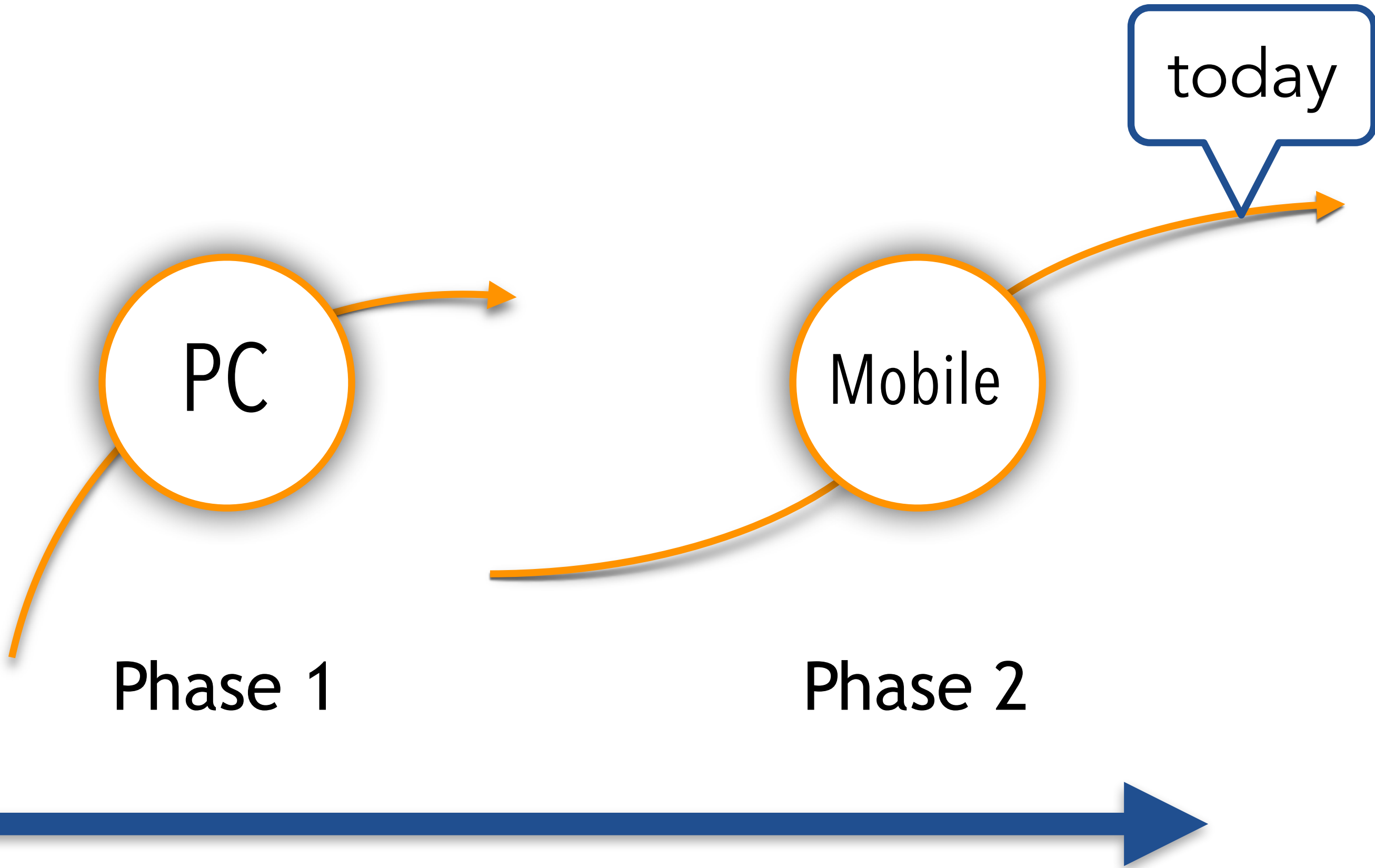
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Flat

World

Business



Phase 1

Phase 2

today

**World Wide Web**

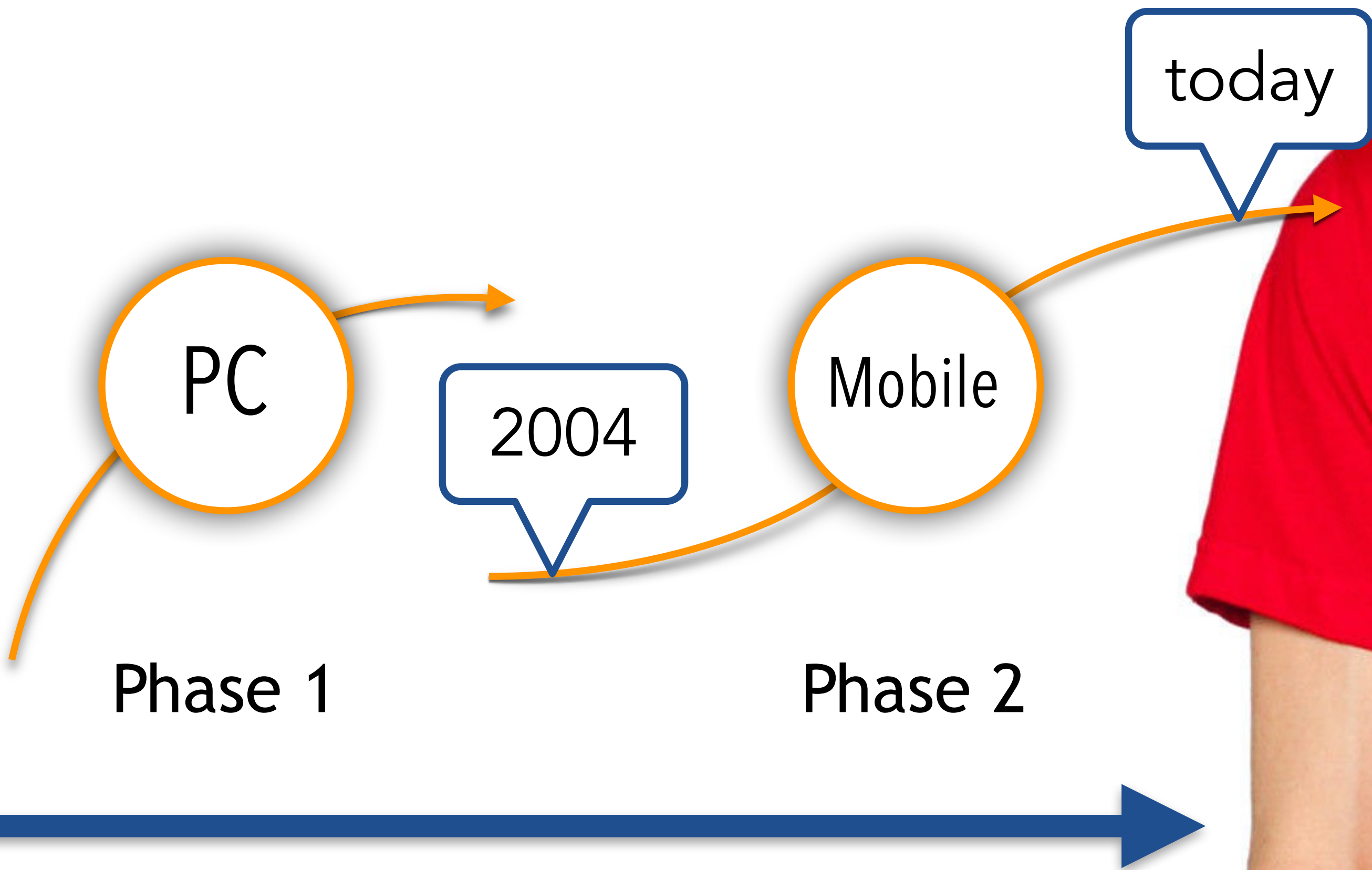
**Social Web**

Web 1.0

Web 2.0

**Internet**

**Mobile**



today

2004

Phase 1

Phase 2



**EAT.  
SLEEP.  
BLOG.  
REPEAT.**

**World Wide Web**

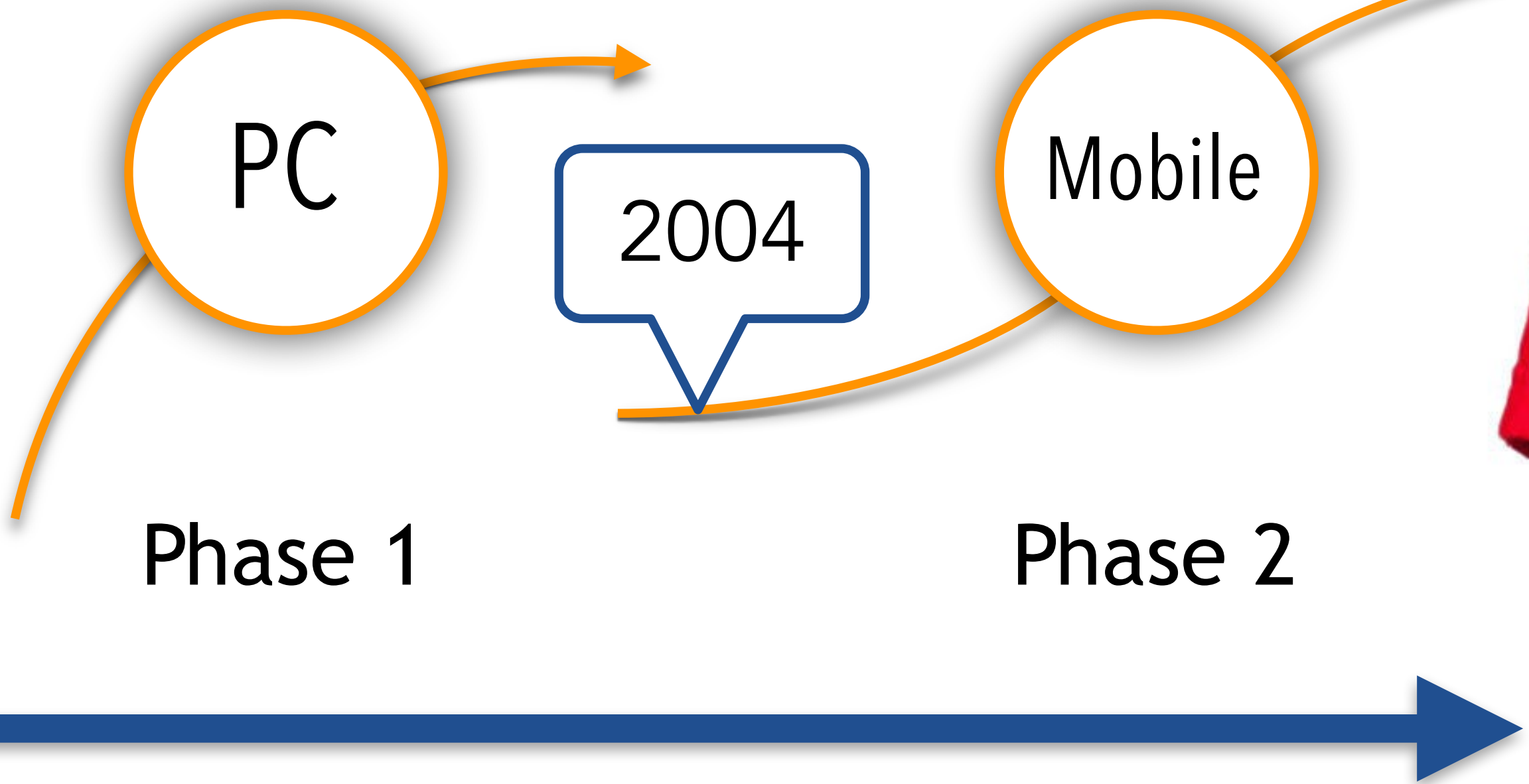
**Social Web**

Web 1.0

Web 2.0

**Internet**

**Mobile**



Phase 1

Phase 2

today

2004

**World Wide Web**

Web 1.0

**Internet**

**Social Web**

Web 2.0

**Mobile**



2006



today

Social

Participating web

You can contribute content.

You can interact with someone.

Phase 2

Social Web

Web 2.0

Mobile

EAT.  
SLEEP.  
BLOG.  
REPEAT.

today

Social

Participating web

You can contribute content.

You can interact with someone.

Phase 2

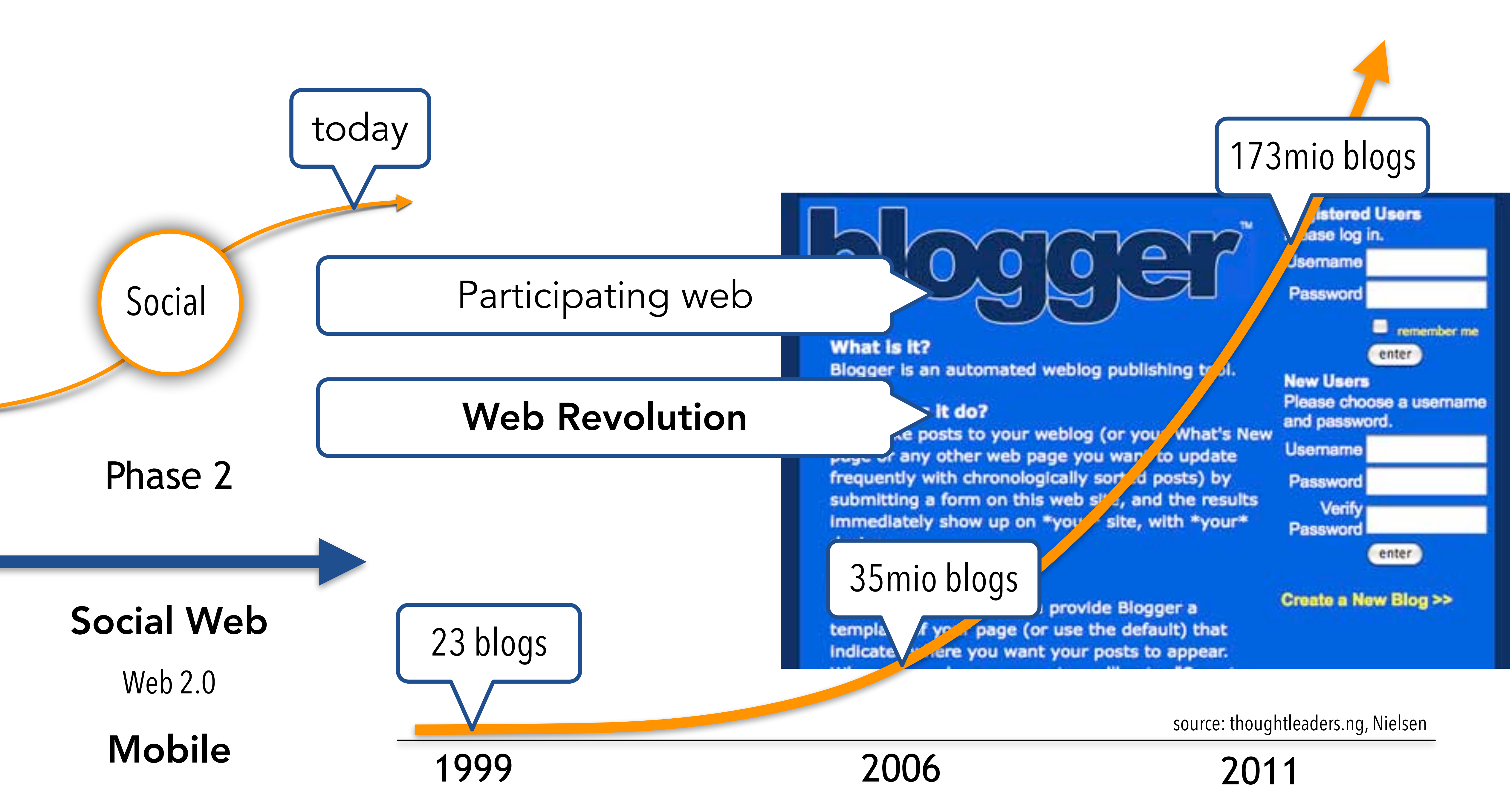


Social Web

Web 2.0

Mobile





today

Social

Participating web

**Web Revolution**

People have an online conversation

Phase 2

**Social Web**

Web 2.0

**Mobile**

Social

today

Participating web

**Web Revolution**

People have an online conversation

Phase 2

**Social Web**

Web 2.0

**Mobile**



Traditional Publishing



1998

DAYS  
100d

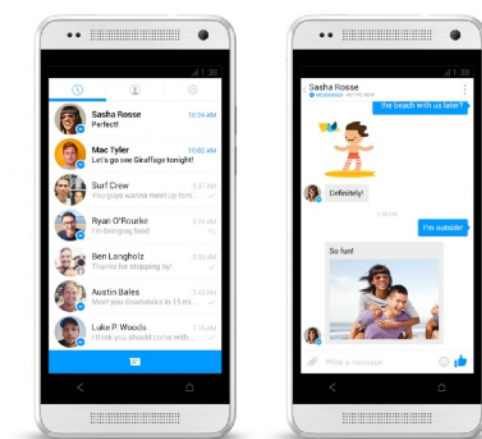
Social Publishing



2006

HOURS  
10K

Interaction



2014

MINUTES  
10M

today

Social

Participating web

Web Revolution

People have an online conversation

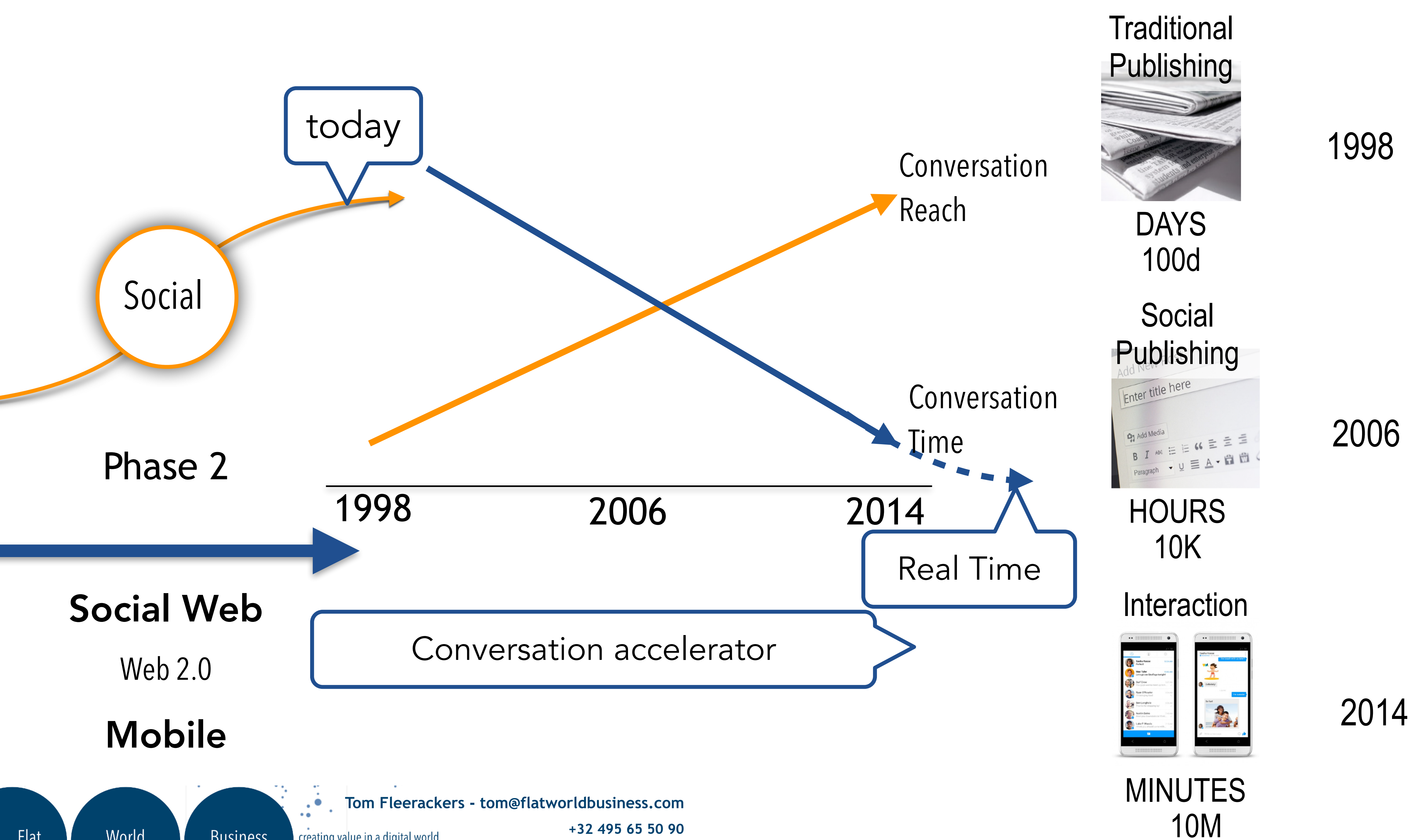
Conversation accelerator

Phase 2

Social Web

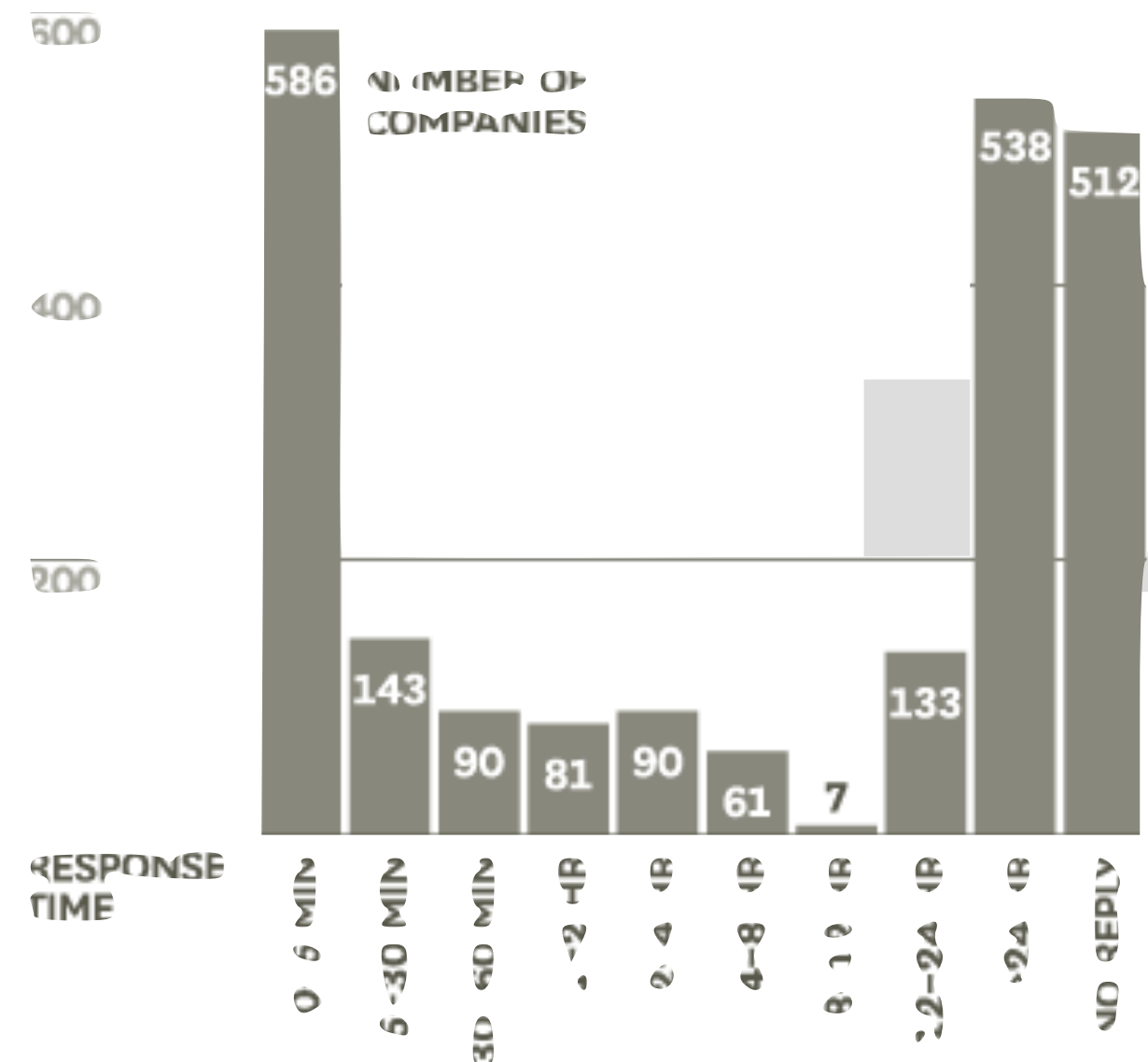
Web 2.0

Mobile



Social

today



People's Wait Time Expectation vs. Brand Response Time on Social



sproutsocial

sproutsocial.com/index

Phase 2

2011

2016

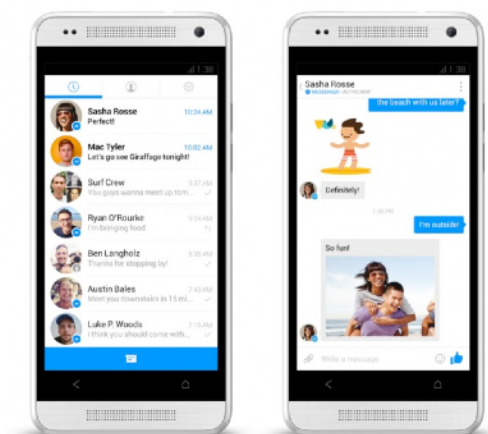
Social Web

Web 2.0

Mobile

Conversation accelerator

Interaction



2014

MINUTES 10M

source: Harvard Business Review (2011), Sprout Social (2016)

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today

Mobile

Mobile as the catalyst for Phase 2

Phase 2

Social Web

Web 2.0

Mobile

today

Mobile

Mobile Technology is defined as any device with internet capability that is accessible from anywhere the user is.

Phase 2

Social Web

Web 2.0

Mobile

source: Penn State University

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today

Mobile

Mobile Technology is defined as **any** device with internet capability that is accessible from anywhere the user is.

Phase 2

Social Web

Web 2.0

Mobile

Mobile

today

Mobile as the catalyst for Phase 2

Phase 2

Social Web

Web 2.0

Mobile



From “move-ability”

Mobile

today

Mobile as the catalyst for Phase 2

Phase 2

Social Web

Web 2.0

Mobile



From “move-ability”

To “bring it along all the time”



today

Mobile

Smart, portable, personal, context-aware, multifunctional devices ...

Phase 2

...which can be used to make a phonecall.

Social Web

Web 2.0

Mobile

today

Mobile

Mobile anytime, anywhere, anyhow!

Phase 2



Social Web

Web 2.0

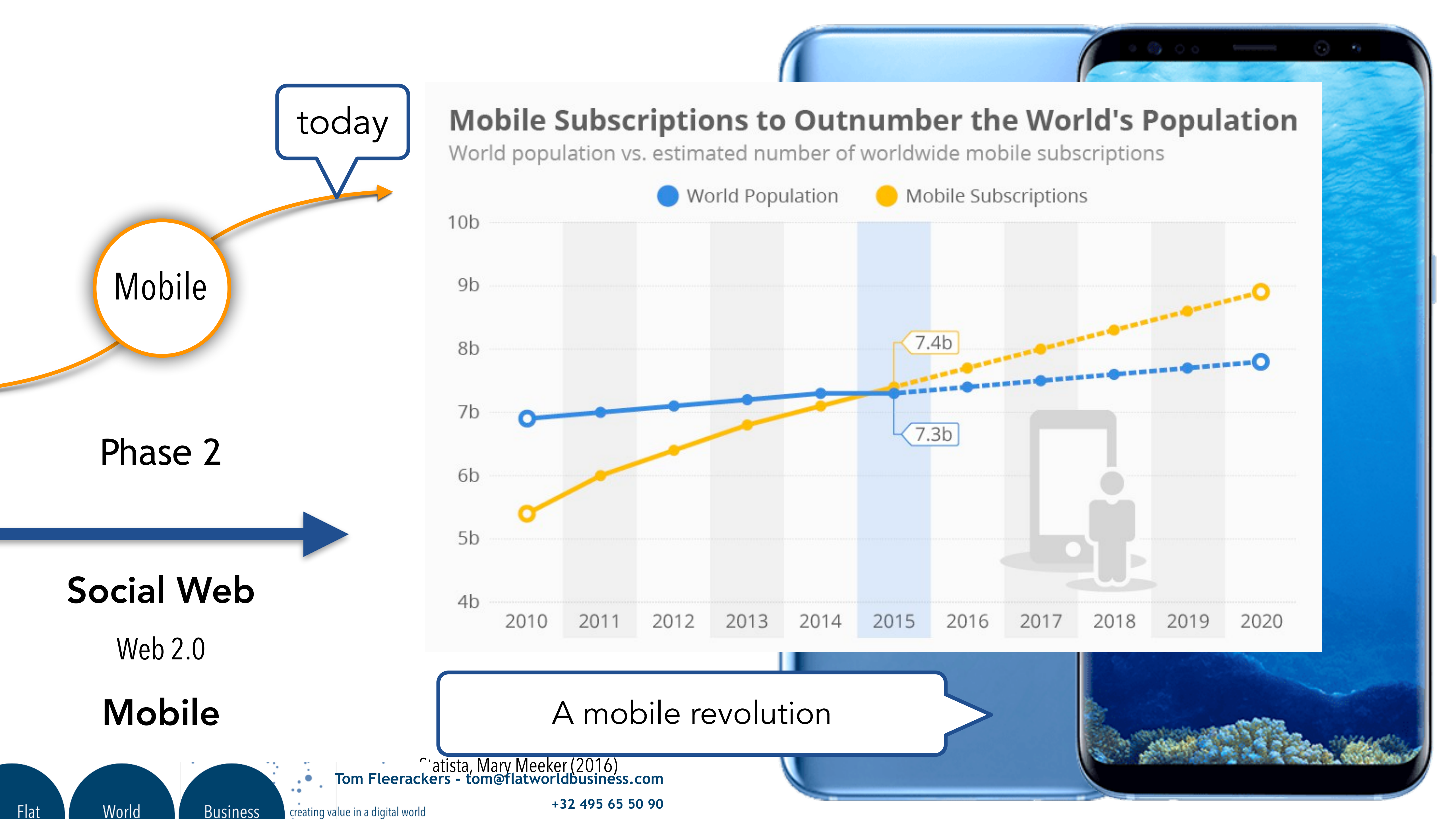
Mobile



source: Wonderfull Engineering (2018)

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today

Mobile

Phase 2



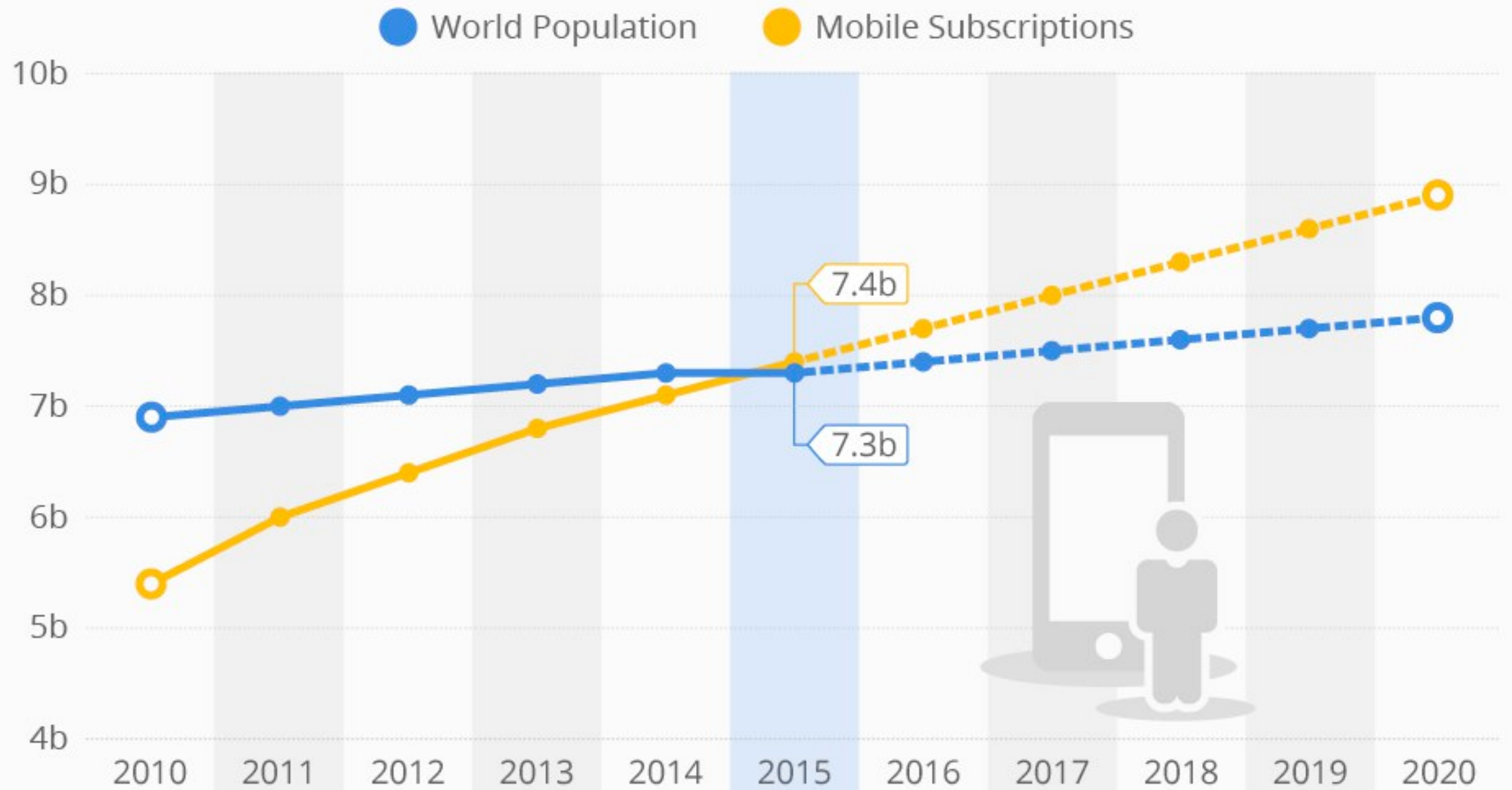
Social Web

Web 2.0

Mobile

# Mobile Subscriptions to Outnumber the World's Population

World population vs. estimated number of worldwide mobile subscriptions



A mobile revolution

Statista, Mary Meeker (2016)  
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Mobile

Phase 2

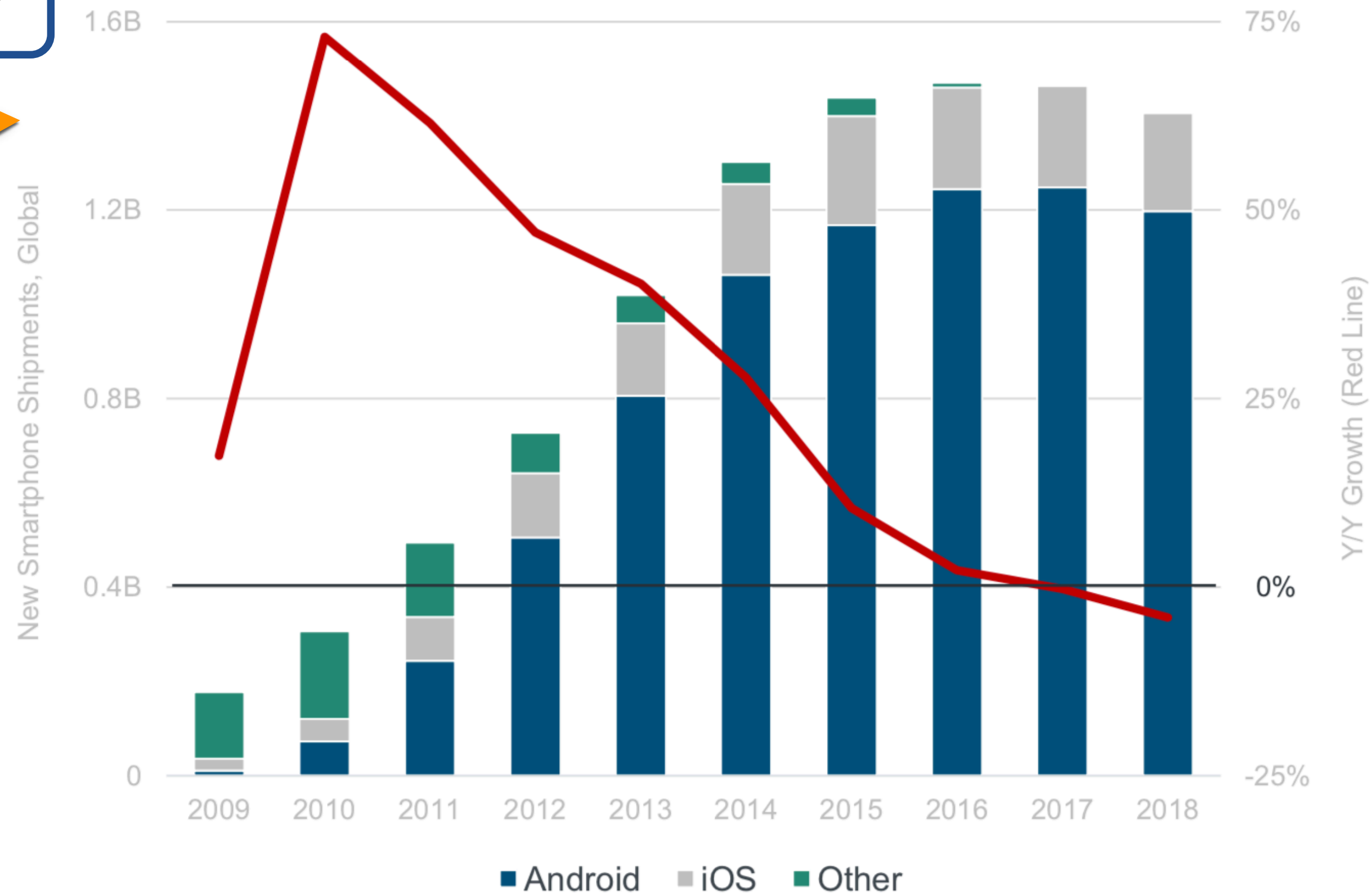
Social Web

Web 2.0

Mobile

today

### New Smartphone Unit Shipments vs. Y/Y Growth

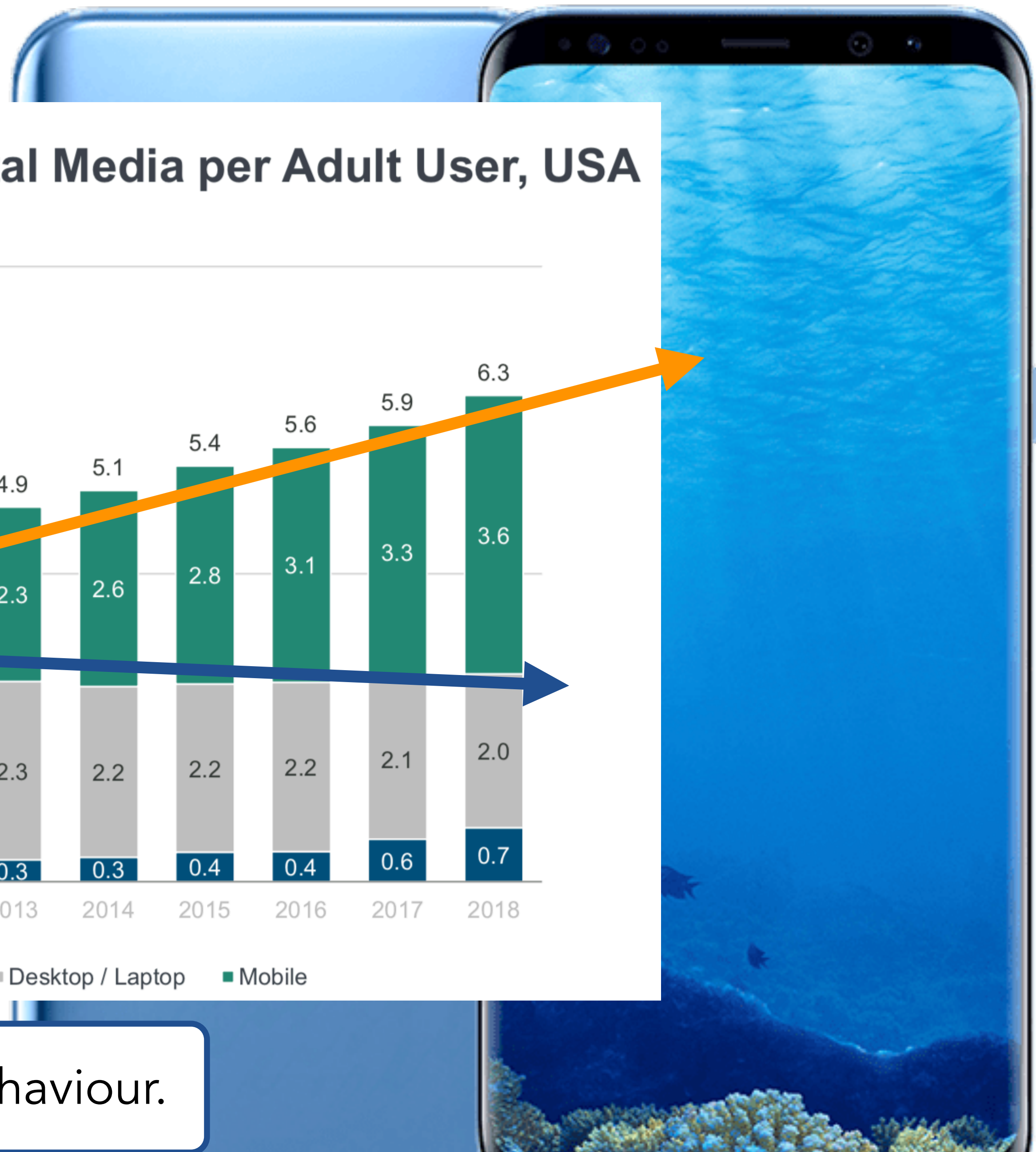


The mobile revolution is slowing down

source: Internet trends, Mary Meeker 2019

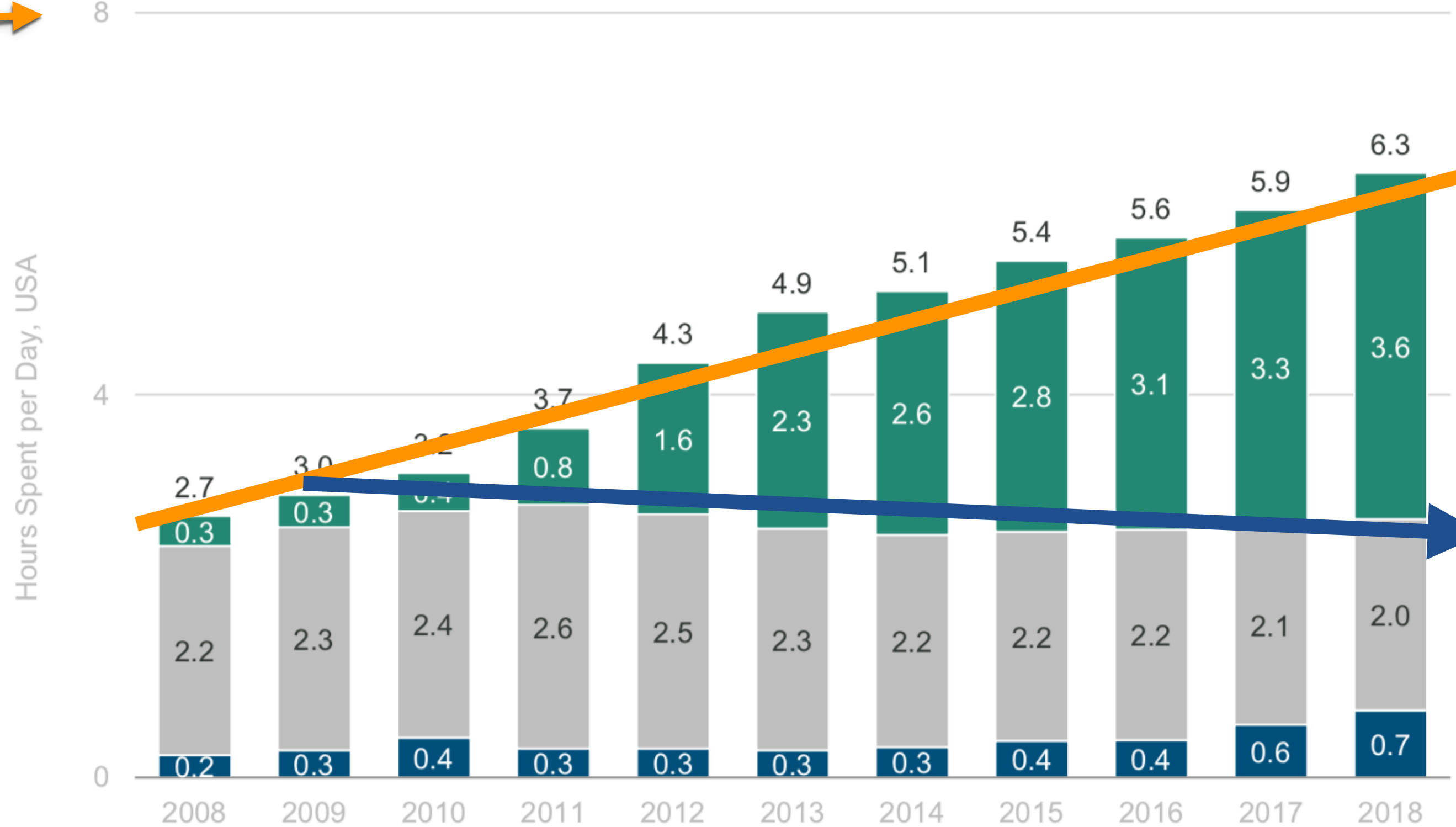
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today

# Daily Hours Spent with Digital Media per Adult User, USA



Mobile

Phase 2

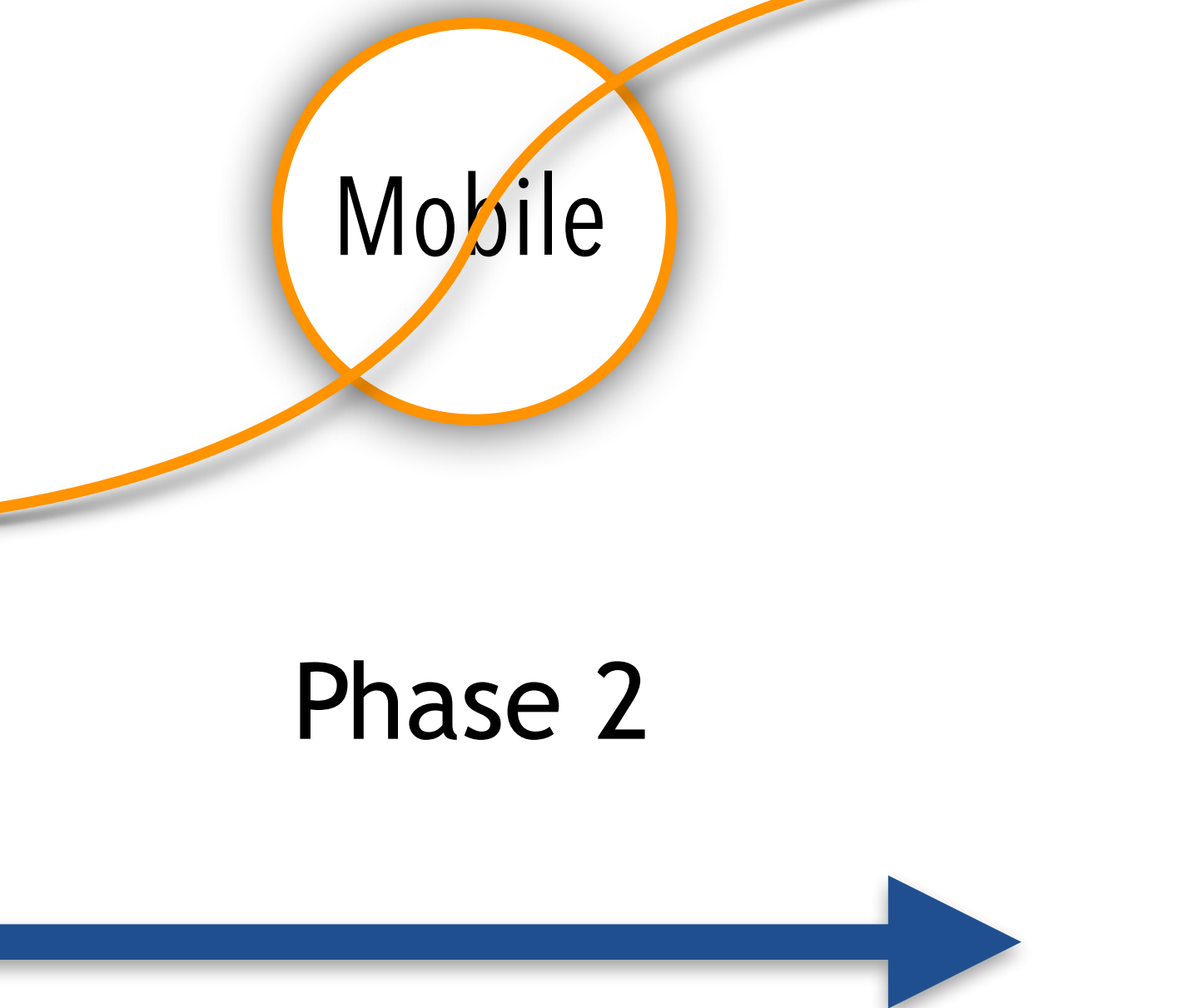
Social Web

Web 2.0

Mobile

Mobile changed our behaviour.



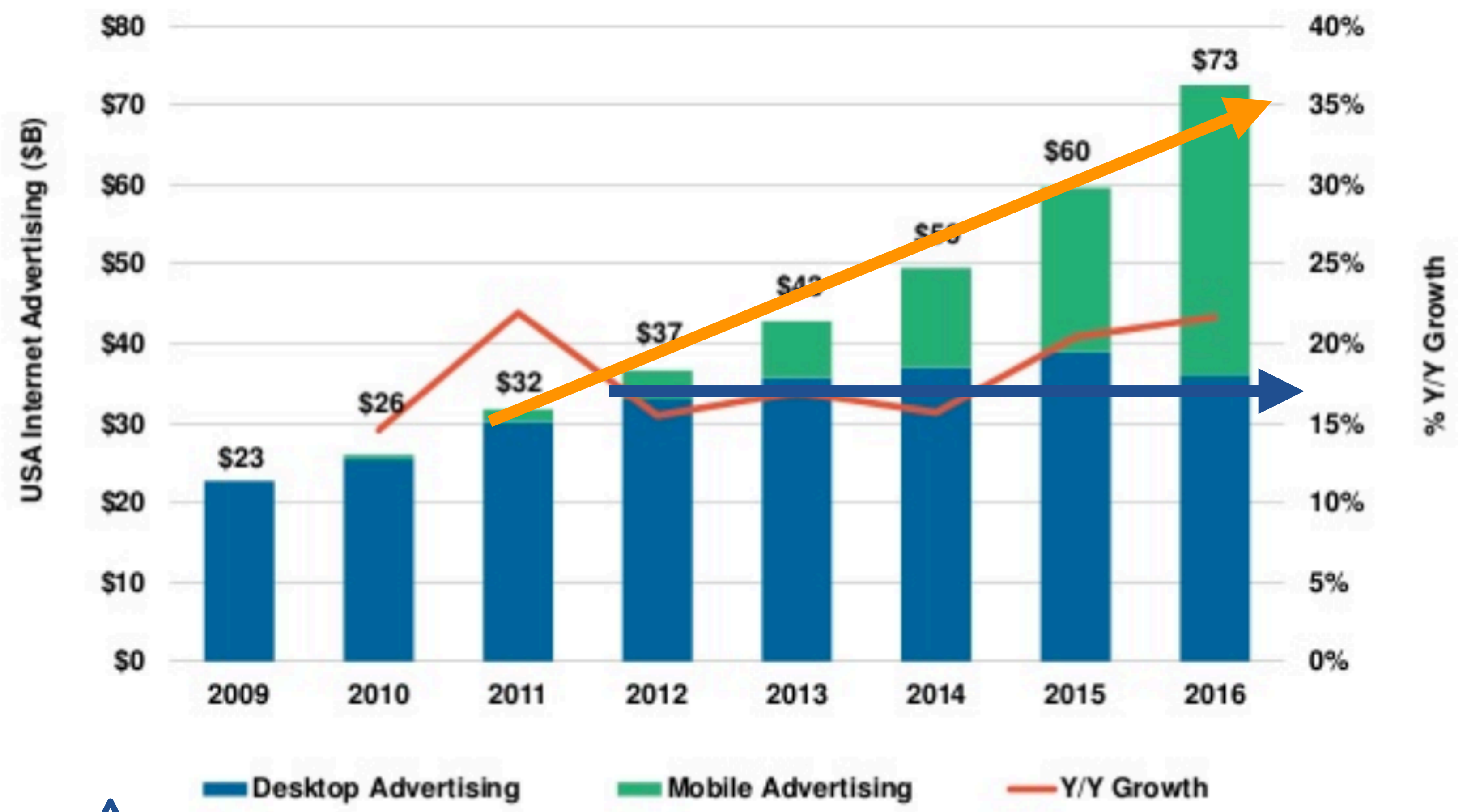


**Social Web**

Web 2.0

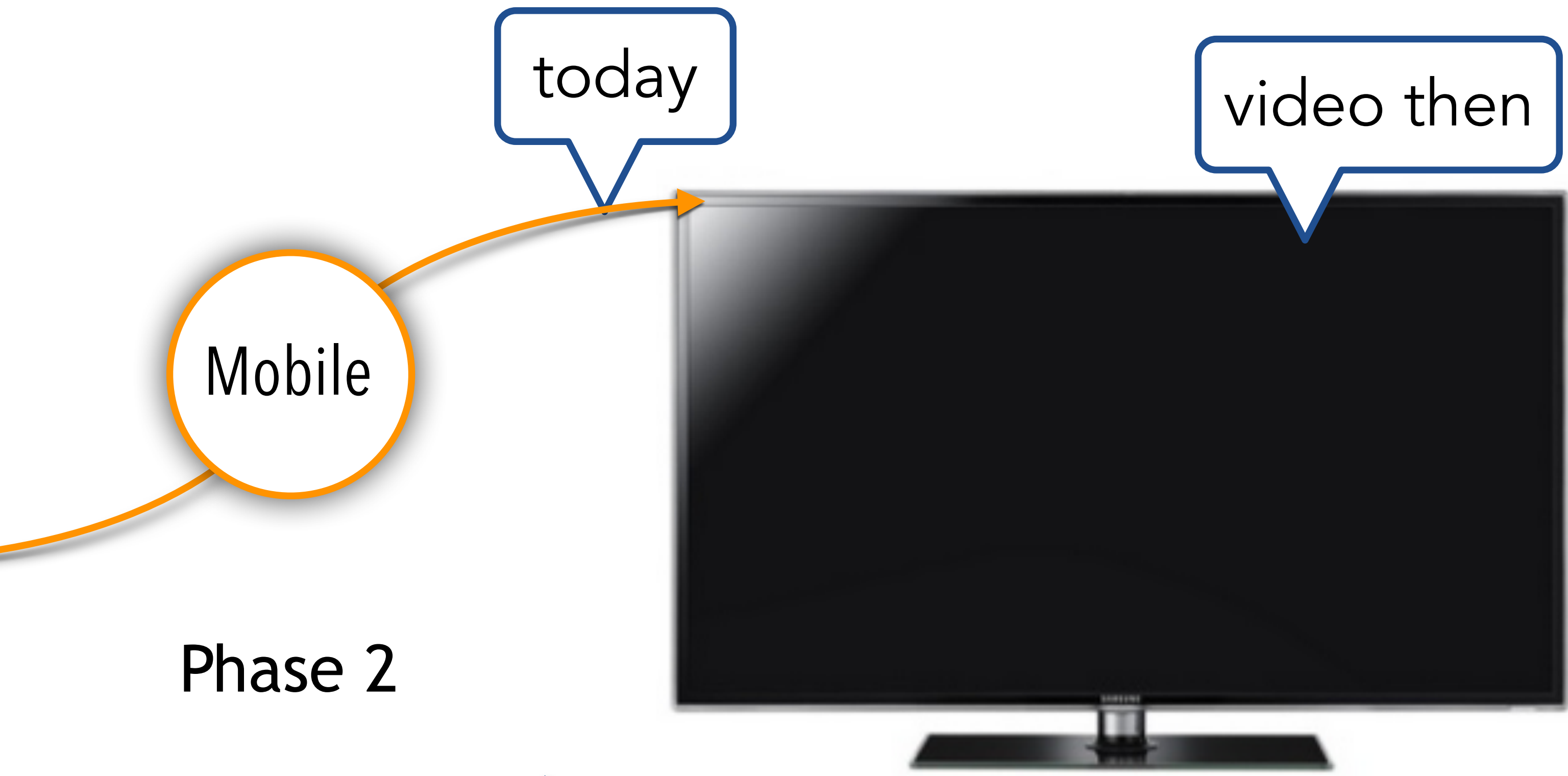
**Mobile**

**USA Internet Advertising (\$B), 2009 – 2016**



source: Internet trends, Mary Meeker 2017

Mobile changed our behaviour.



Phase 2



**Social Web**

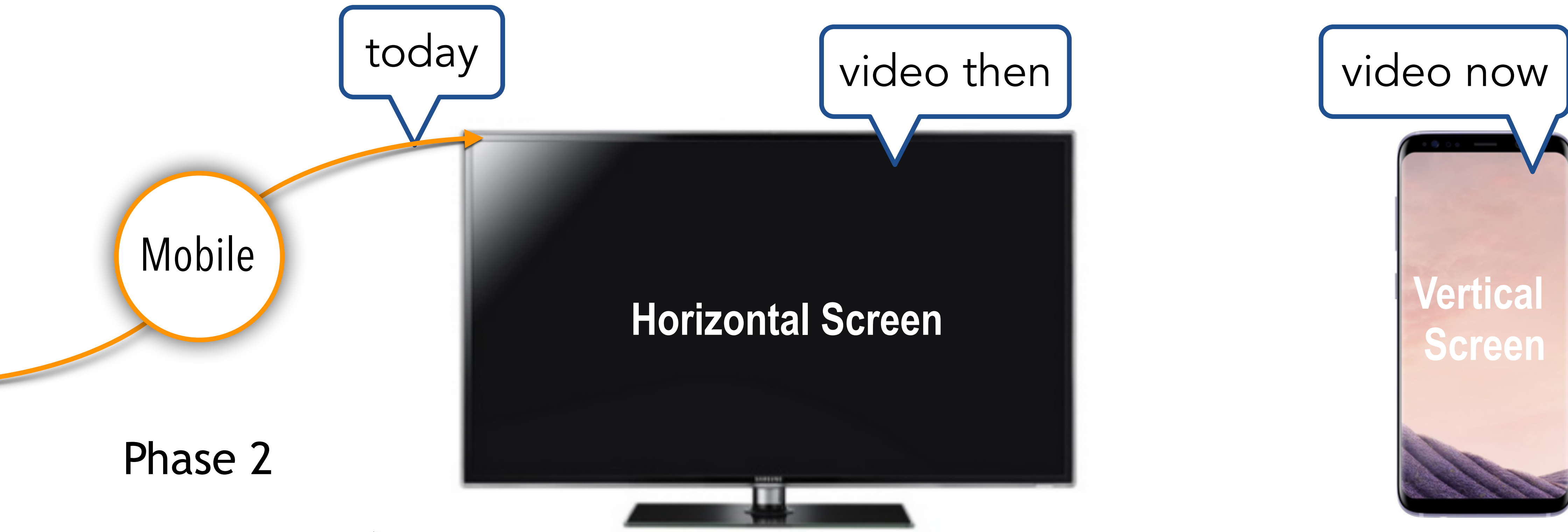
Web 2.0

**Mobile**

Mobile changed our behaviour.

Something strange happened when we switched to mobile.

source: Internet trends, Mary Meeker 2017



Phase 2

**Social Web**

Web 2.0

**Mobile**

Mobile changed our behaviour.

Something strange happened when we switched to mobile.

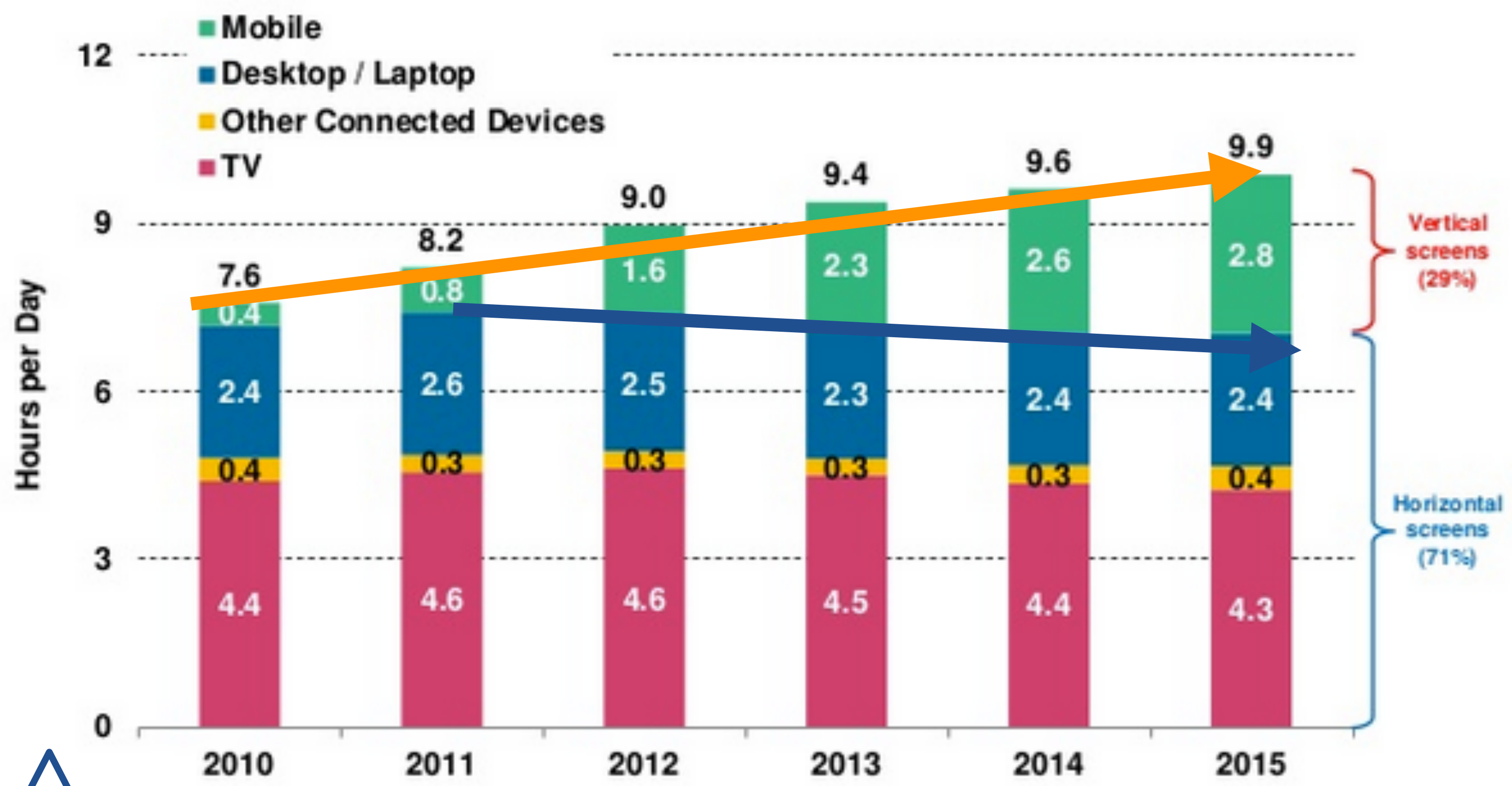
source: Internet trends, Mary Meeker 2017

Mobile

today

Phase 2

Time Spent on Screens by Orientation (Hours / Day), USA, 2010 – 2015



Social Web

Web 2.0

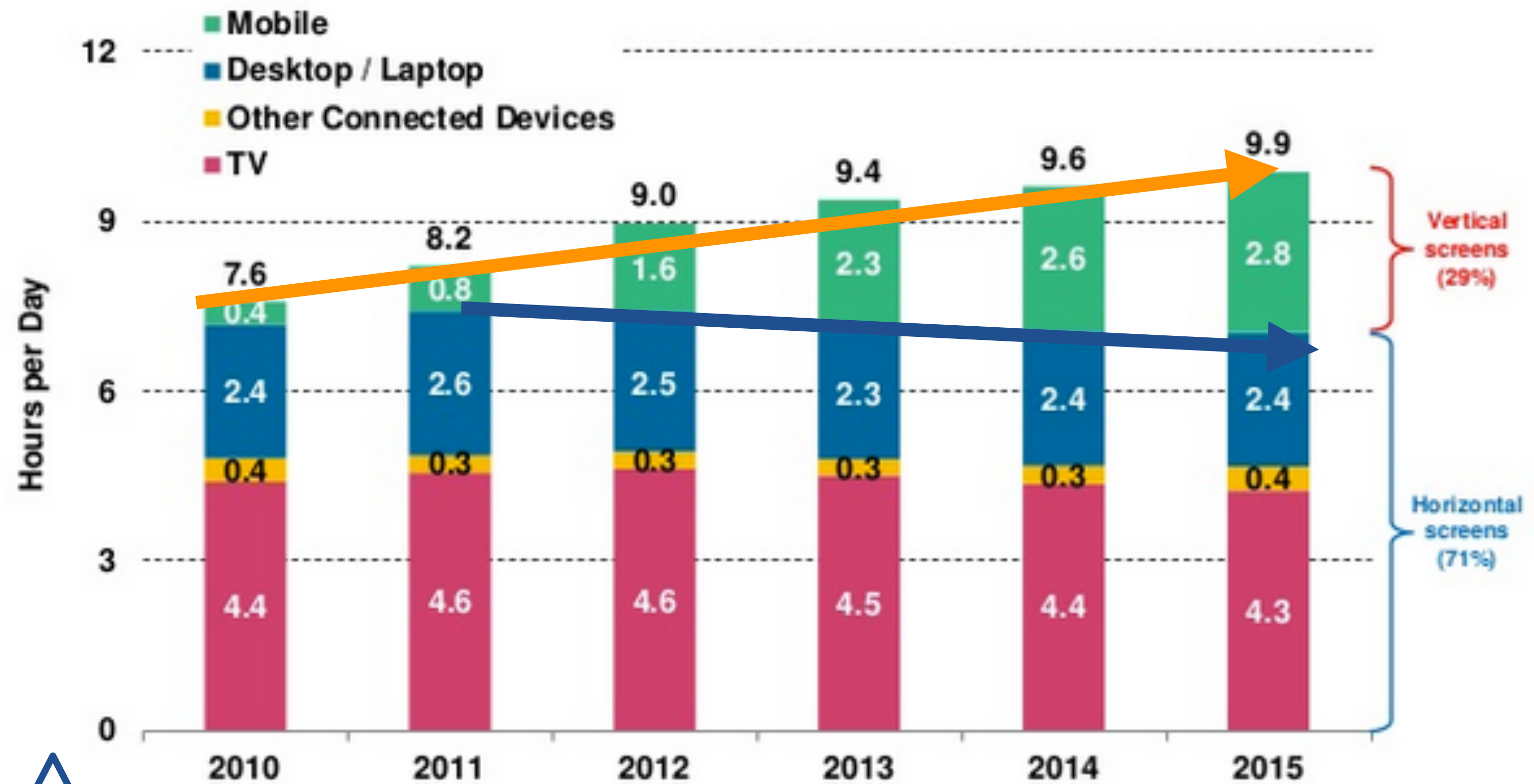
Mobile

Mobile changed our behaviour.

Something strange happened when we switched to mobile.

source: Internet trends, Mary Meeker 2017

Time Spent on Screens by Orientation (Hours / Day), USA, 2010 – 2015



today

Mobile

Phase 2

Social Web

Web 2.0

Mobile

Mobile changed our behaviour.

Something strange happened when we switched to mobile.

source: Internet trends, Mary Meeker 2017

today

Mobile

We are living a multi-screen environment

Phase 2



Social Web

Web 2.0

Mobile

today

Mobile

We are living a multi-screen environment

Phase 2

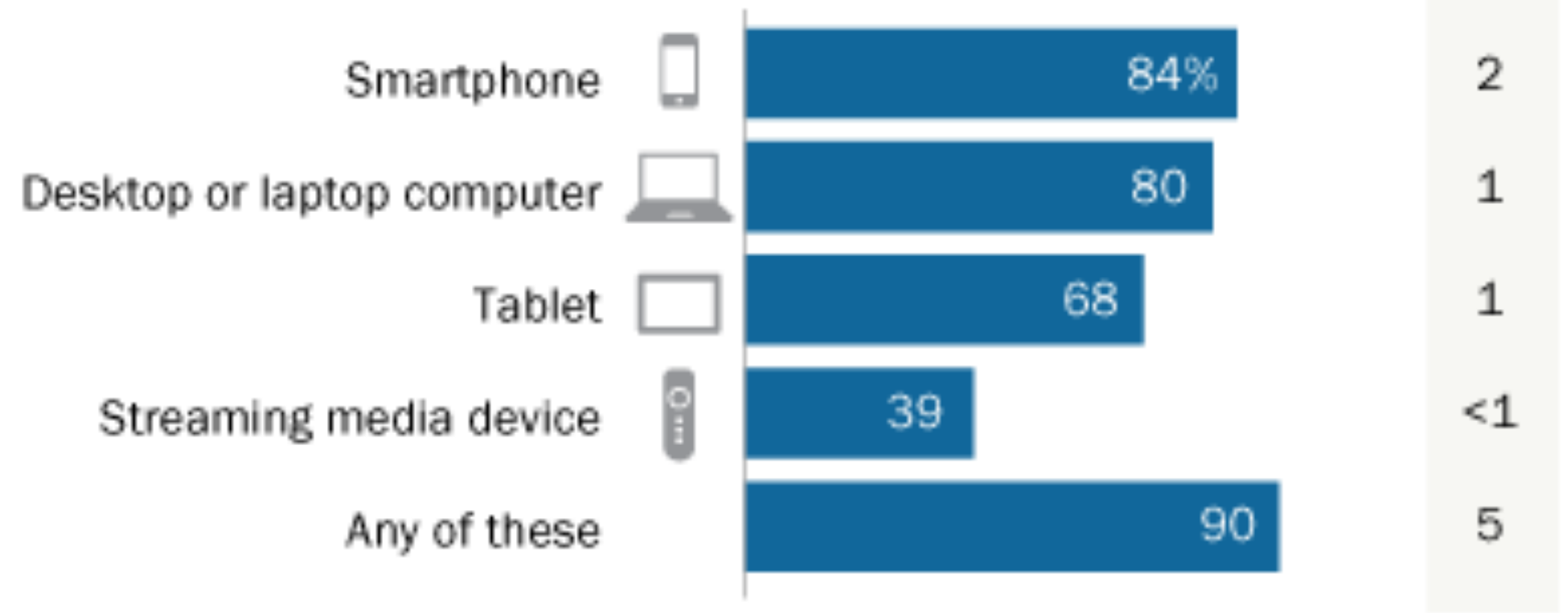
Social Web

Web 2.0

Mobile

% of U.S. adults who say their household contains a ...

Median number per household



Note: Streaming media device refer to devices such as an Apple TV, Roku, Google Chromecast or Amazon Fire TV.

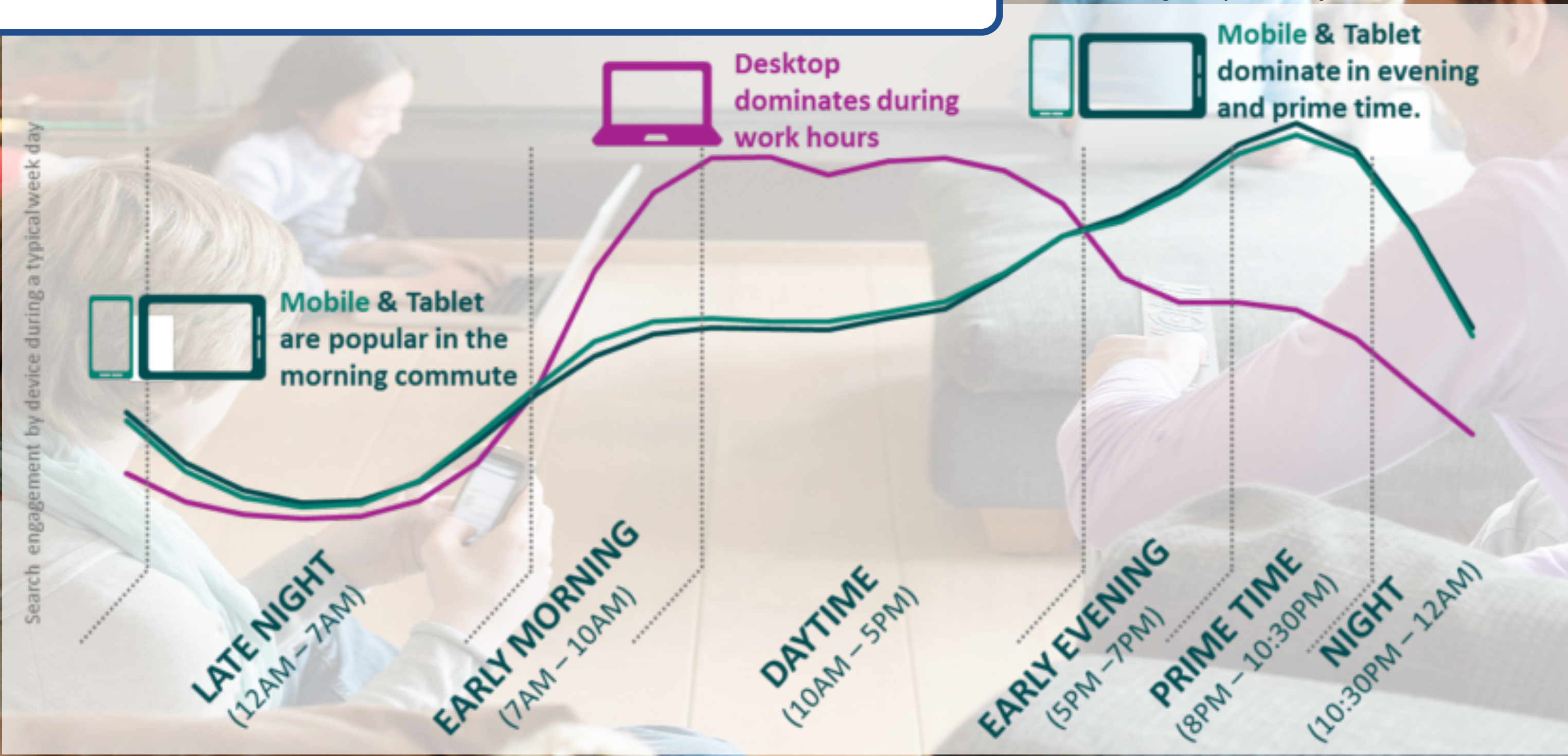
Source: Survey conducted Sept. 29-Nov. 6, 2016.

today

Mobile

We are living a multi-screen environment

source: Bing Proprietary Data (2017)



Phase 2

Social Web

Web 2.0

Mobile



today

Mobile

We are living a multi-screen environment

### Nielsen Audience Report (USA)

88% = Use a Second Digital Device While Watching TV

71% = Look Up Content Related To Content They Are Watching

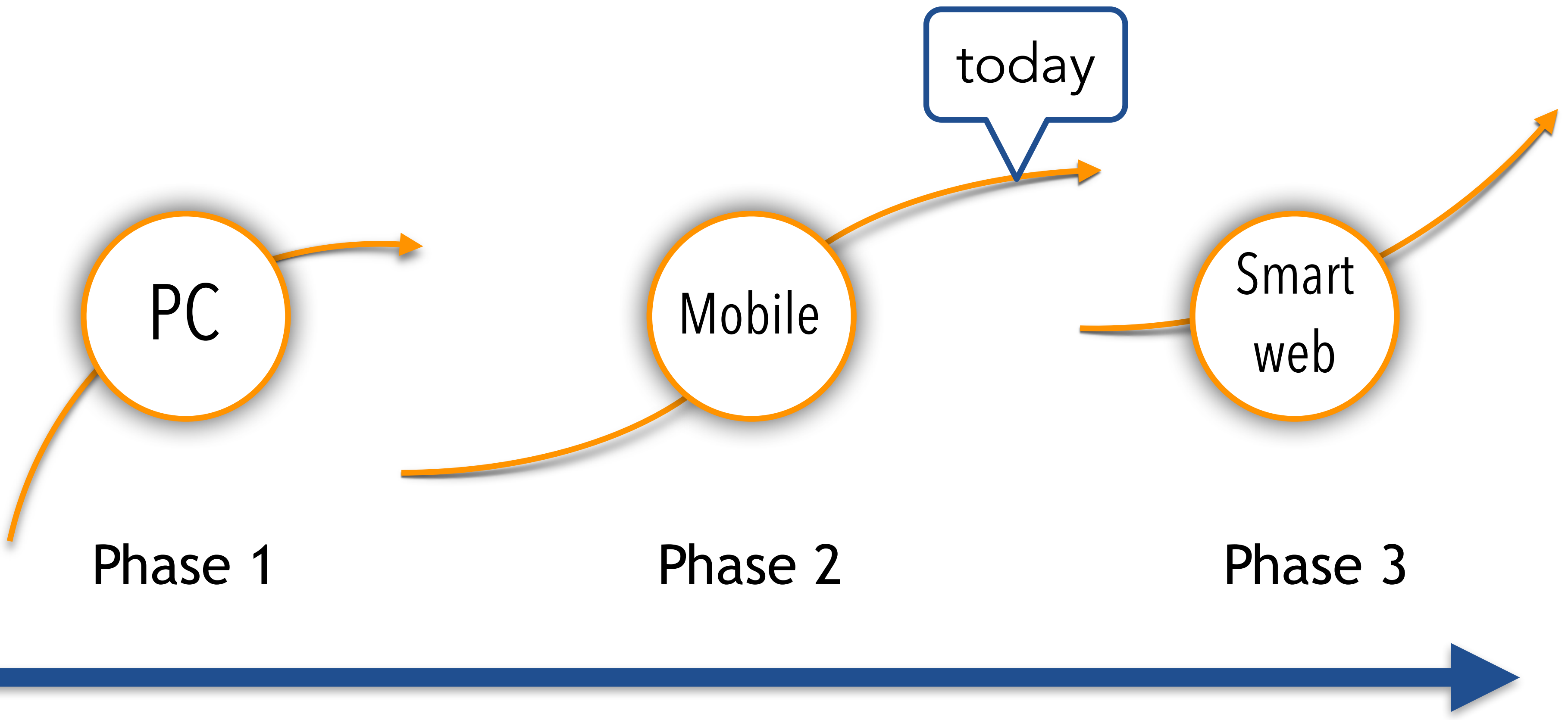
41% = Message Friends / Family About Content They Are Watching

Phase 2

Social Web

Web 2.0

Mobile



**World Wide Web**

Web 1.0

**Internet**

**Social Web**

Web 2.0

**Mobile**

**Semantic Web**

Web 3.0

**AI/VR/AR**



Smart  
web

Phase 3



**Semantic Web**

Web 3.0

**AI/VR/AR**

Smart web

Semantic/smart web is a web where all information is categorized and stored in such a way that a computer can understand it as well as a human.

Phase 3

Semantic Web

Web 3.0

AI/VR/AR



Actual print media



what you see using **layar**

# Web build around data

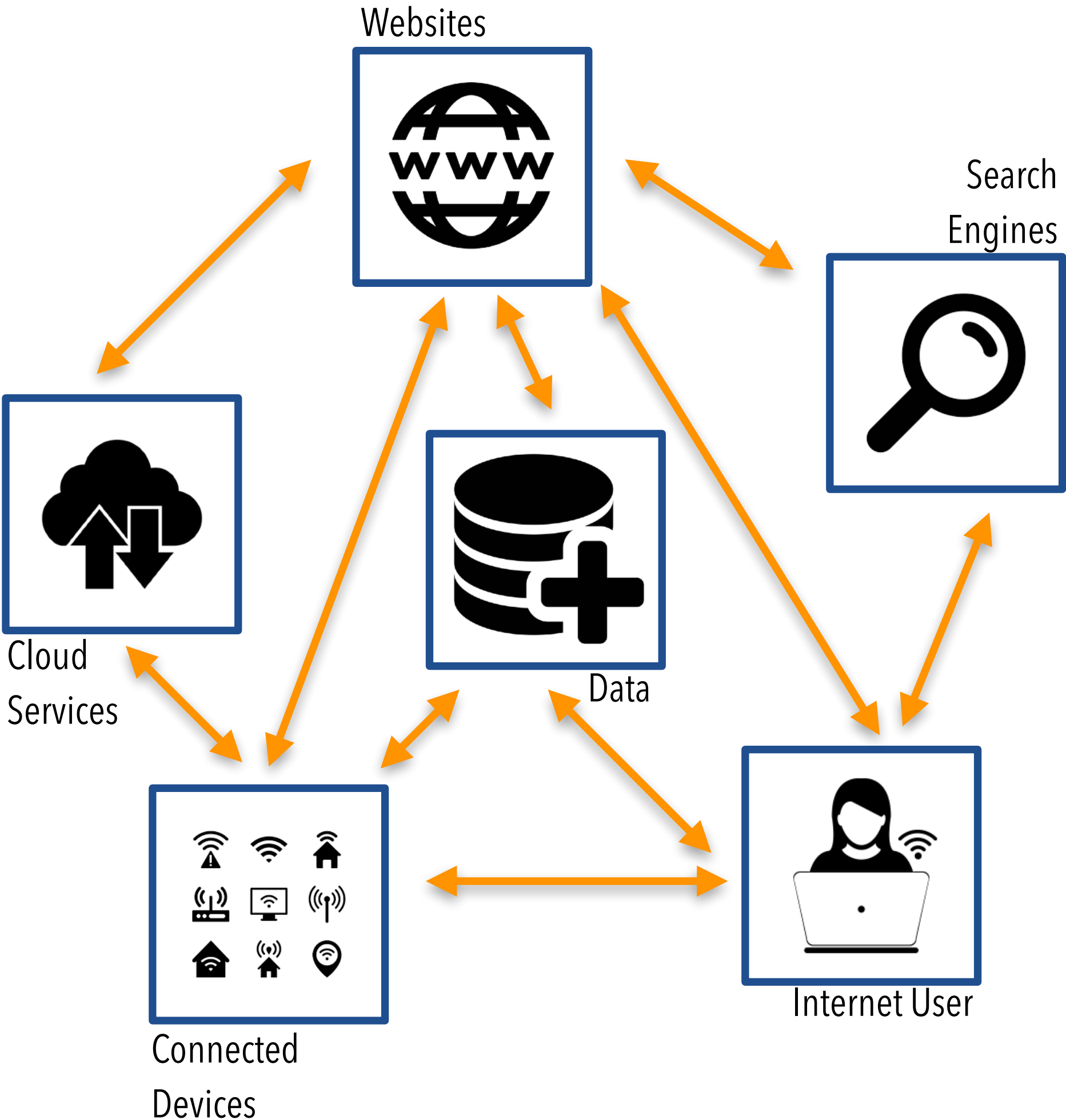
Smart web

Phase 3

Semantic Web

Web 3.0

AI/VR/AR



# Web build around data

Smart web

Phase 3

"Data is moving from something you use outside of the work stream to becoming a part of the business app itself.  
It's how the knowledge worker is actually performing their job."

Frank Bien, CEO Looker

## Semantic Web

Web 3.0

AI/VR/AR



# Web built around data

Smart web

Leverage augmented and virtual reality

Real-time, Personalized and Tailor made

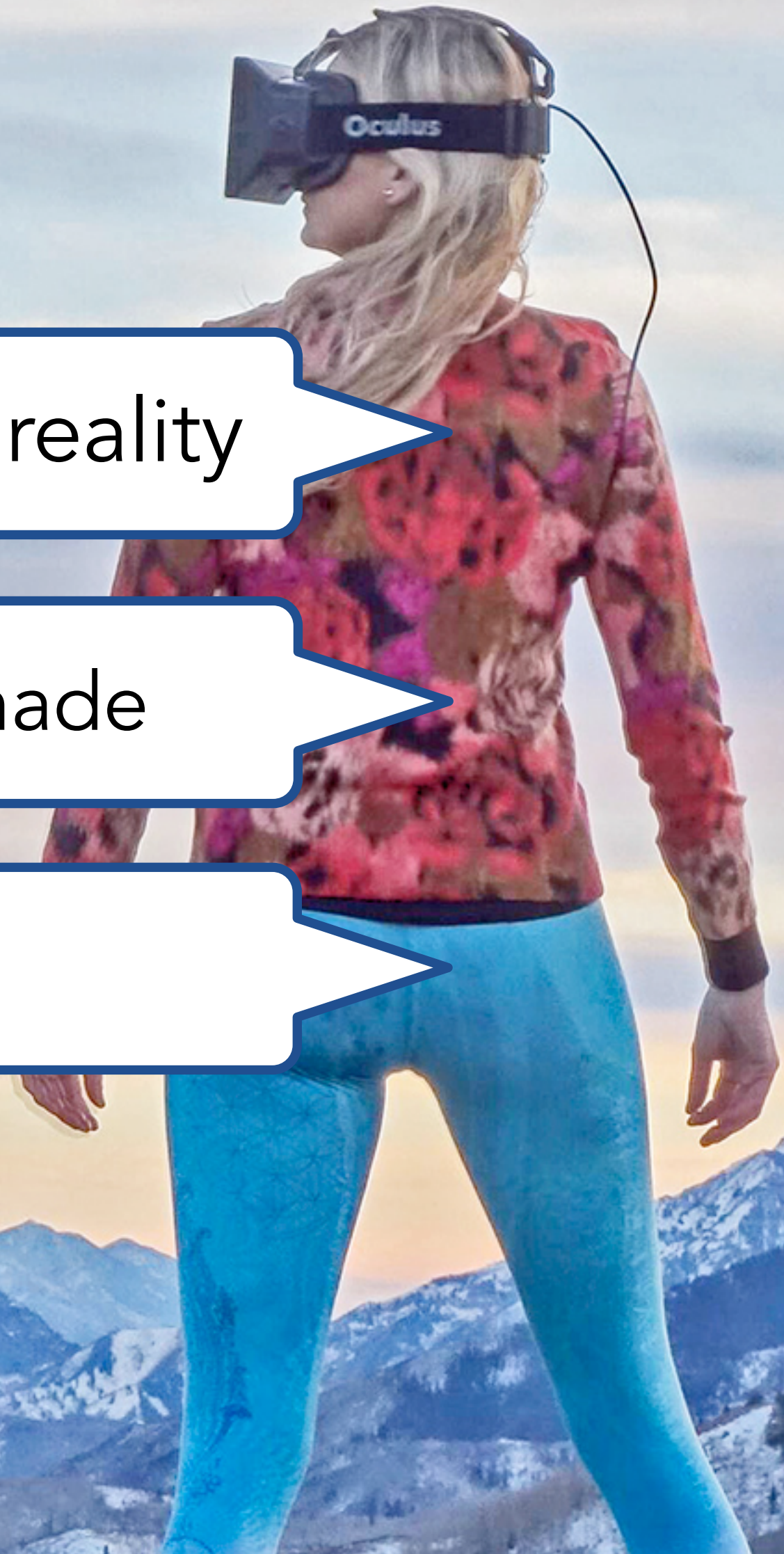
Machine learning opportunities

Phase 3

Semantic Web

Web 3.0

AI/VR/AR



Smart web

XR

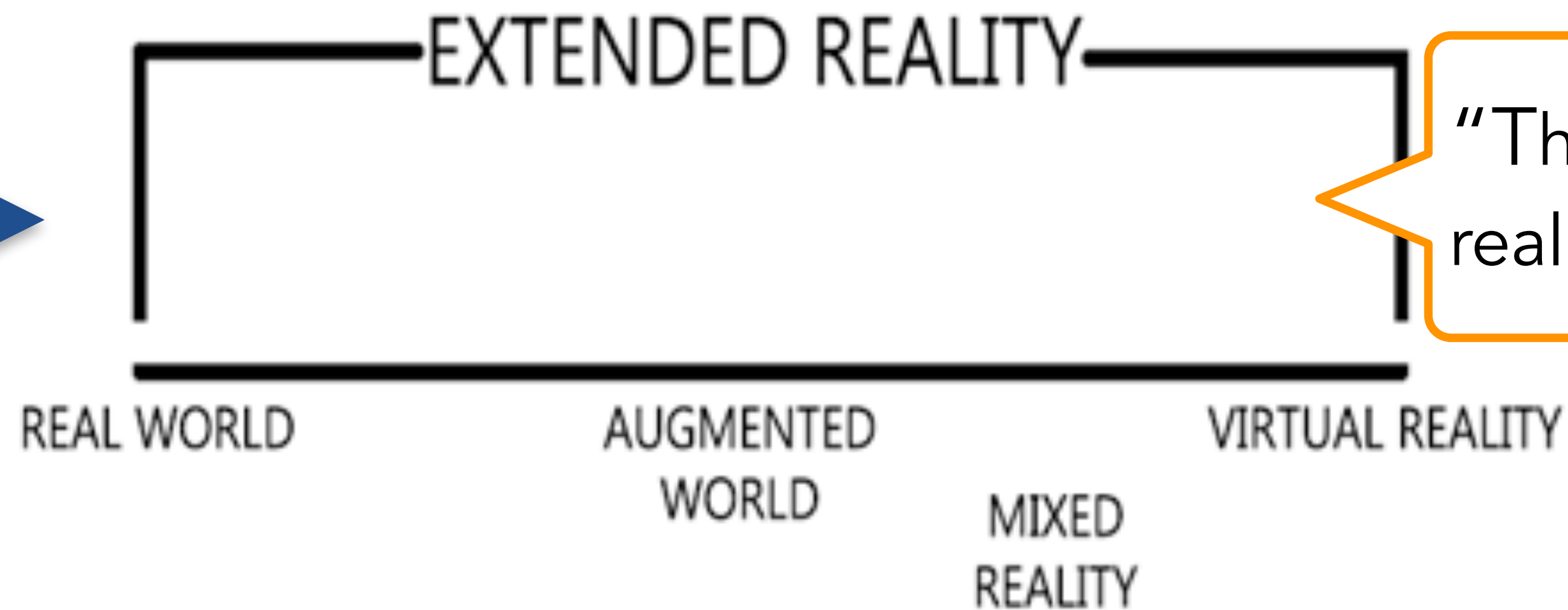
(Mobile) Extended Reality Extended Reality (XR) is a combination of real and virtual world and human-machine interaction

Phase 3

Semantic Web

Web 3.0

AI/VR/AR



"The Extended reality is a real Virtuality continuum."

Paul Migram

source: Qualcomm Wireless Evolution - The mobile future of extended reality (2017)



# First responder glasses

Smart web

XR

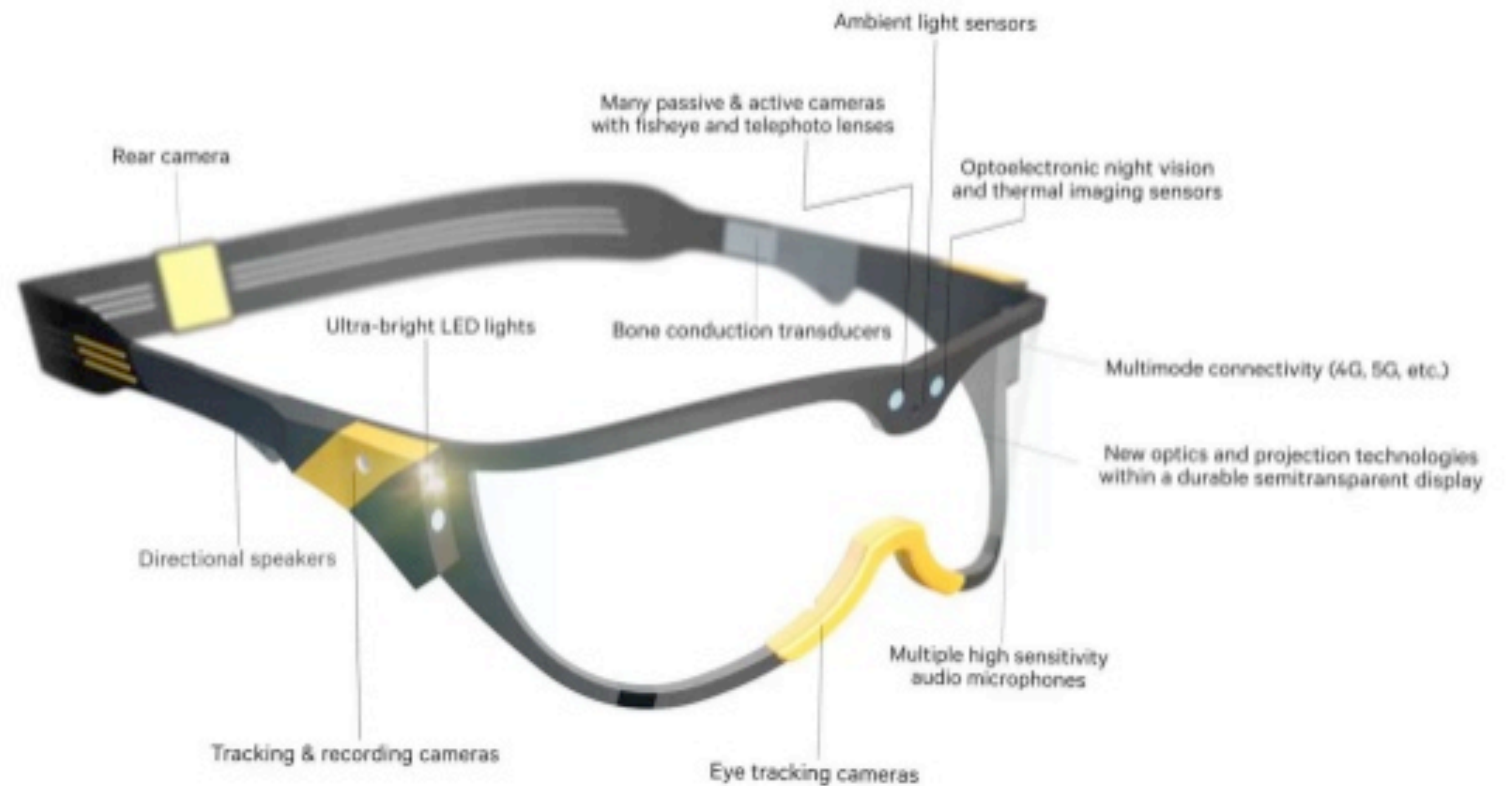
Phase 3

Semantic Web

Web 3.0

AI/VR/AR

source: Qualcomm Wireless Evolution - The mobile future of extended reality (2017)



# First responder glasses

Smart web

XR

Phase 3



source: Qualcomm Wireless Evolution - The mobile future of extended reality (2017)

Semantic Web

Web 3.0

AI/VR/AR

# First responder glasses

Smart web

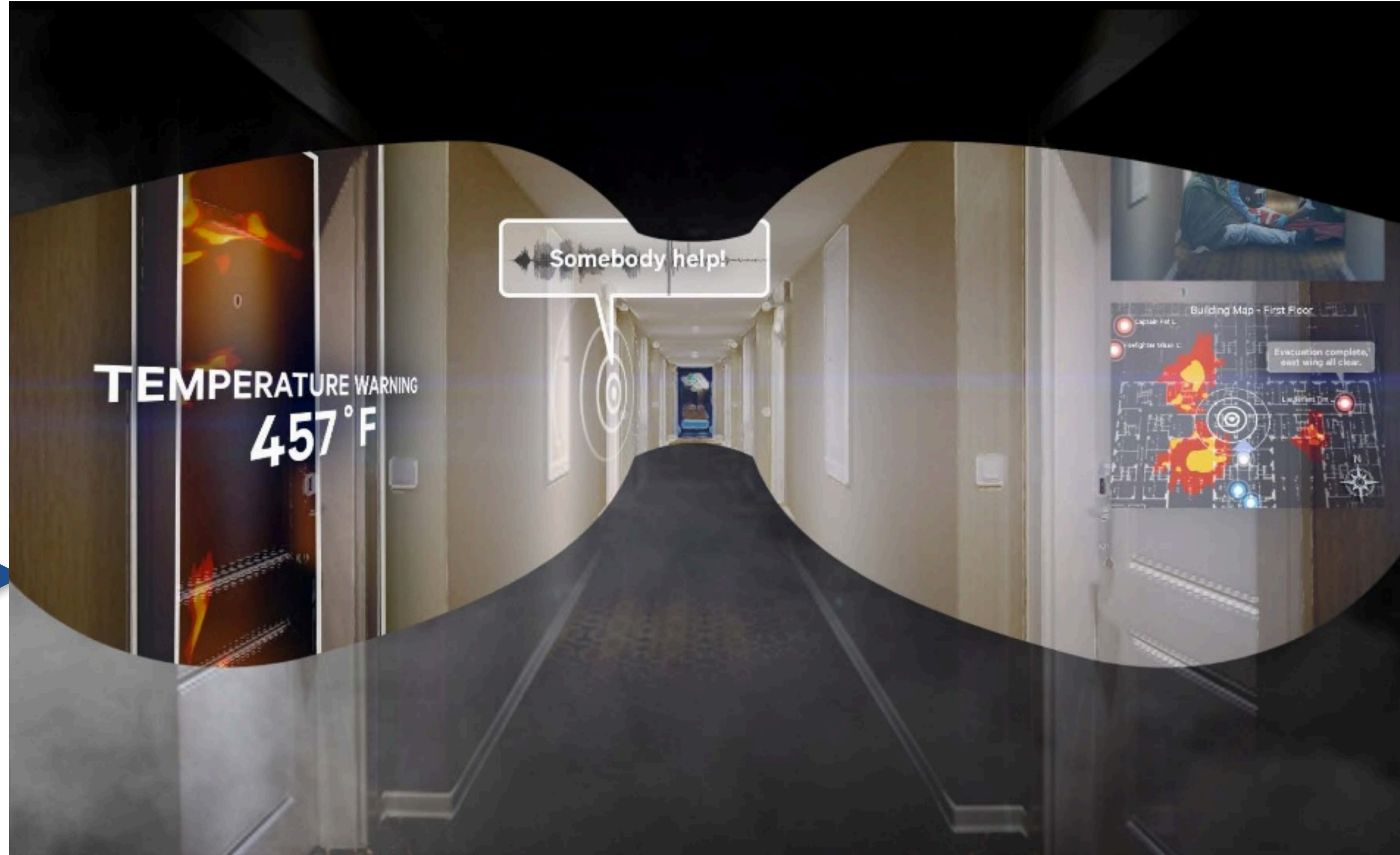
XR

Phase 3

Semantic Web

Web 3.0

AI/VR/AR



source: Qualcomm Wireless Evolution - The mobile future of extended reality (2017)

Smart web

XR

Phase 3

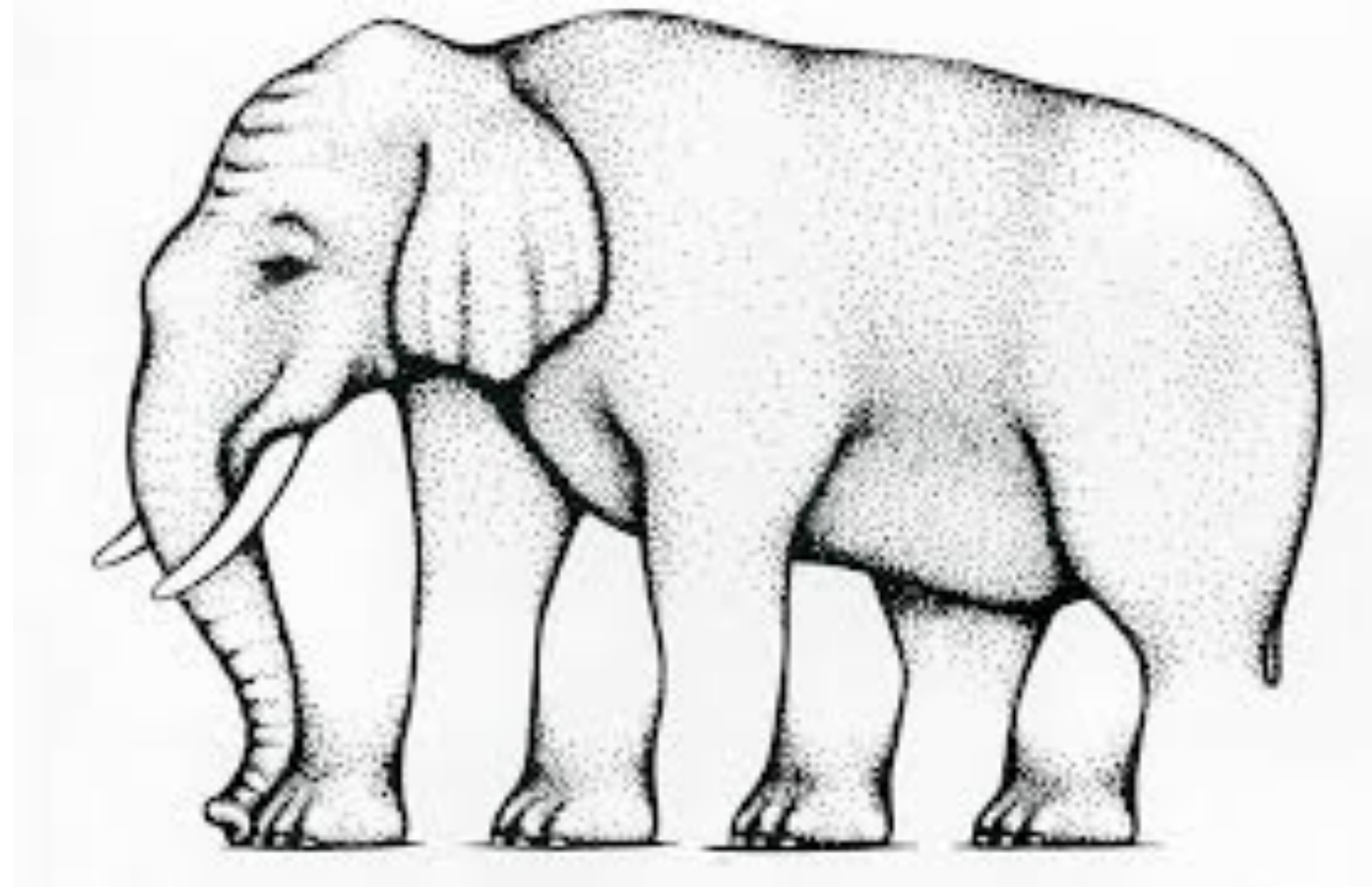
Semantic Web

Web 3.0

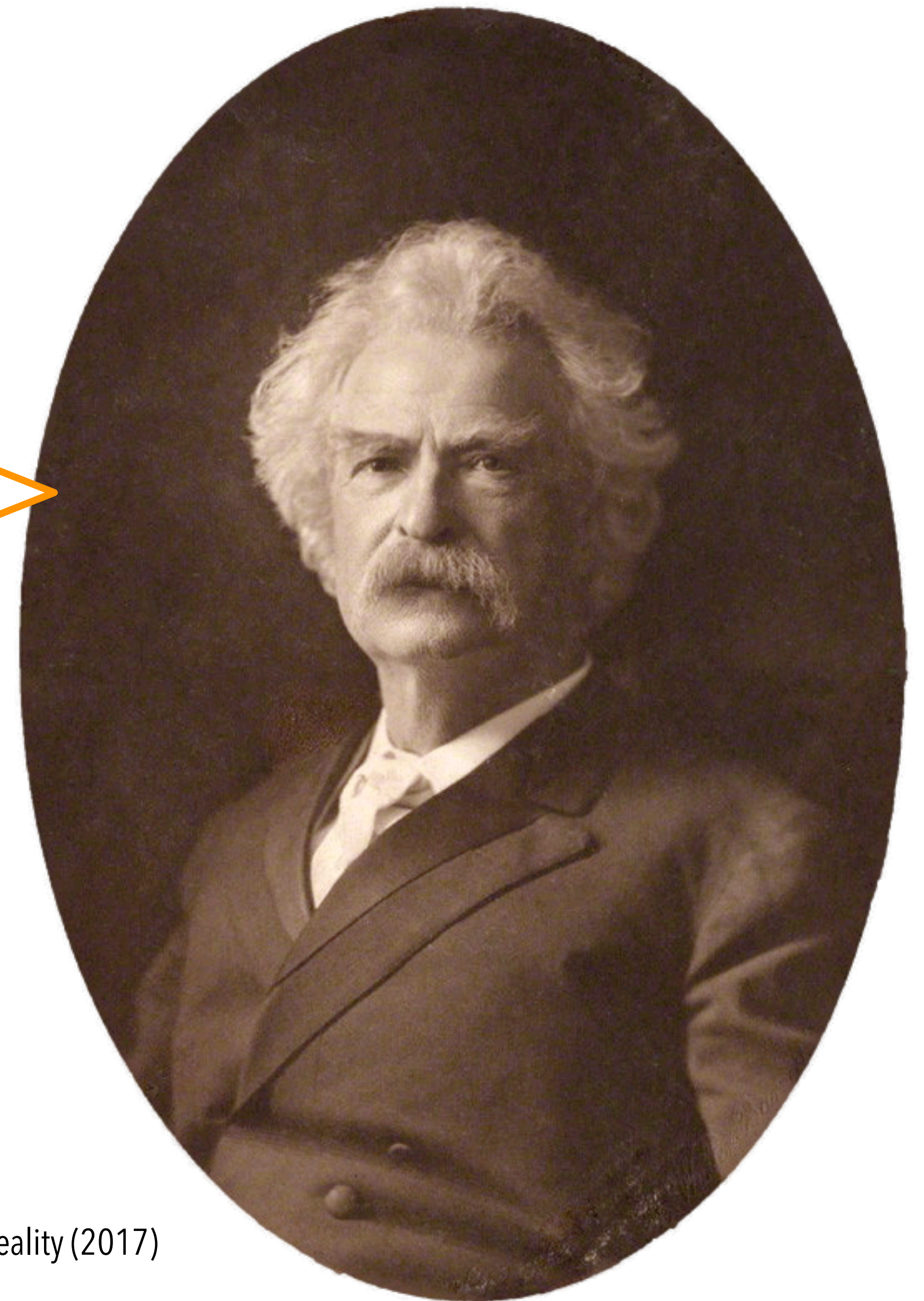
AI/VR/AR

Mark Twain

"You can't depend on your eyes, when your imagination is out of focus"



source: Qualcomm Wireless Evolution - The mobile future of extended reality (2017)



# Virtuality

Smart web

XR

Phase 3



Semantic Web

Web 3.0

AI/VR/AR

# Virtuality

Smart web

XR

Phase 3

Virtual Reality in 1989. 2 mio \$

Virtual Reality in 2016. 600 \$



Semantic Web

Web 3.0

AI/VR/AR

**Virtuality**

Smart  
web

XR

Phase 3

**Semantic Web**

Web 3.0

**AI/VR/AR**

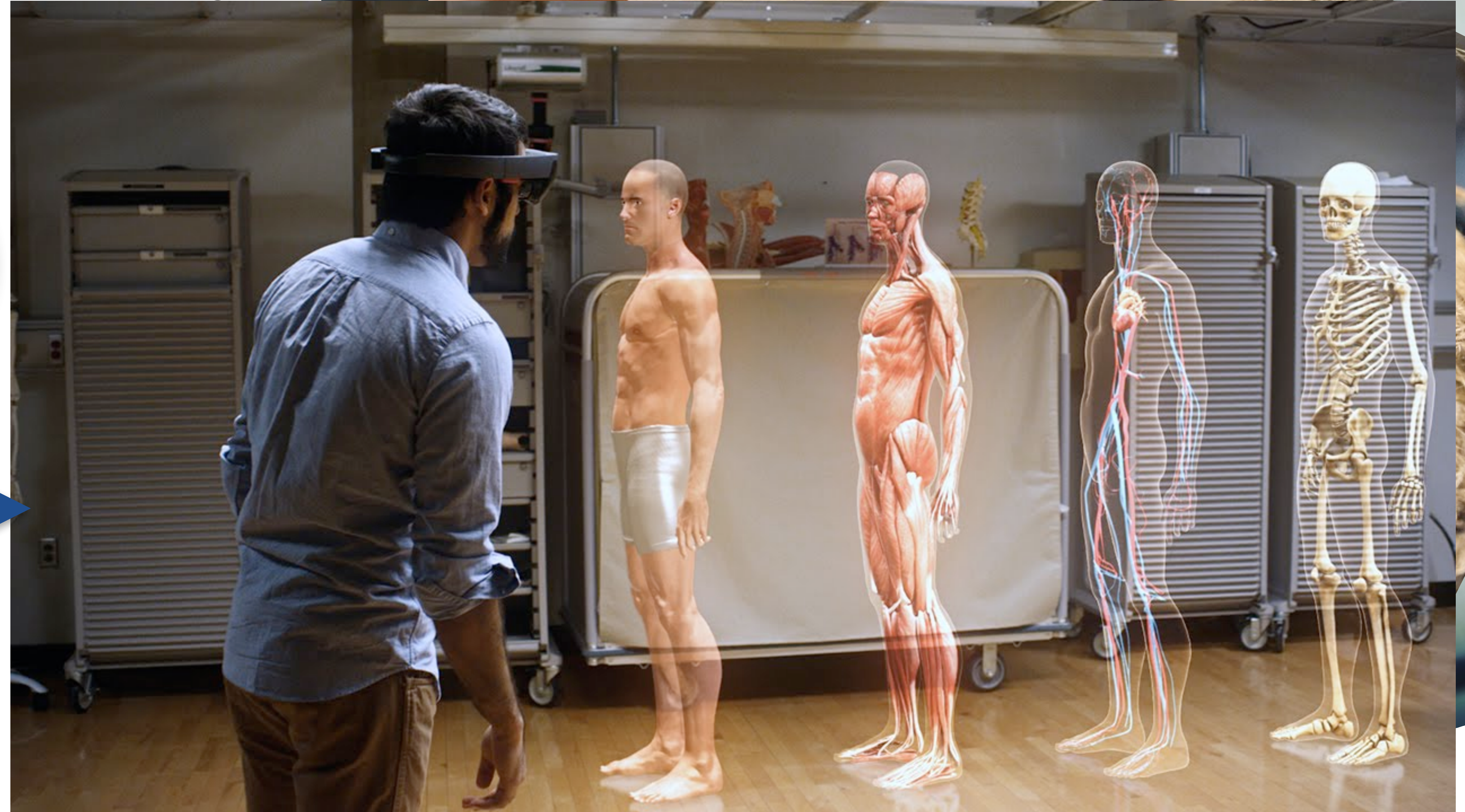


# Virtuality

Smart web

XR

Phase 3



Semantic Web

Web 3.0

AI/VR/AR

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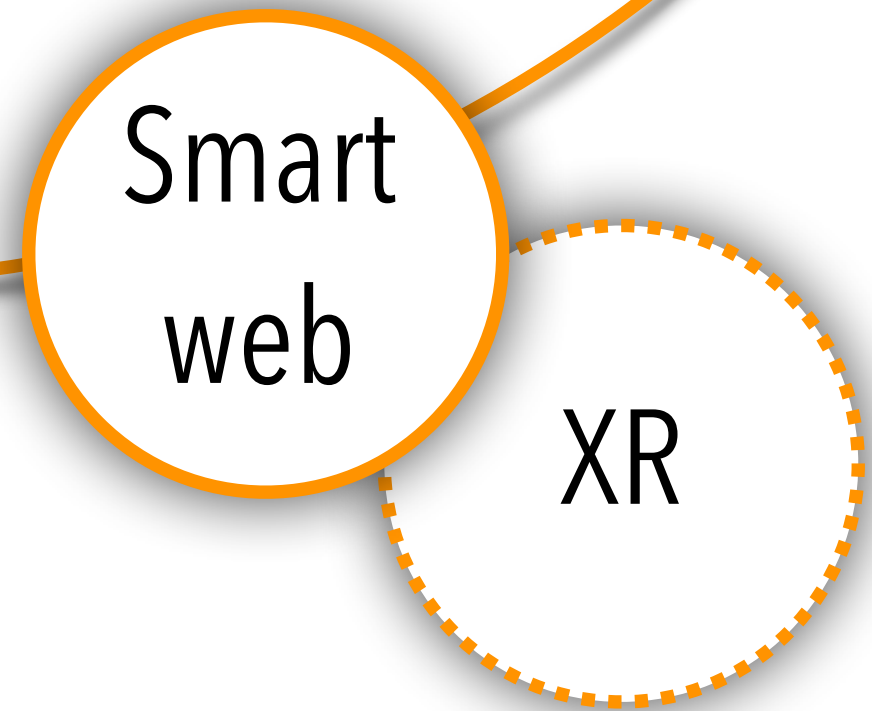
Flat

World

Business

creating value in a digital world





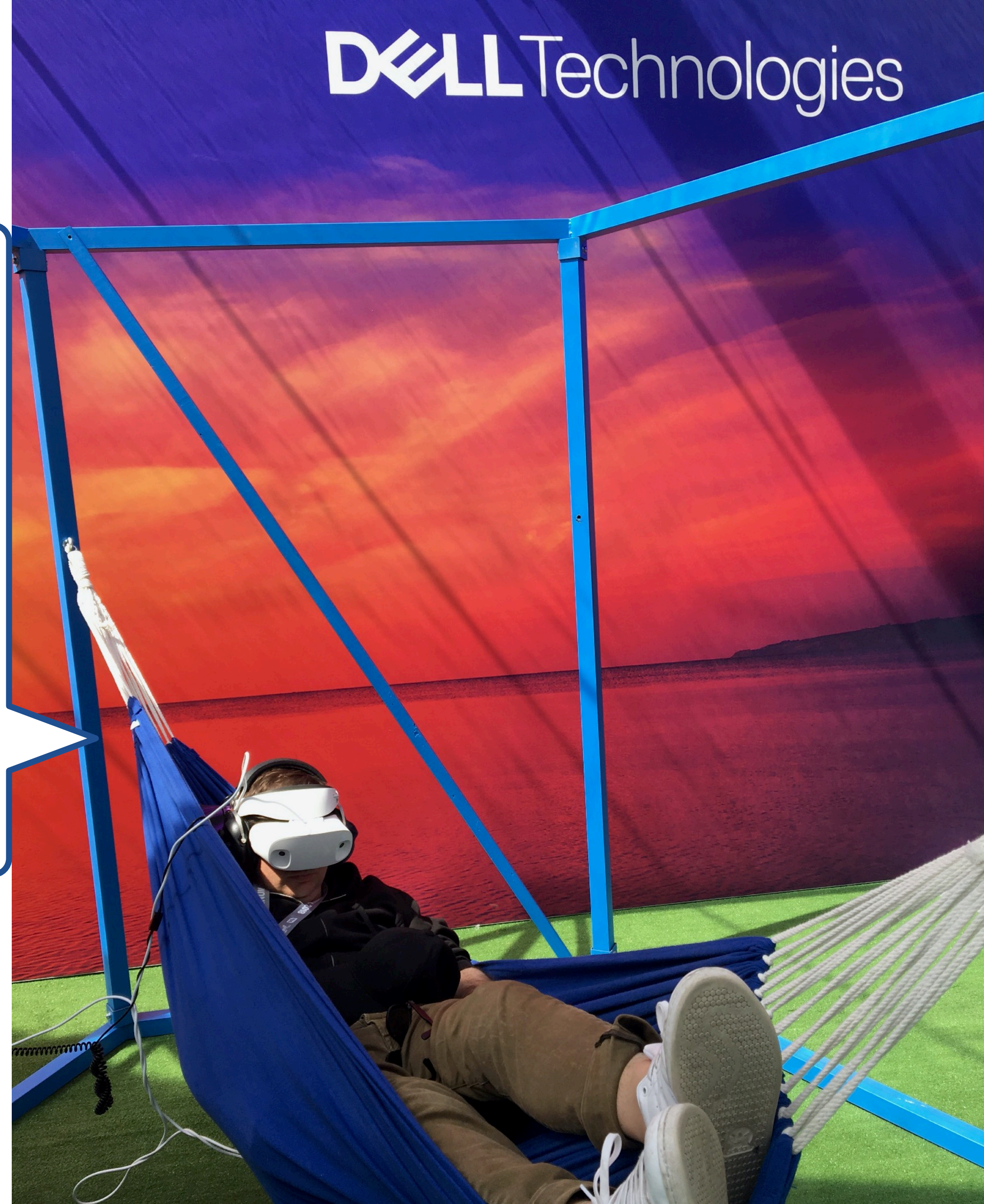
Phase 3

The internet of **information** will become the internet of **experience.**

Semantic Web

Web 3.0

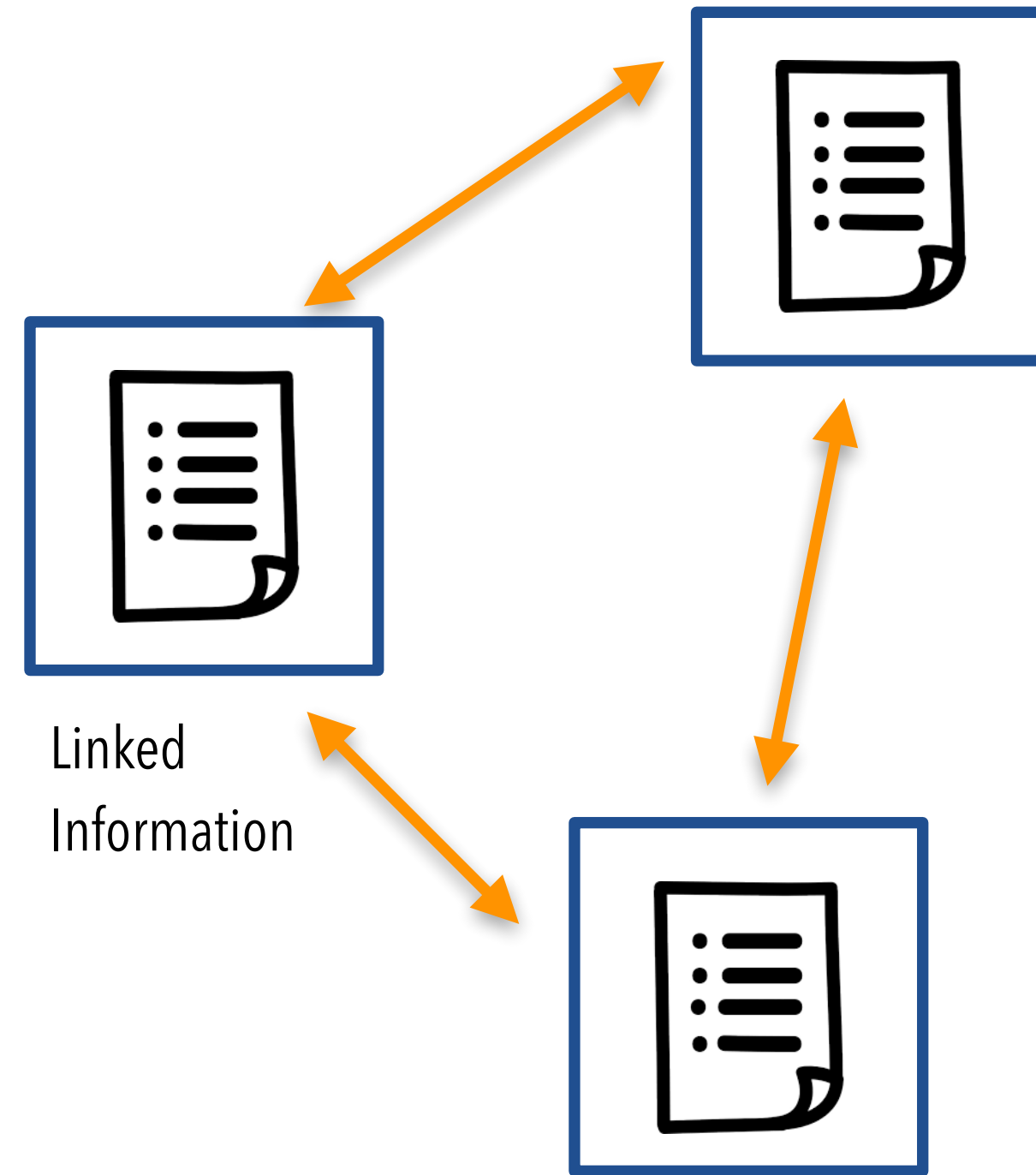
AI/VR/AR



# From information to experience

Smart web

Phase 3

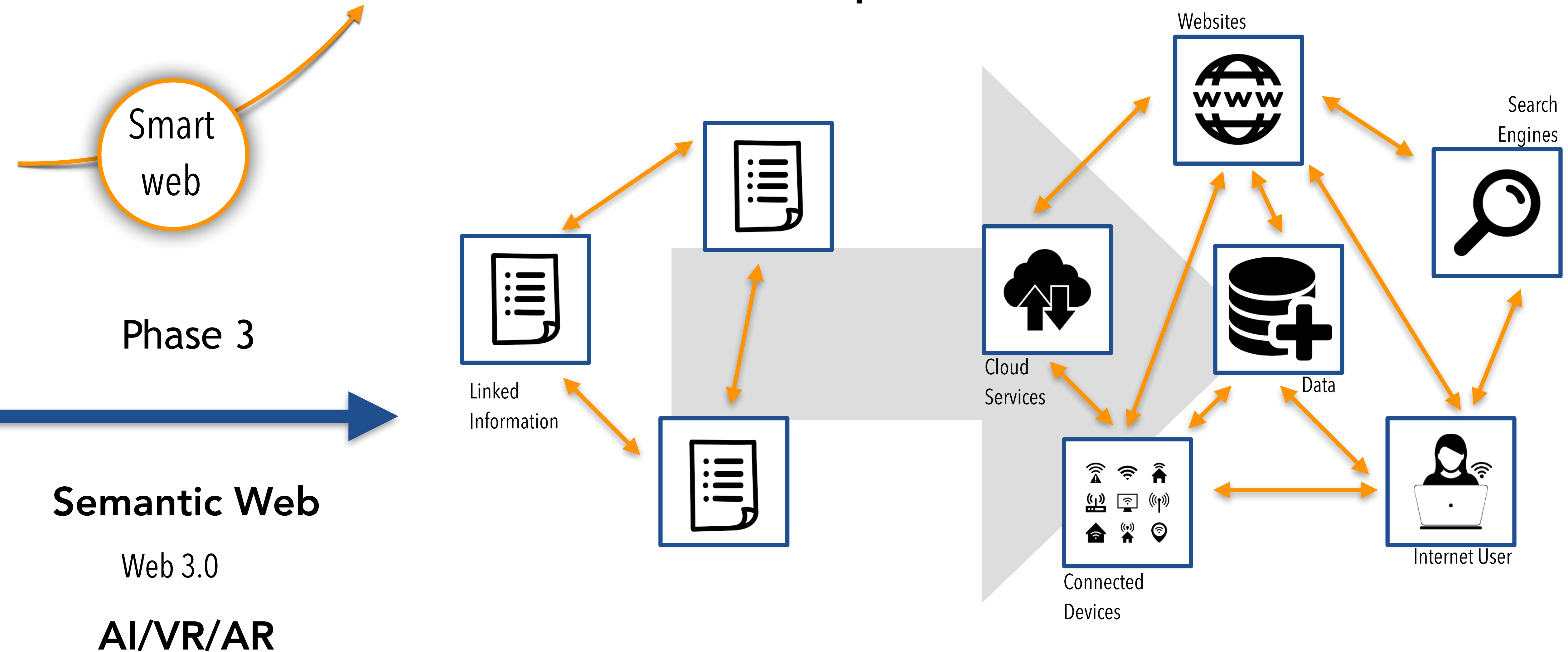


Semantic Web

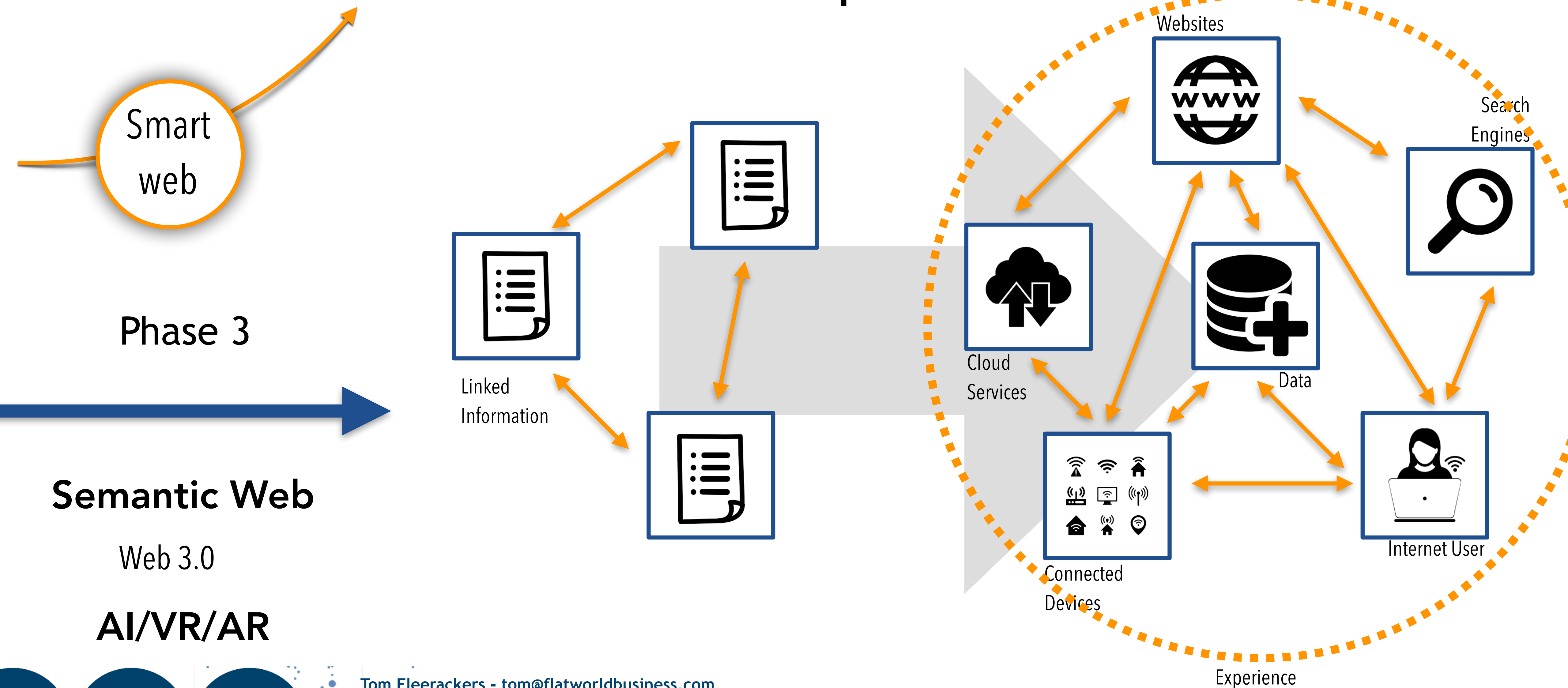
Web 3.0

AI/VR/AR

# From information to experience



# From information to experience



# Virtuality

Smart web

XR

Other economic sectors become more important after 2025.

Phase 3

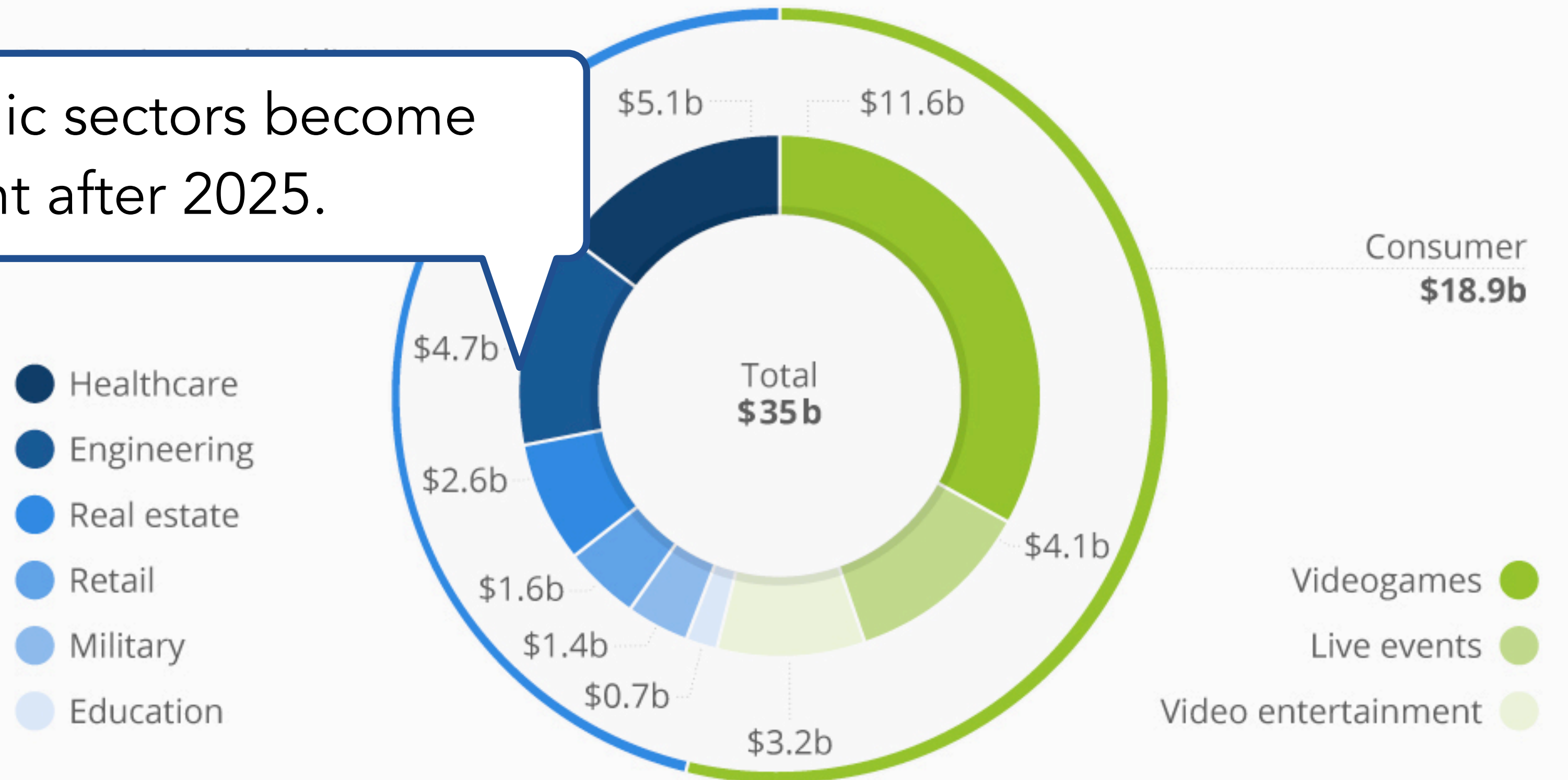
Semantic Web

Web 3.0

AI/VR/AR

## The Diverse Potential of VR & AR Applications

Predicted market size of VR/AR software for different use cases in 2025\*



© StatistaCharts

\* Base case scenario

Source: Goldman Sachs Global Investment Research

statista

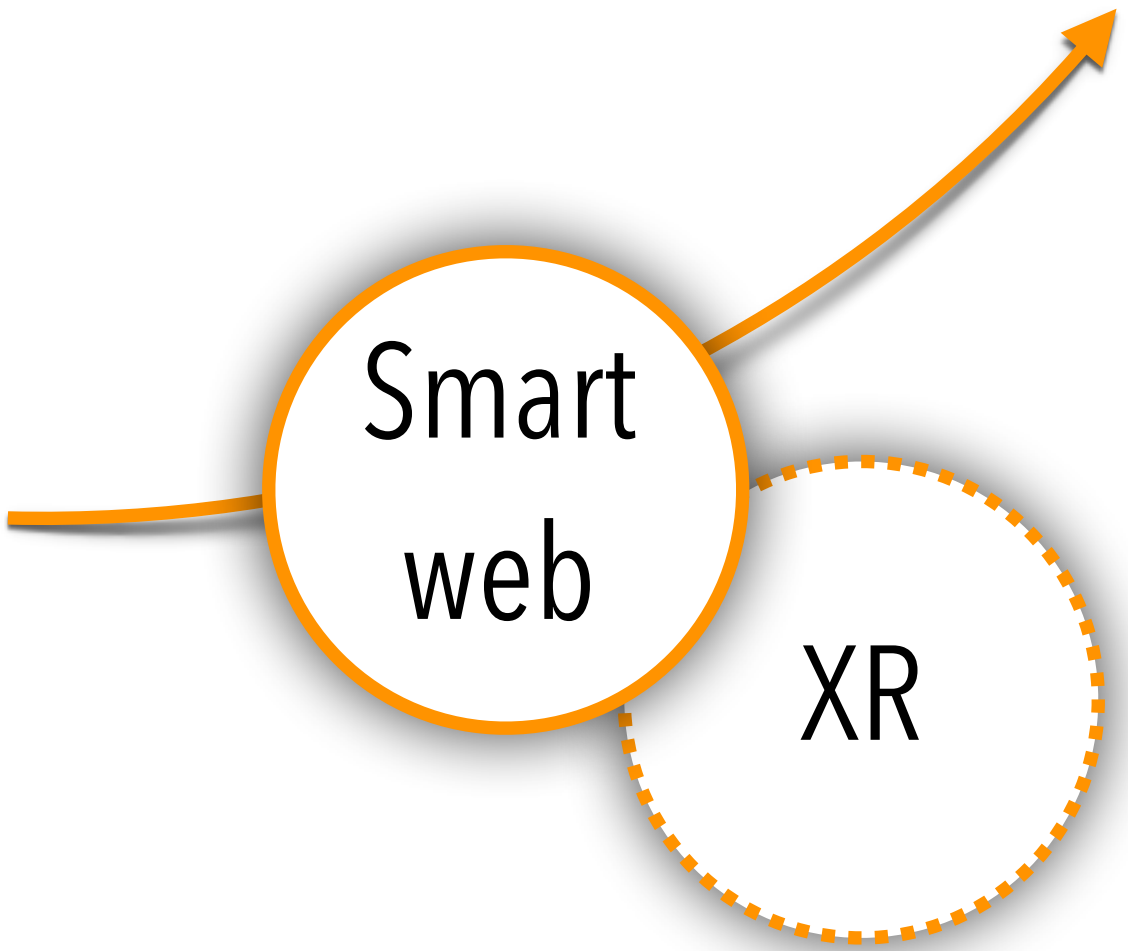
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creating value in a digital world

Flat World Business

# Virtuality



Phase 3



Importance of tactile experience in MR.



**Semantic Web**

Web 3.0

**AI/VR/AR**

# Virtuality helps to push the boundaries of human perception.

Smart web

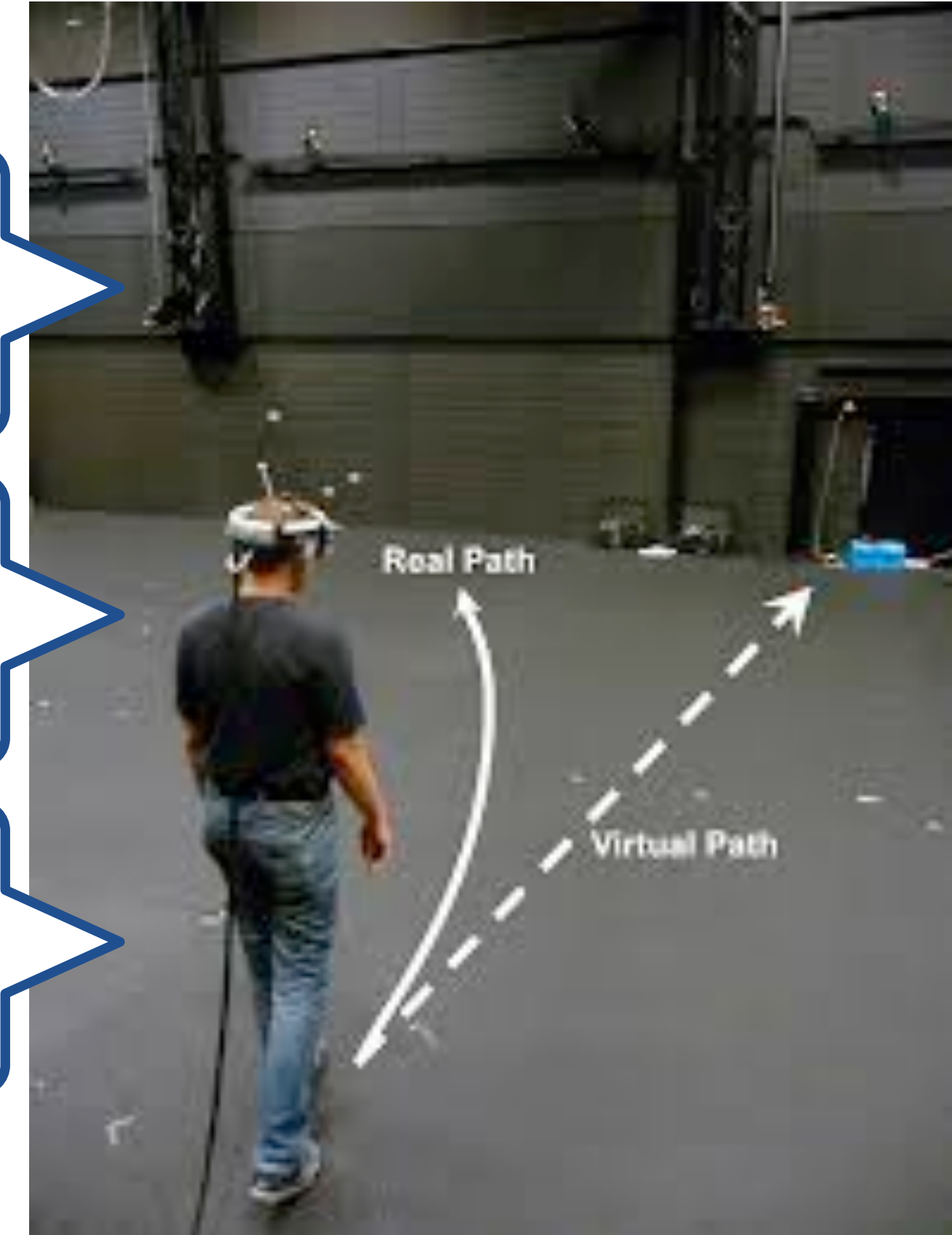
XR

Phase 3

What we perceive in the real world is an illusion due to the limitations of our senses.

Our context changes our perception.

MR helps to overcome the limitations of our body in the real world.



Semantic Web

Web 3.0

AI/VR/AR

# Virtuality helps to push the boundaries of human perception.

Smart web

XR

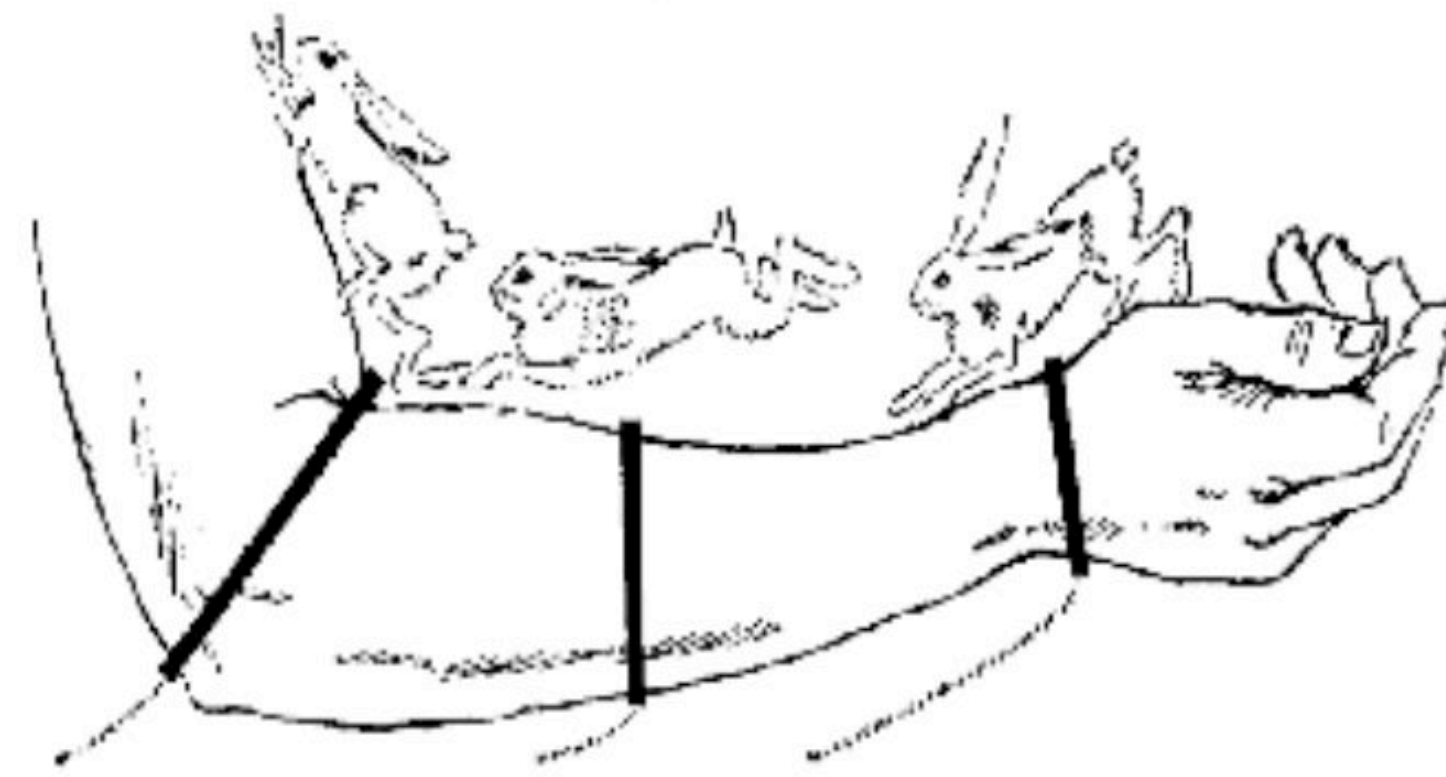
What we perceive in the real world is an illusion due to the limitations of our senses.

Phase 3

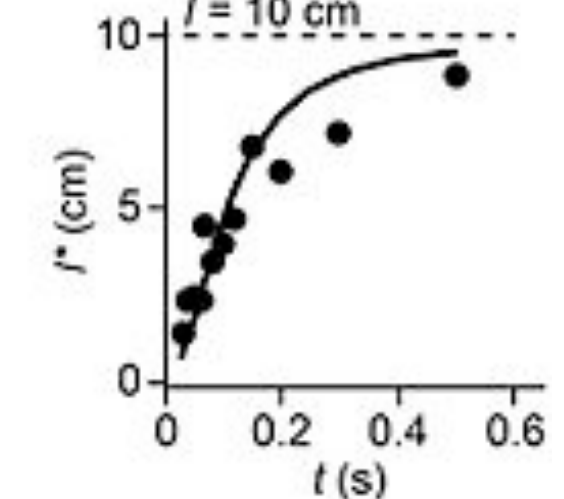
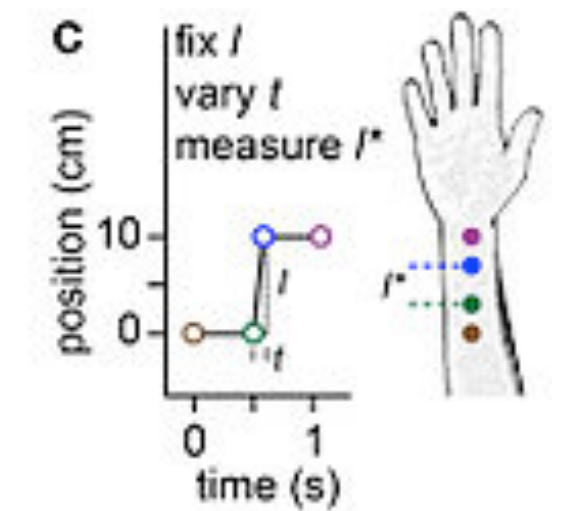
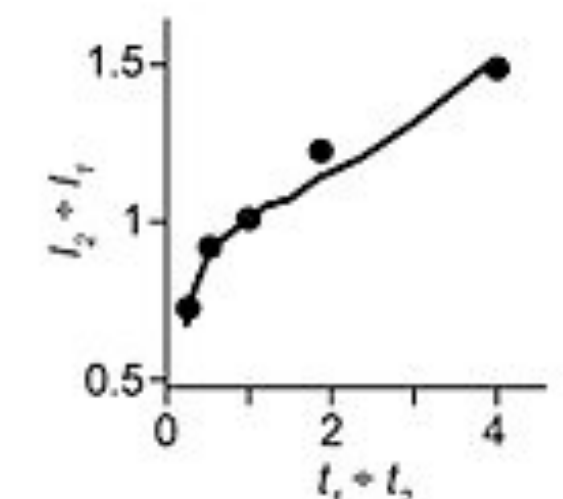
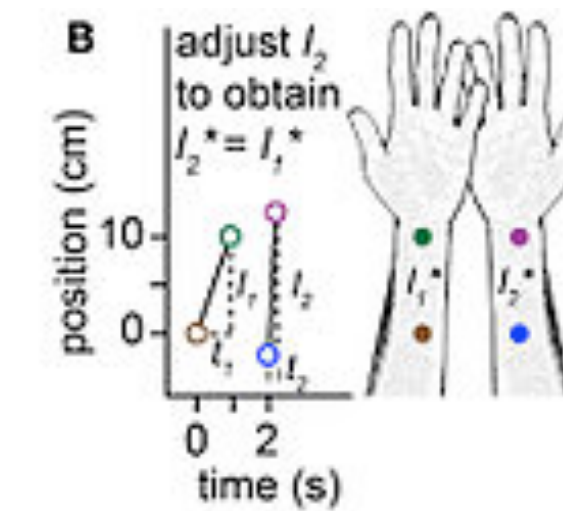
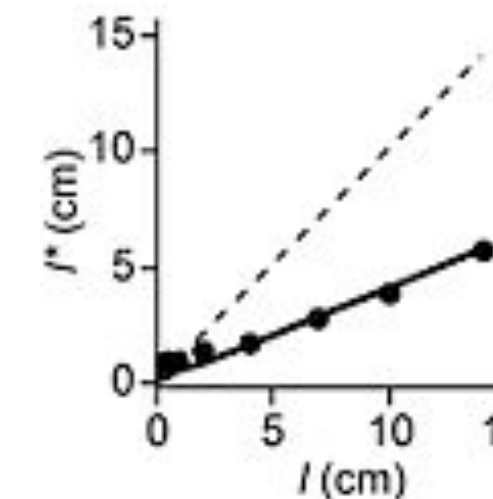
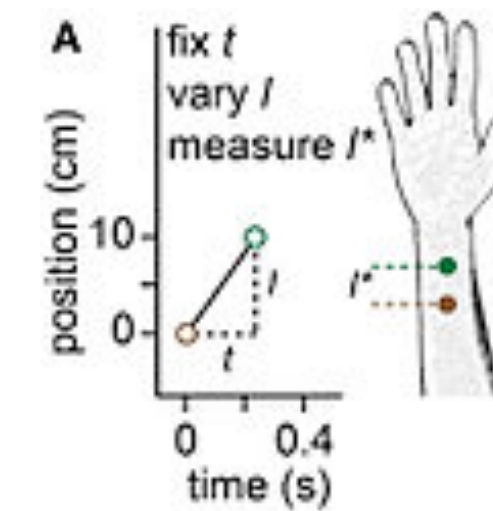
Semantic Web

Web 3.0

AI/VR/AR



Geldard, F.A., and Sherrick, C.E., 1972, "The Cutaneous 'rabbit': a perceptual illusion," Science, 178, pp.178-9.





# Virtuality helps to push the boundaries of human perception.

Smart web

XR

What we perceive in the real world is an illusion due to the limitations of our senses.

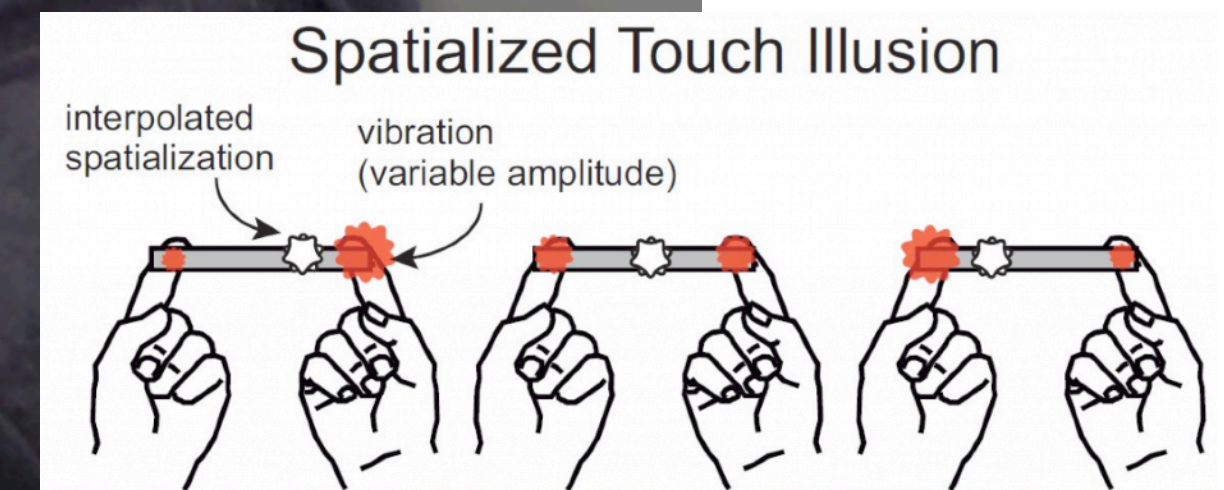
source: Uncanny valley and sense of touch - Microsoft (2018)

Phase 3

Semantic Web

Web 3.0

AI/VR/AR





Smart  
web

Cogni-  
fication

Phase 3



**Semantic Web**

Web 3.0

**AI/VR/AR**

Smart web

Cognition

Phase 3

Semantic Web

Web 3.0

AI/VR/AR



1997  
IBM Deep blue wins chess games from



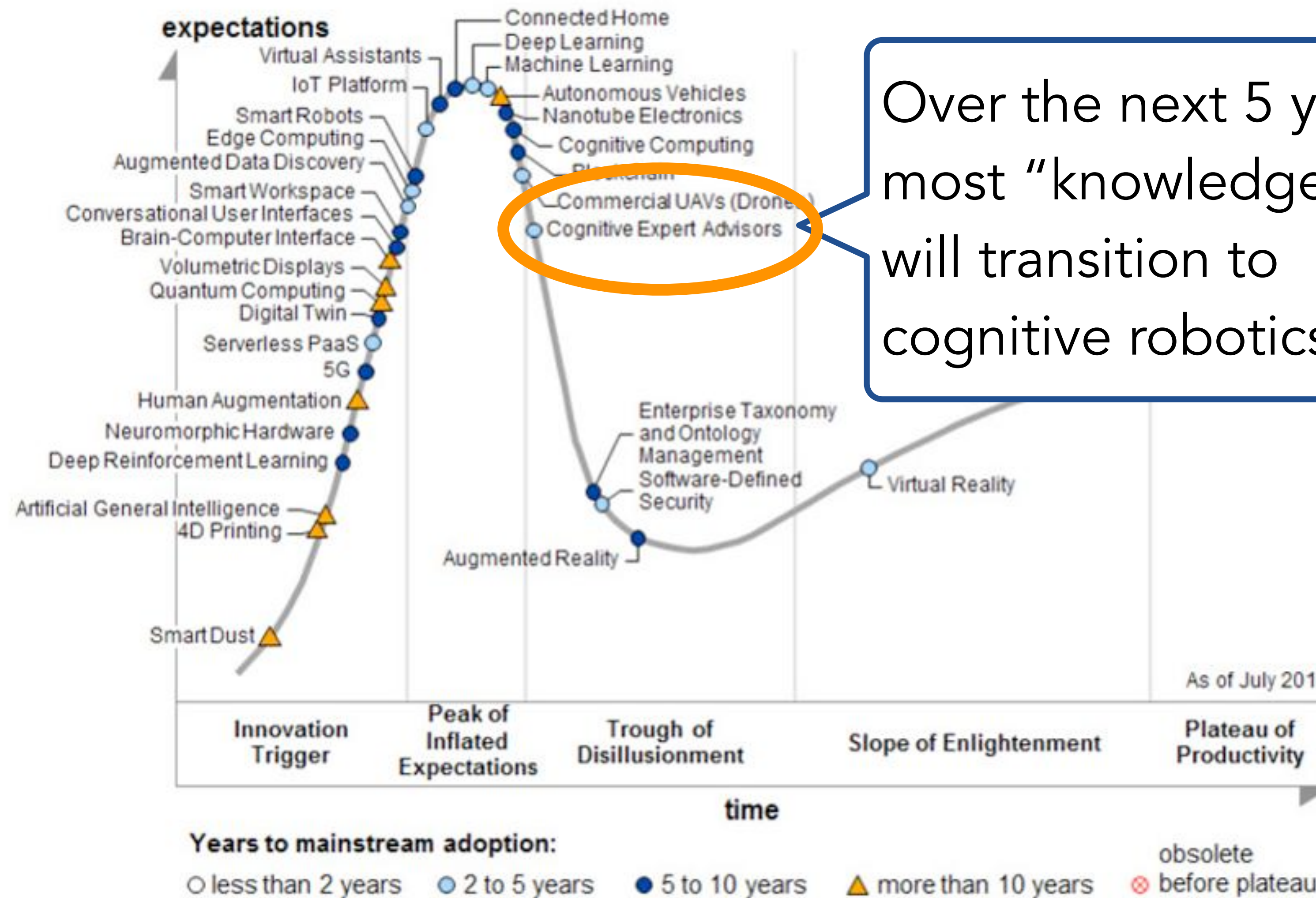
2011  
IBM Watson wins Jeopardy.



2016  
Google Alpha Go wins GO game from

# Cognitive era is here!

source: Gartner Hype Cycle (July 2017)



Over the next 5 years most "knowledge jobs" will transition to cognitive robotics.

Smart web

Cogni-  
fication

Phase 3

Semantic Web

Web 3.0

AI/VR/AR

**Cognitive era is here!**

Smart web

Cogni-  
fication

Phase 3

**Semantic Web**

Web 3.0

**AI/VR/AR**

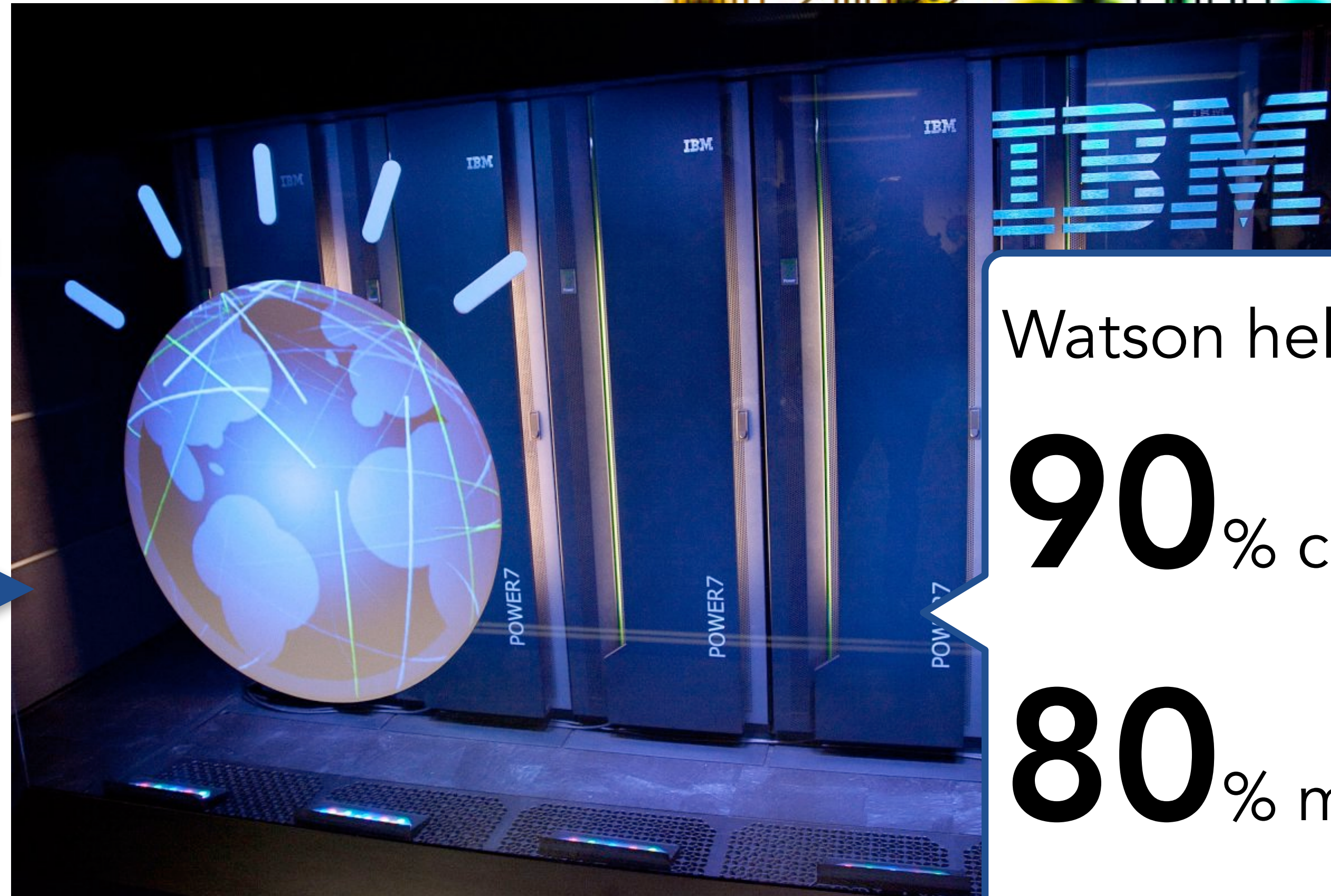
Over the next 5 years most "knowledge jobs" will transition to cognitive robotics.

# Cognitive era is here!

Smart web

Cogni-  
fication

Phase 3



Watson helps to cure cancer.

**90%** concordance

**80%** more accurate

## Semantic Web

Web 3.0

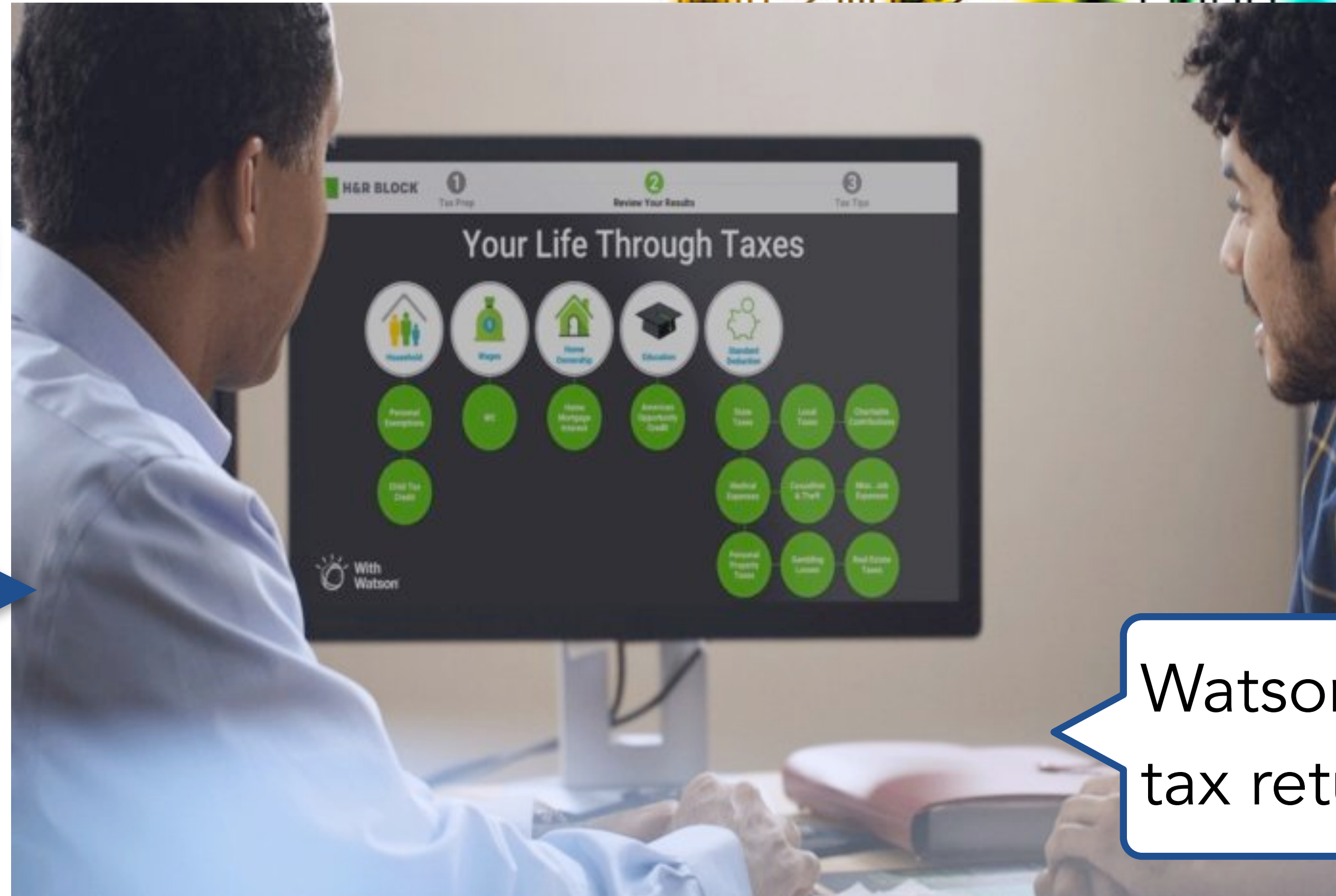
## AI/VR/AR

# Cognitive era is here!

Smart web

Cogni-  
fication

Phase 3



Watson helps to tackle your tax return.

source: IBM (2017)

Semantic Web

Web 3.0

AI/VR/AR

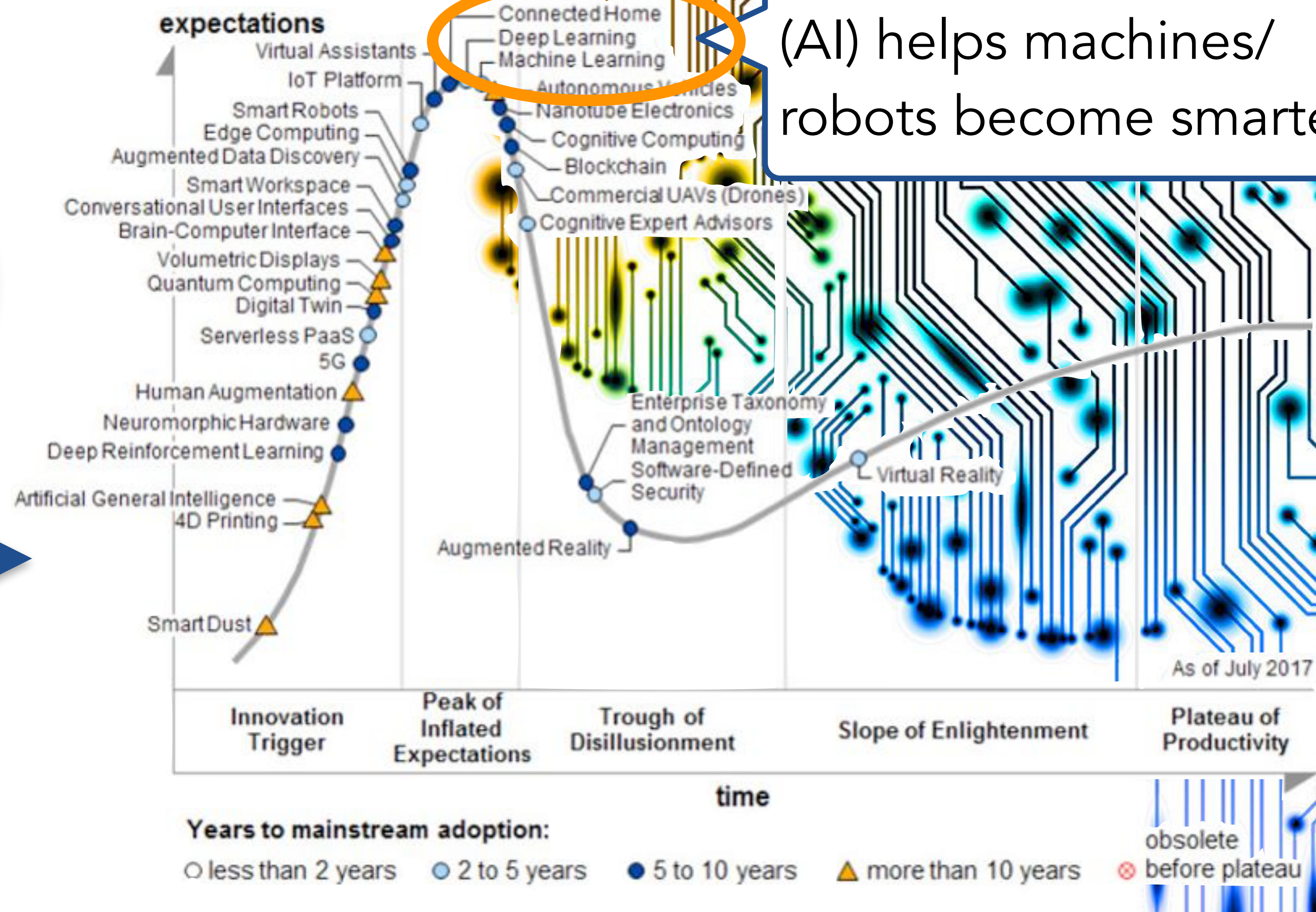
# Cognitive era is here!

Artificial Intelligence (AI) helps machines/ robots become smarter.

Smart web

Cogni-  
fication

Phase 3



## Semantic Web

Web 3.0

## AI/VR/AR



# Cognitive era is here!

Smart web

Cogni-  
fication

Phase 3

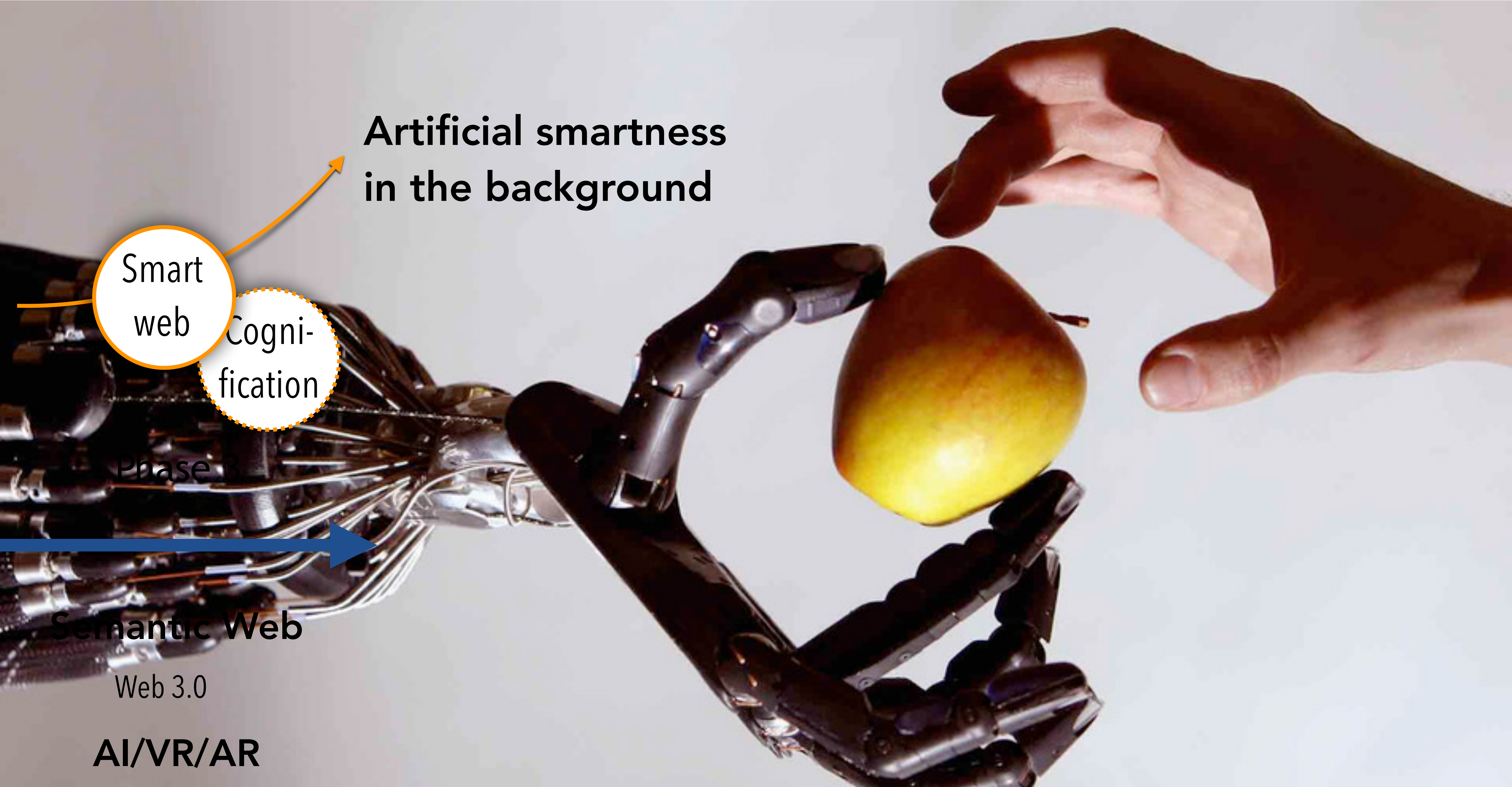
Artificial Intelligence (AI) helps machines/ robots become smarter.



Semantic Web

Web 3.0

AI/VR/AR



**Artificial smartness  
in the background**

Smart  
web

Cogni-  
fication

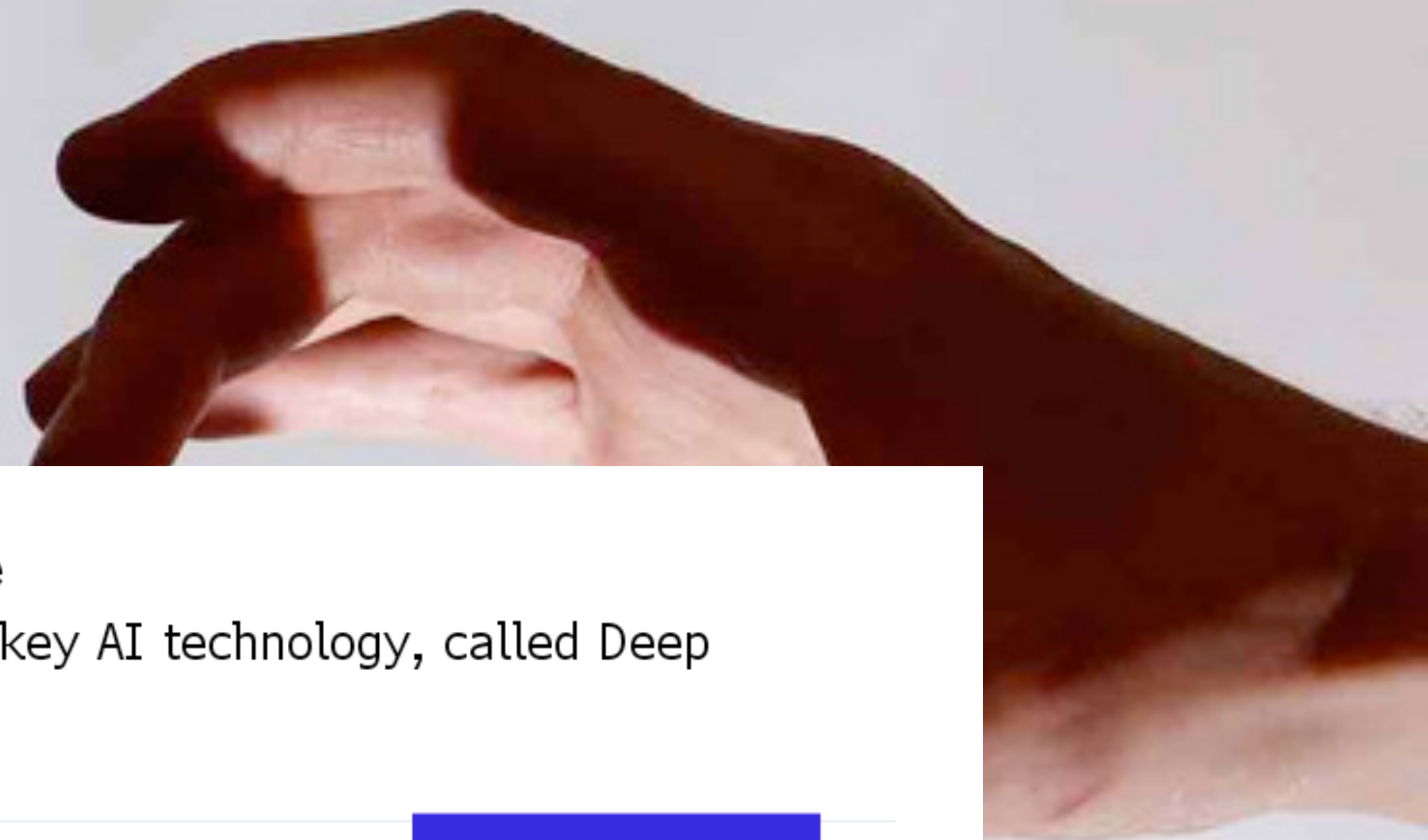
Phase 3

**Semantic Web**

Web 3.0

**AI/VR/AR**

# Artificial smartness in the background



Smart  
web

Cogni-  
fication

Phase 3

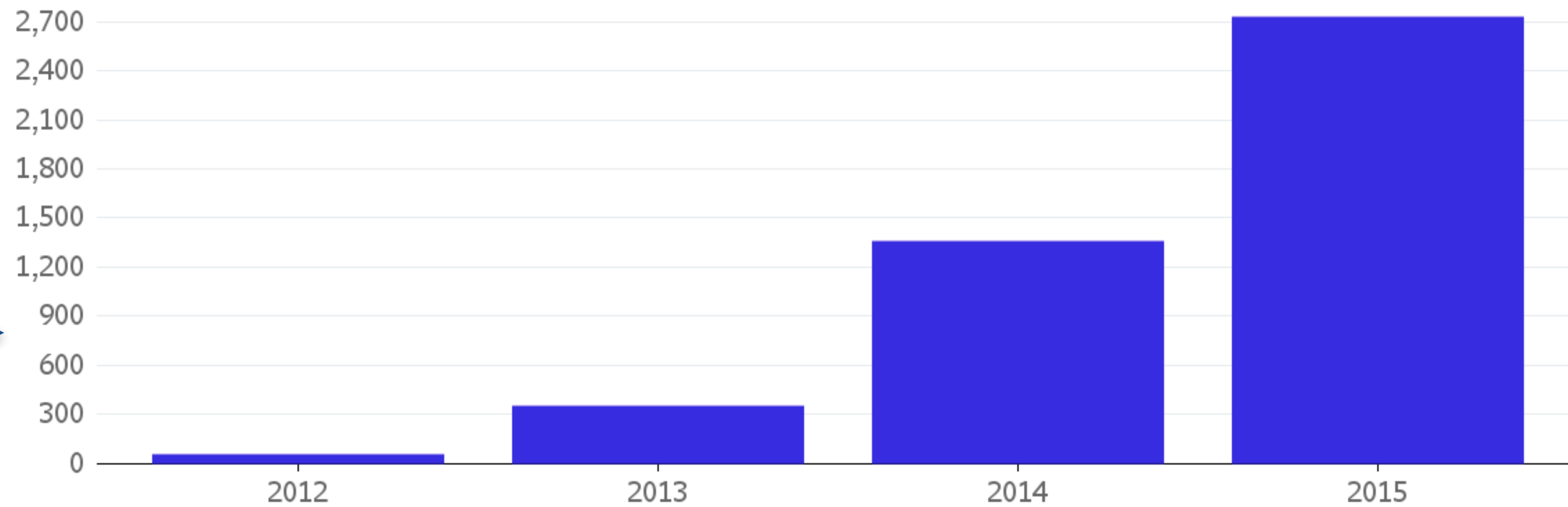
Semantic Web

Web 3.0

AI/VR/AR

## Artificial Intelligence Takes Off at Google

Number of software projects within Google that uses a key AI technology, called Deep Learning.



Source: Google

Note: 2015 data does not incorporate data from Q4

Bloomberg

Artificial smartness  
in the background

Smart  
web

Cogni-  
fication

Phase 3

# AI Weekly: Google shifts from mobile-first to AI-first world

BLAISE ZEREGA @BEEZEE MAY 18, 2017 6:12 PM

source: Venture Beat (2017)

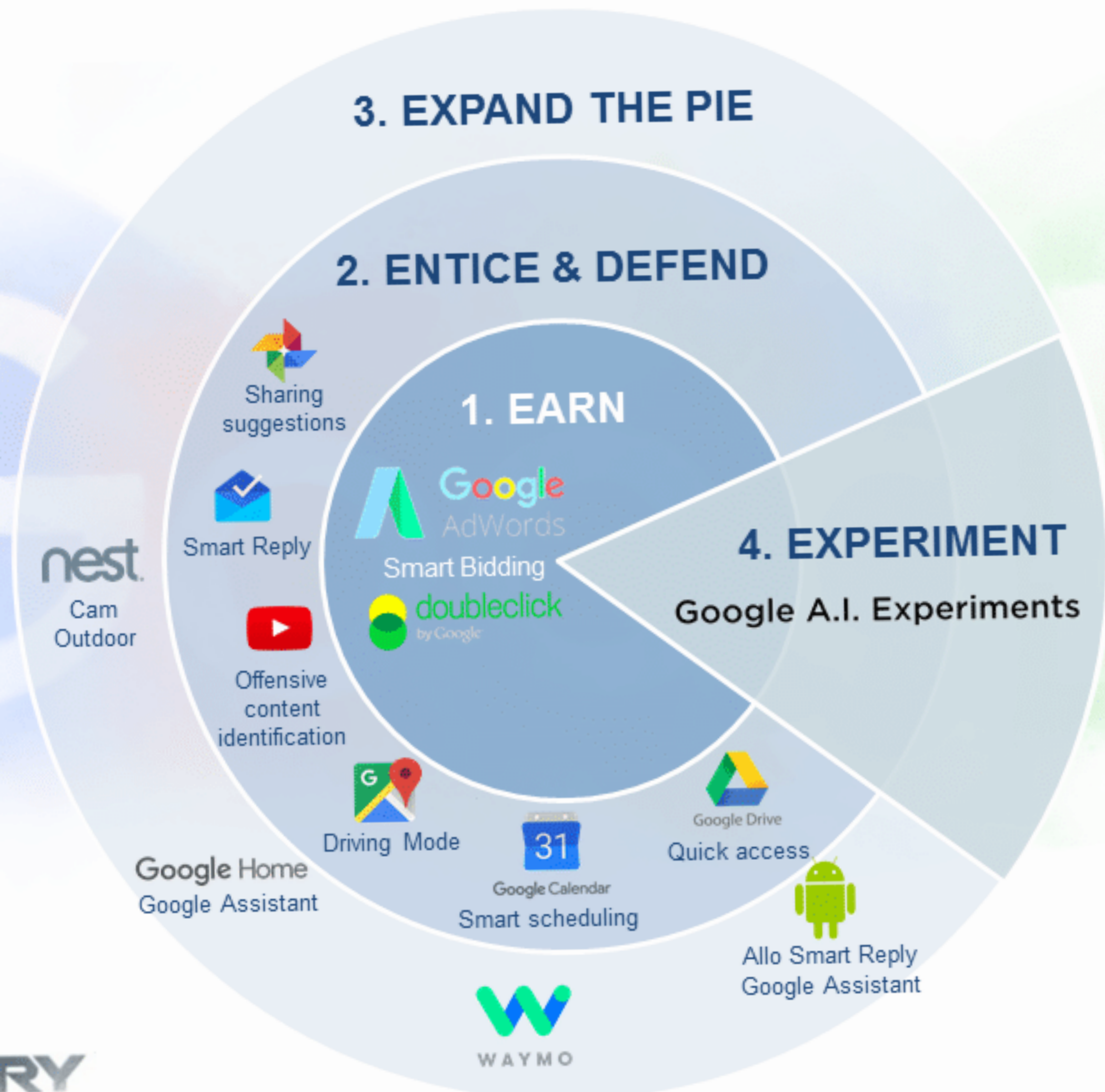
Semantic Web

Web 3.0

AI/VR/AR



# AI is deeply integrated in Google products



source: IAMultiple.Com, 2019

Smart web

Cogni-fication

Phase 3

Semantic Web

Web 3.0

AI/VR/AR

# Artificial smartness in the background

Smart  
web

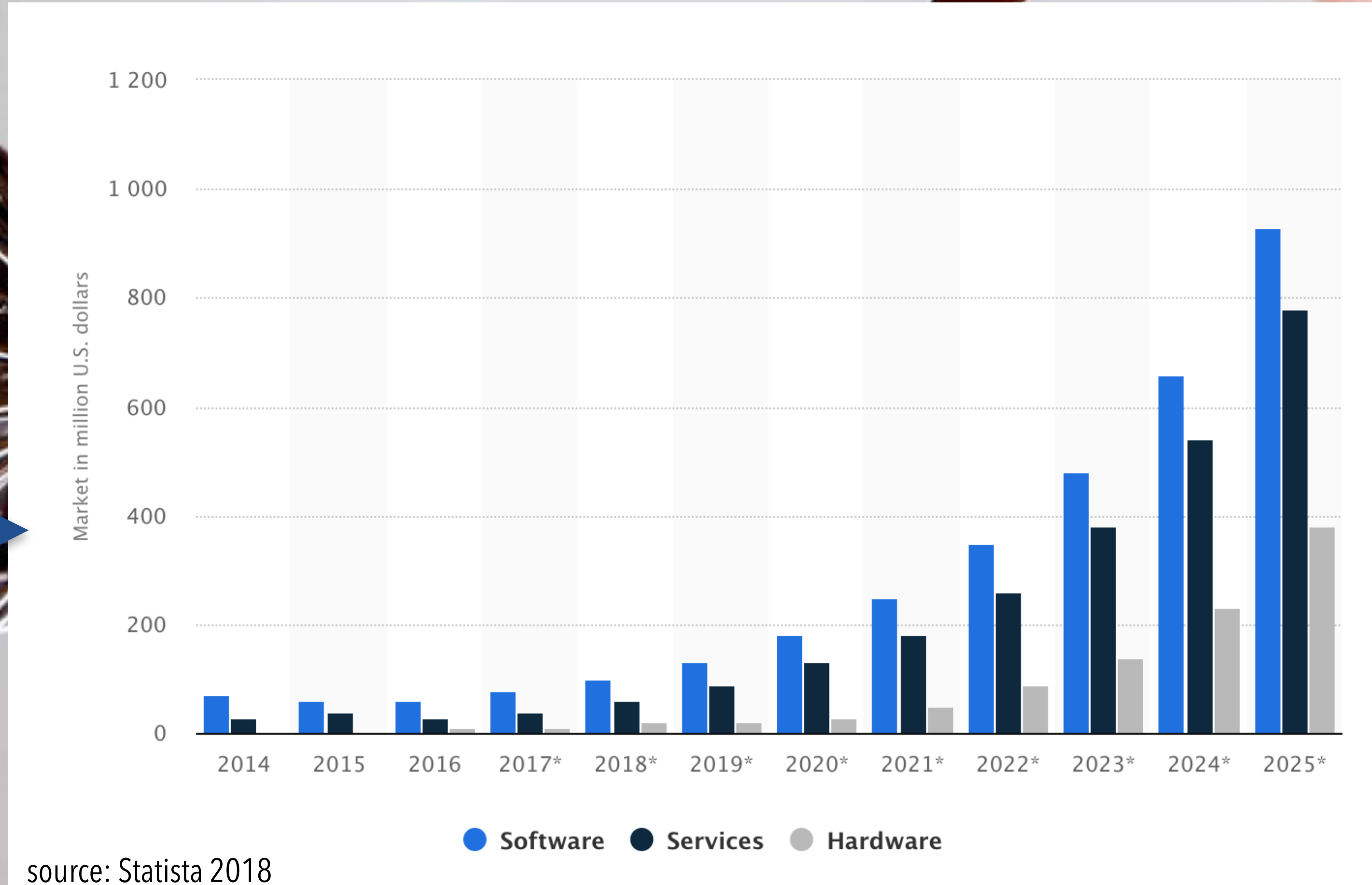
Cogni-  
fication

Phase 3

Semantic Web

Web 3.0

AI/VR/AR



# Artificial smartness in the background



Smart  
web

Cogni-  
fication

Phase 3

Semantic Web

Web 3.0

AI/VR/AR



source: Google 2015

# Artificial smartness in the background

source: The Verge (2017) - Deep Photo Style Transfer



Smart  
web

Cogni-  
fication

Phase 3

Semantic Web

Web 3.0

AI/VR/AR

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# Artificial smartness in the background

Smart  
web

Cogni-  
fication

Phase 3

Semantic Web

Web 3.0

AI/VR/AR



# Artificial smartness in the background

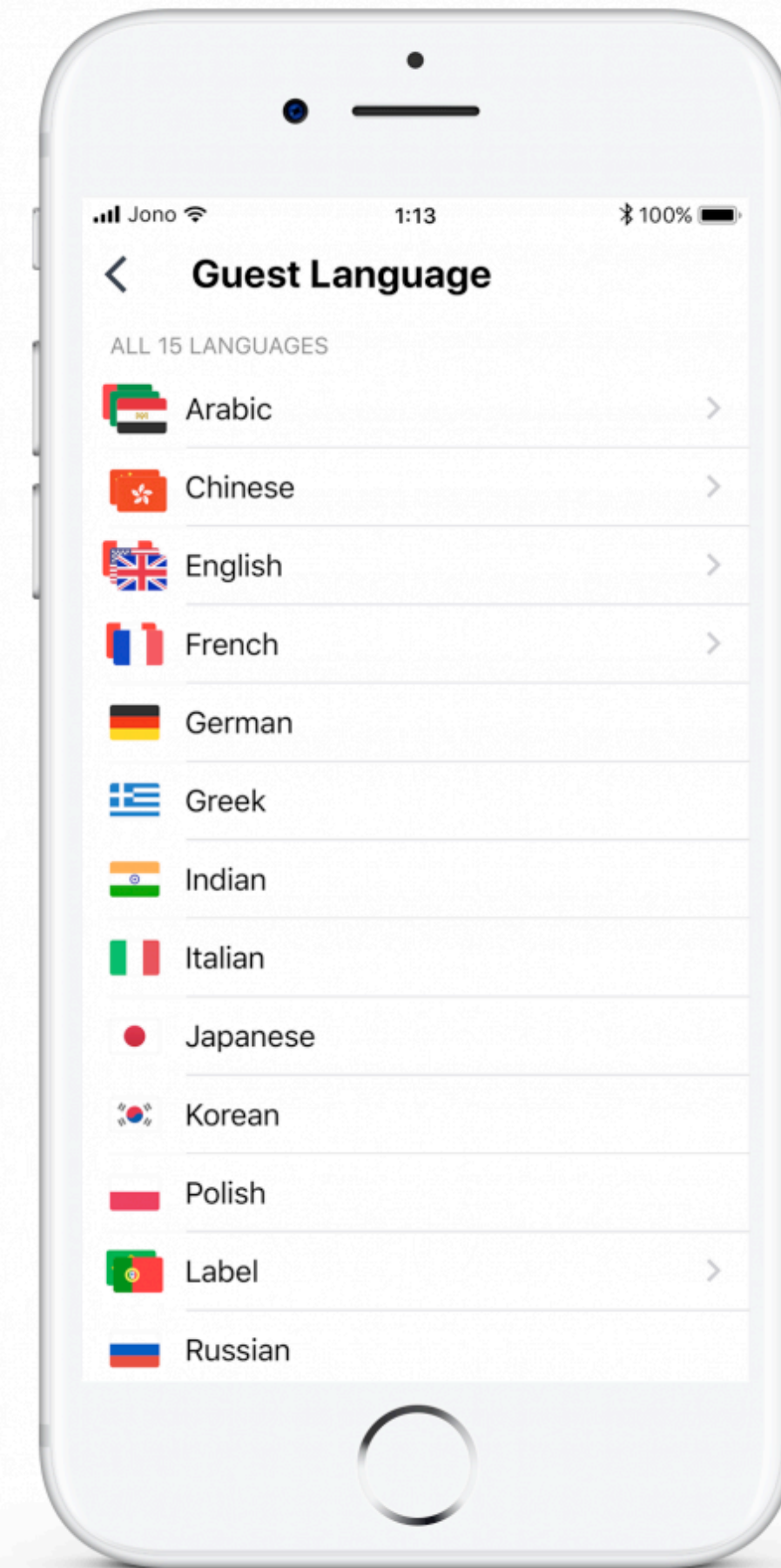
Smart  
web

Cogni-  
fication

Phase 3



source: Bloomberg (2018), Waverly Labs



Semantic Web

Web 3.0

AI/VR/AR

# Artificial smartness in the background

Smart  
web

Cogni-  
fication

Phase 3

Semantic Web

Web 3.0

AI/VR/AR

source: Google Earbuds (2019),



# Artificial smartness in the background

Smart  
web

Cogni-  
fication

The more we use AI  
the smarter it gets!

Phase 3

Semantic Web

Web 3.0

AI/VR/AR

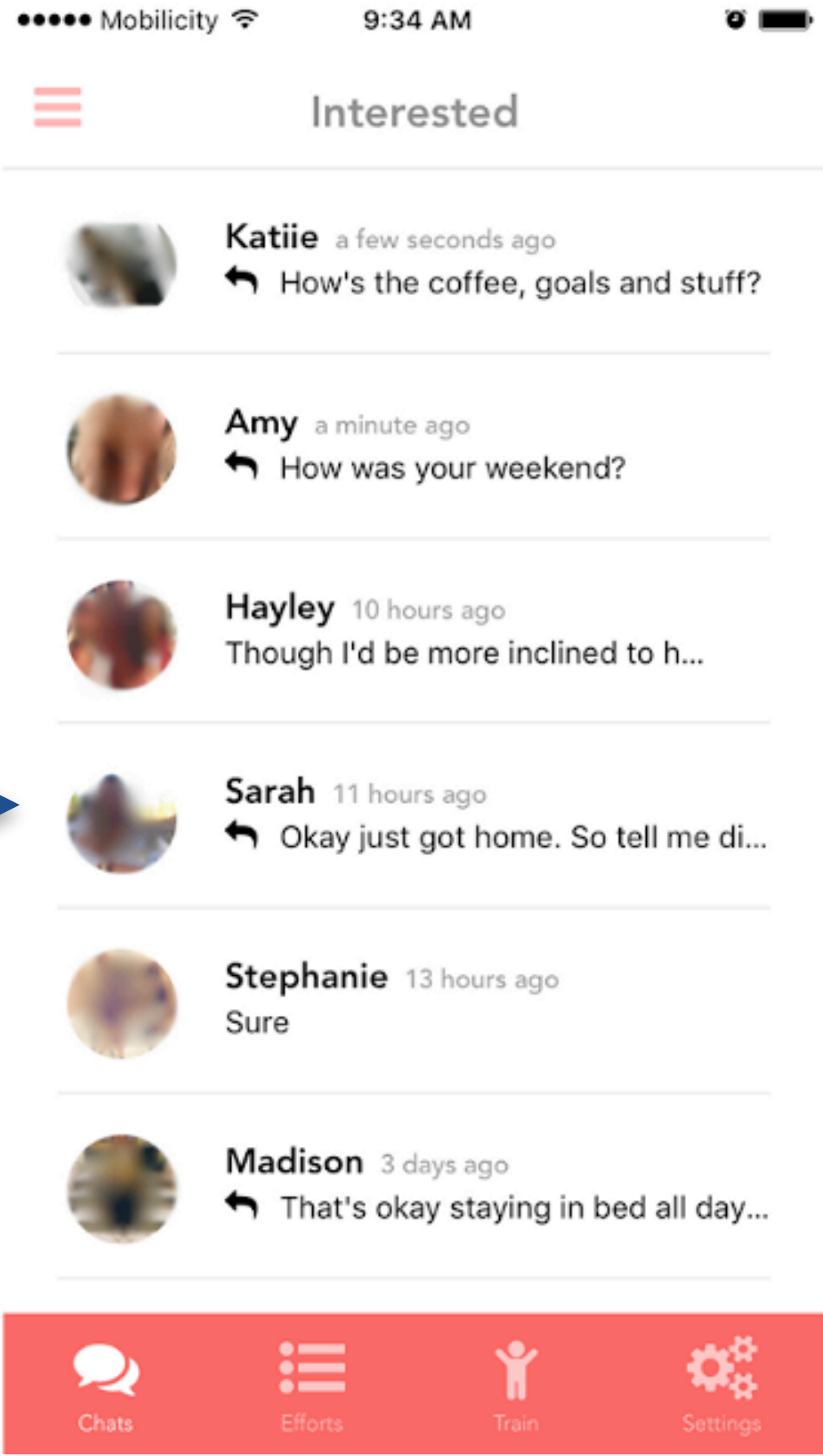
# Bernie

## Artificial smartness in the background

Smart  
web

Cogni-  
fication

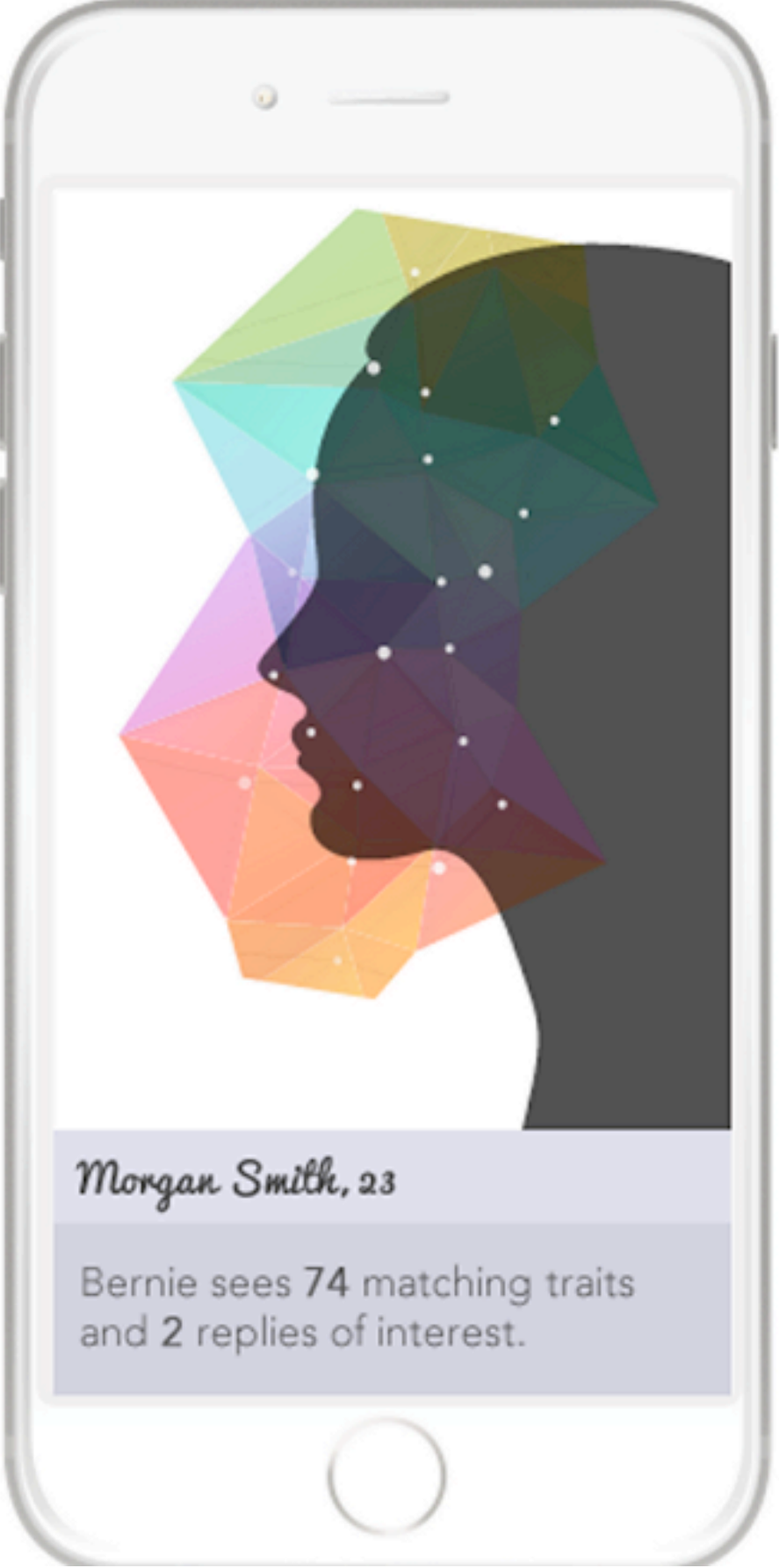
Phase 3



### Hi Justin

In the last couple of days, I've found **4 new matches** you may like, and I've performed **46 efforts**. You have **1 new message** from an interested match I think you will like.

Warmly,  
Bernie



source: [www.bernie.ai](http://www.bernie.ai), [www.medium.com](http://www.medium.com) (2016)

## Semantic Web

Web 3.0

## AI/VR/AR

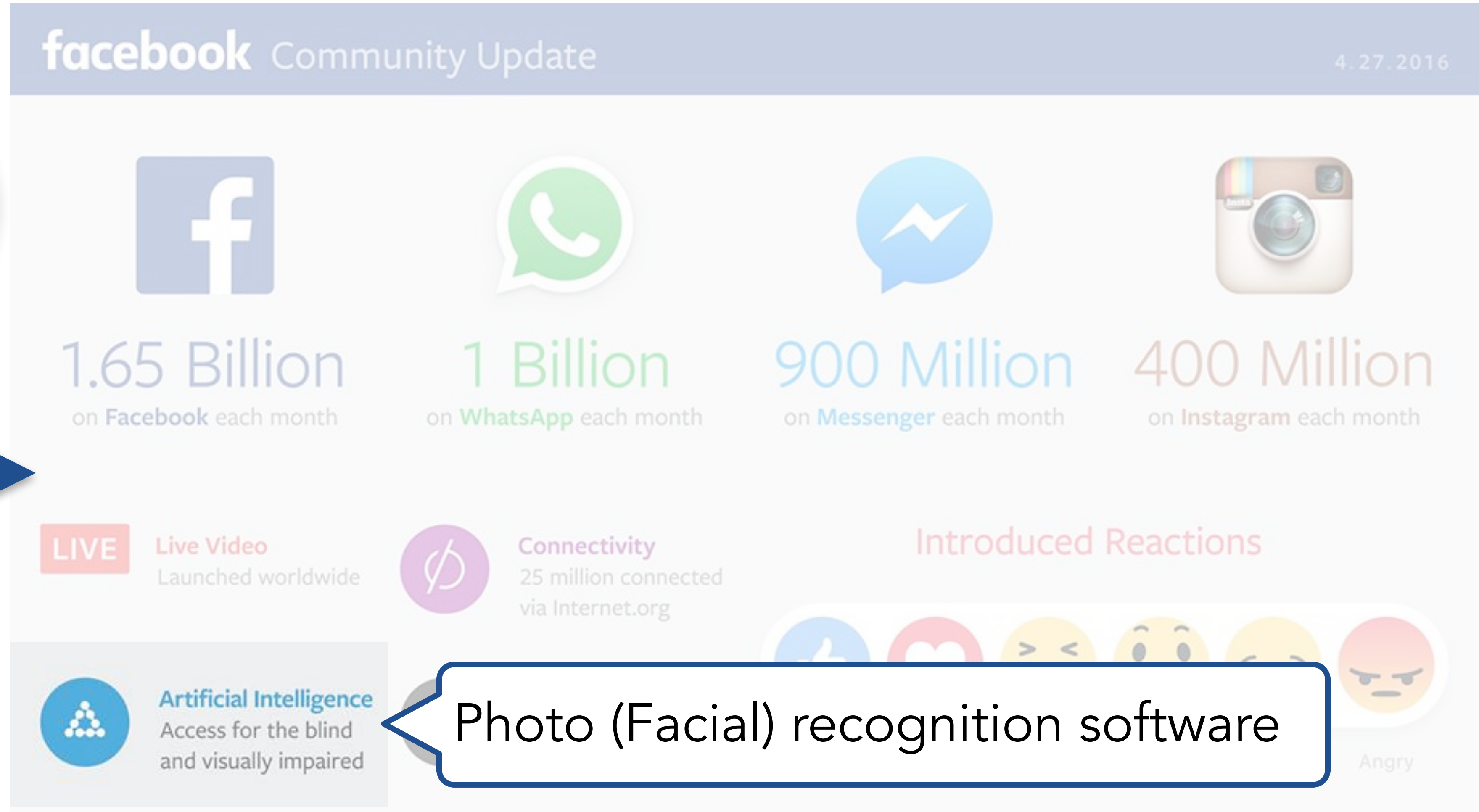
# Artificial smartness in the background

source: Facebook Community Update 2016

Smart web

Cognition

Phase 3



Semantic Web

Web 3.0

AI/VR/AR

# Artificial smartness in the background

source: Facebook Community Update 2016

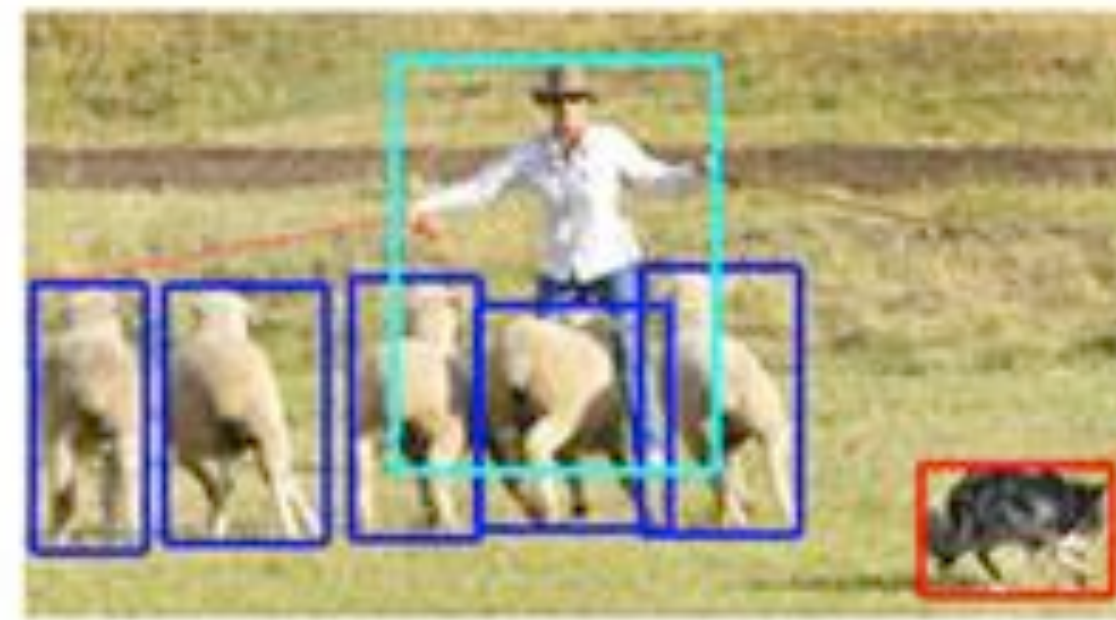
Smart web

Cognition

Phase 3



(a) classification



(b) detection



(c) segmentation

## Semantic Web

Web 3.0

AI/VR/AR



Artificial Intelligence  
Access for the blind  
and visually impaired

Photo (Facial) recognition software

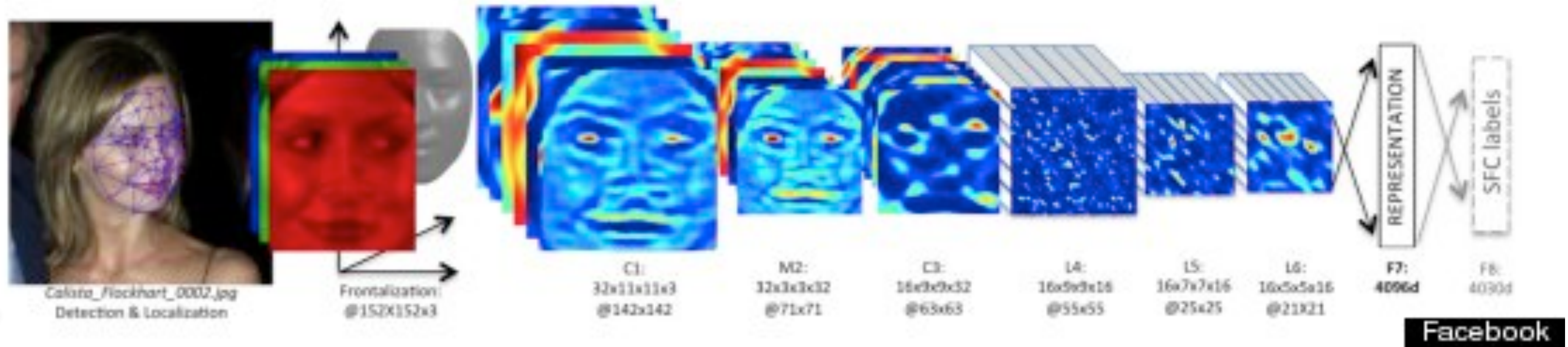
# Artificial smartness in the background

source: Facebook Community Update 2016

Smart web

Cognition

Phase 3



## Semantic Web

Web 3.0

AI/VR/AR

 **Artificial Intelligence**  
Access for the blind and visually impaired

Photo (Facial) recognition software

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# Artificial smartness in the background

Smart  
web

Cogni-  
fication

Phase 3

## Semantic Web

Web 3.0

AI/VR/AR



**Artificial Intelligence**  
Access for the blind  
and visually impaired



Smart web

Cognition

Phase 3

Semantic Web

Web 3.0

AI/VR/AR

## Short-range Face Capturing / Recognition

The screenshot shows a web-based interface for face recognition. At the top, it says 'SENSETIME 商湯科技' and has navigation tabs for '实时监控' (Real-time monitoring), '历史记录' (History), '人脸地图' (Face map), '以图搜图' (Search by image), '名单管理' (List management), and '系统设置' (System settings). The main area is divided into three sections:

- Top Left:** A live video feed from a camera showing a group of people walking. A timestamp reads '08-13-2015 16:19:37'. A blue banner across the video says 'Face Capturing Success'.
- Top Right:** A section titled '发现重点人物' (Discover key figures) showing a list of identified individuals. Each entry includes a small photo, a name, and a percentage (e.g., 93.2%, 46%, 45%).
- Bottom:** A gallery of captured faces titled '人脸抓拍' (Face capture) with a '抓拍统计' (Capture statistics) section showing '今日: 23976 张' (Today: 23976 photos) and '本月: 25085 张' (This month: 25085 photos). Below the gallery is a grid of small face images with timestamps.

source: The Verge, 2018

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**Chinese police are using facial recognition sunglasses to track citizens**  
*The glasses are being used by officers in police stations to oversee travelers during the Lunar New Year*

Smart web

Cogni-  
fication

Phase 3

Semantic Web

Web 3.0

AI/VR/AR

Smart web

Cognition

Phase 3

Semantic Web

Web 3.0

AI/VR/AR

source: Business Insider Singapore, 2019

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Smart  
web

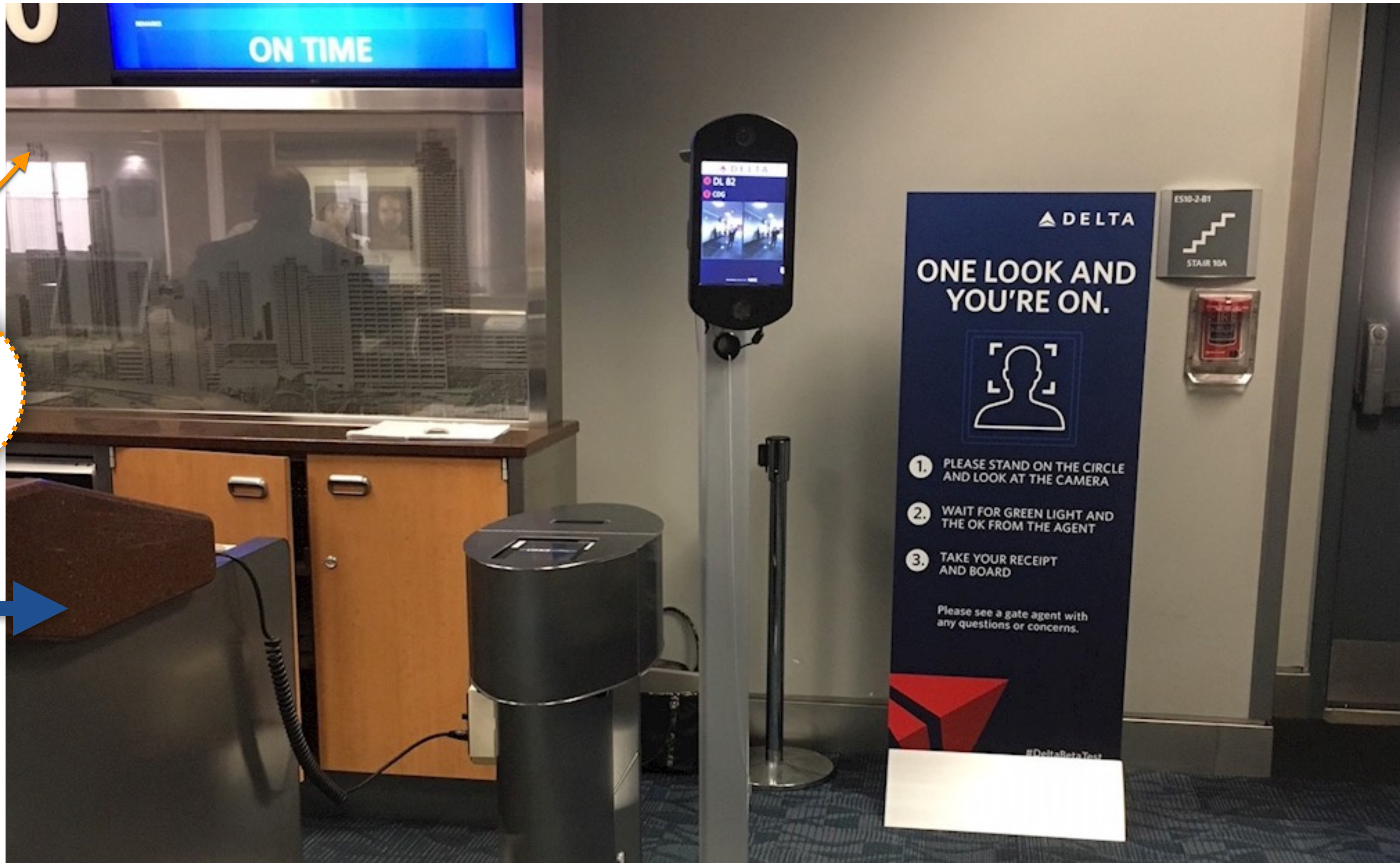
Cogni-  
fication

Phase 3

Semantic Web

Web 3.0

AI/VR/AR



source: Delta.Com, 2017

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Smart  
web

Cogni-  
fication

Artificial Intelligence will be(come) a commodity,  
always available.

Phase 3

Semantic Web

Web 3.0

AI/VR/AR



Smart  
web

Screen  
less

Phase 3



**Semantic Web**

Web 3.0

**AI/VR/AR**

Smart  
web

Screen  
less

An internet based task that is accomplished without the use of a screen

Phase 3

Semantic Web

Web 3.0

AI/VR/AR





# Voice assistants - a story of accuracy

Smart  
web

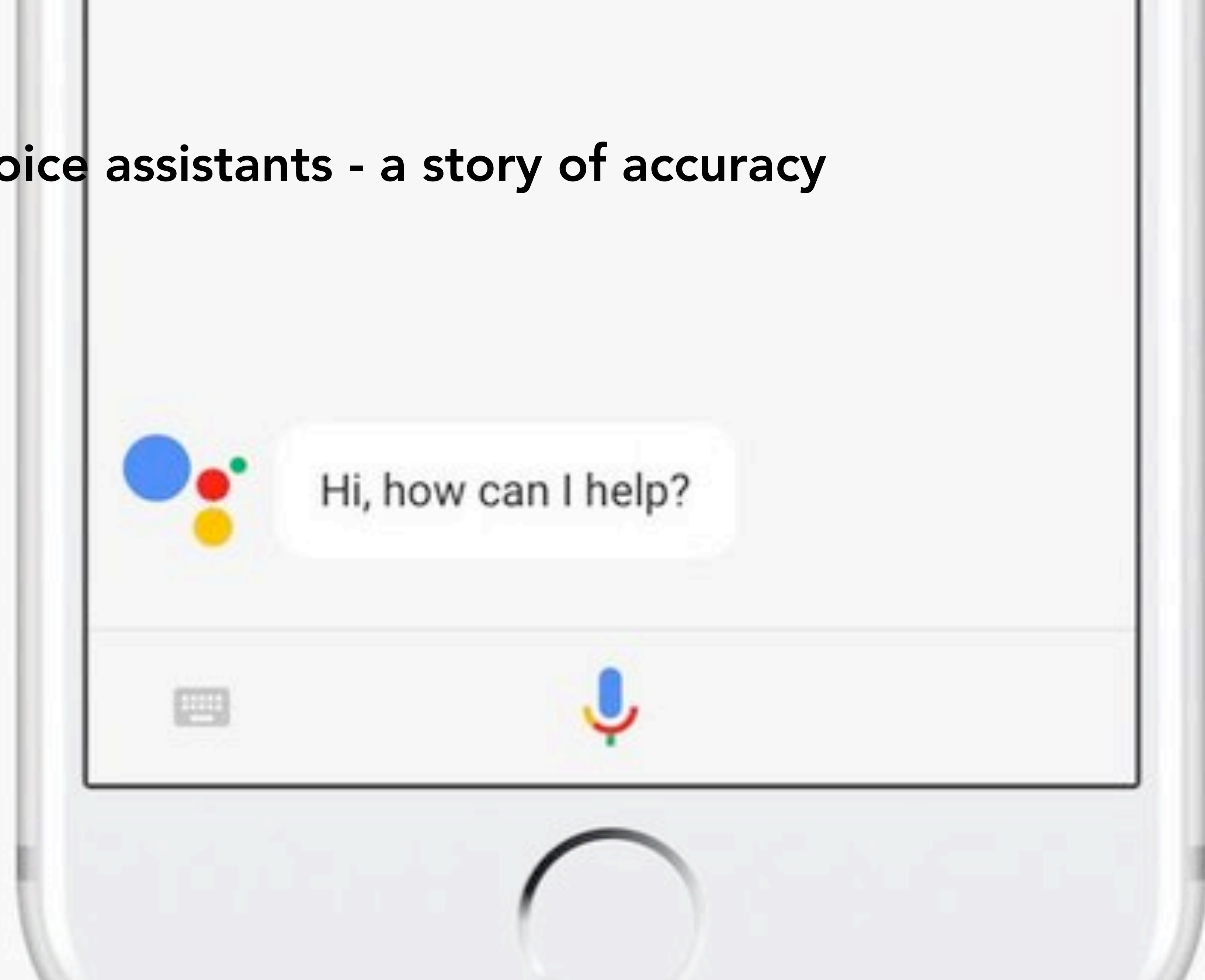
Screen  
less

Phase 3

Semantic Web

Web 3.0

AI/VR/AR



# Voice assistants - a story of accuracy

Smart web

Screen less

Phase 3

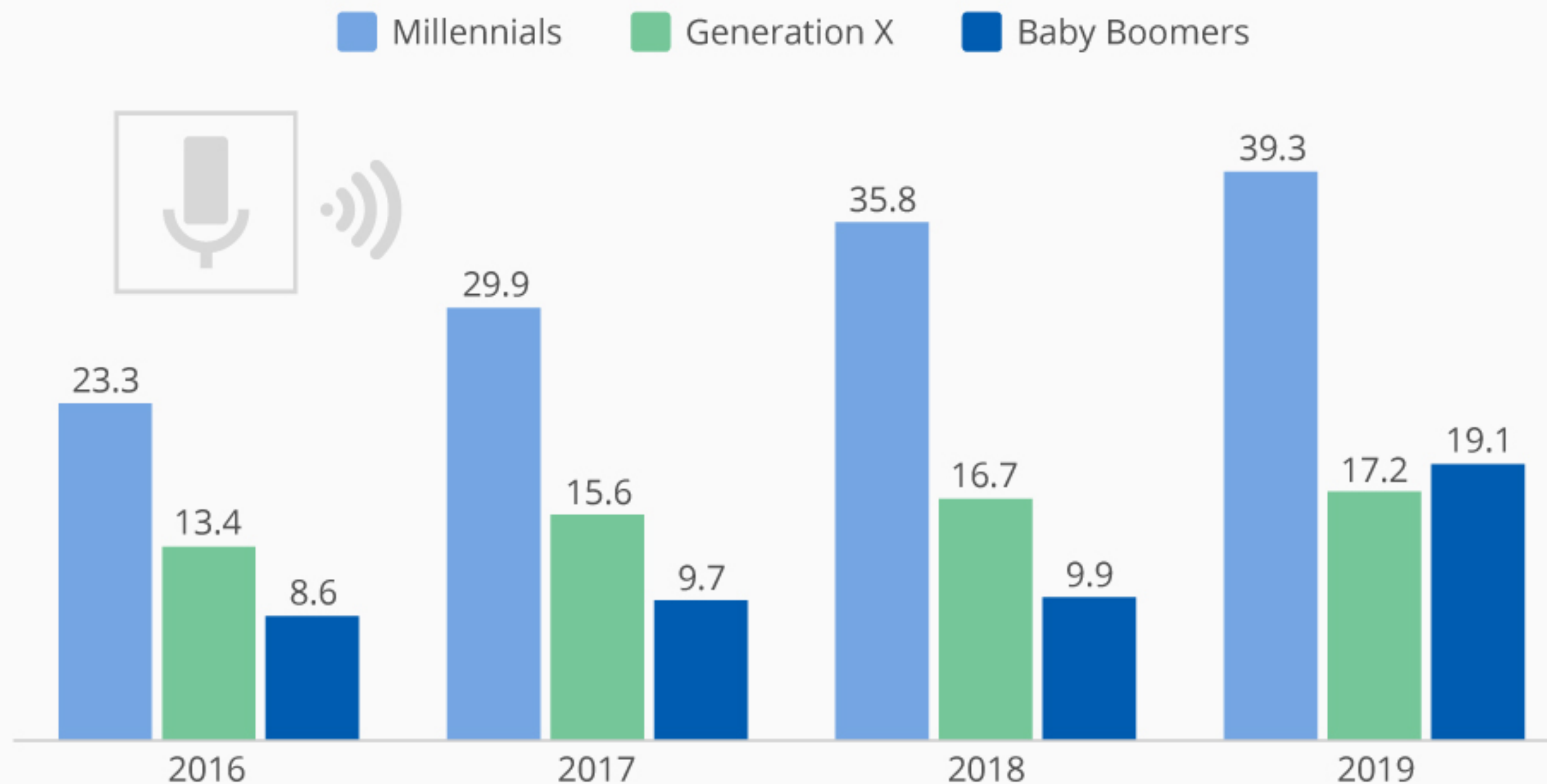
Semantic Web

Web 3.0

AI/VR/AR

## Millennials are the most prolific digital assistant users

U.S. voice-enabled digital assistant users by generation (in millions)



source: eMarketer, Statista



@StatistaCharts

Individuals in the United States who use voice-enabled assistants at least once a month on any device

Source: eMarketer

statista

# Voice assistants - a story of accuracy

Smart web

Screen less

Phase 3

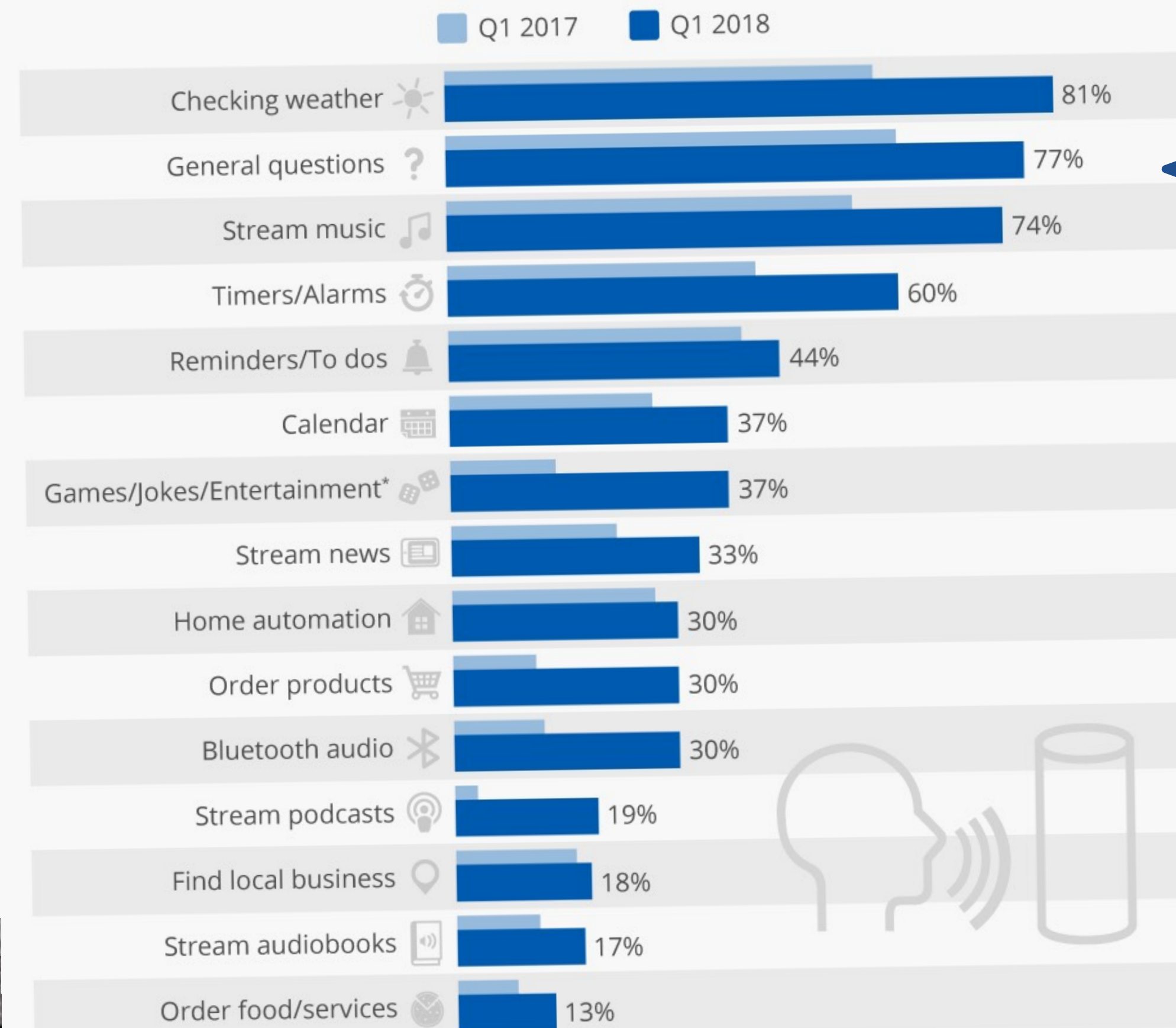
Semantic Web

Web 3.0

AI/VR/AR

## Users Learn to Appreciate Smart Speakers' Many Talents

% of smart speaker owners in the U.S. who have used the device to do the following



Consumers' Primary Uses for Voice assistants

April 2018

\* category was limited to "playing games" in Q1 2017 survey  
 Base: U.S. households owning at least one smart speaker  
 Source: comScore



# Wireless AirPods as a new entry gate

Smart web

Screen less

Apple Earpods launch in 2017

April 2017

Phase 3

Semantic Web

Web 3.0

AI/VR/AR

# Wireless AirPods as a new entry gate

Smart web

Screen less

Phase 3

Apple Earpods launch in 2016

Semantic Web

Web 3.0

AI/VR/AR



# Google Pixel Buds as your new assistant

Smart  
web

Screen  
less

Phase 3

Semantic Web

Web 3.0

AI/VR/AR

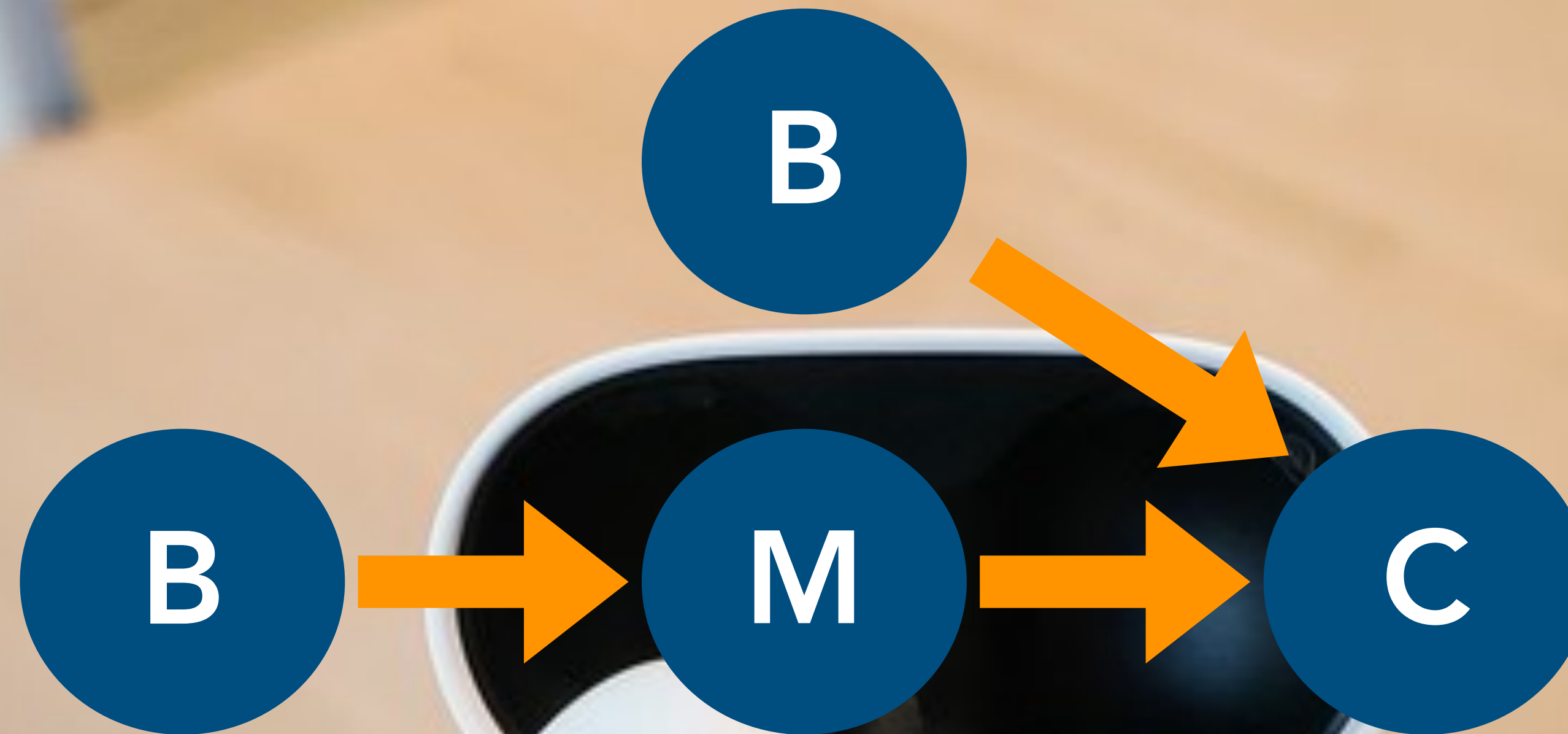


A new marketing model!

Smart web

Screen less

Phase 3



Semantic Web

Web 3.0

AI/VR/AR

Automated

Commerce

A new marketing model!

Smart web

Screen less

Phase 3

Product filter

B

B

M

C

Semantic Web

Web 3.0

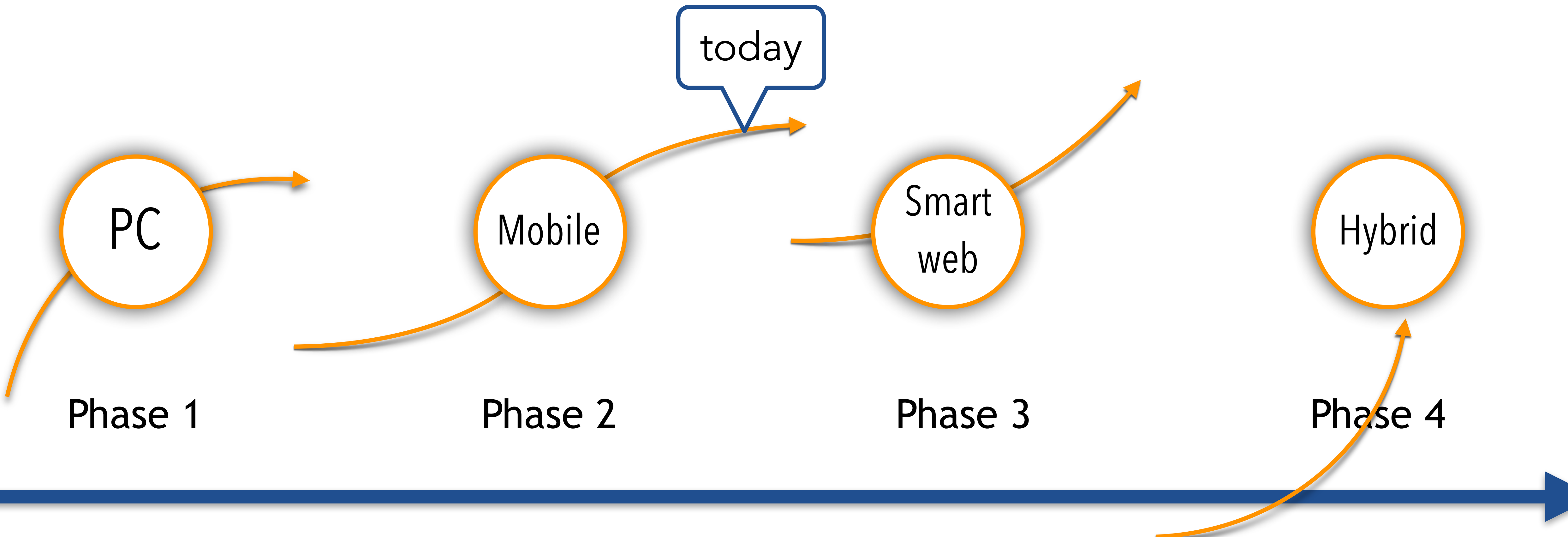
AI/VR/AR

B

Automated

Commerce





Phase 1

Phase 2

Phase 3

Phase 4

today

**World Wide Web**

**Social Web**

**Semantic Web**

**Emotional Web**

Web 1.0

Web 2.0

Web 3.0

Web 5.0

**Internet**

**Mobile**

**AI/VR/AR**

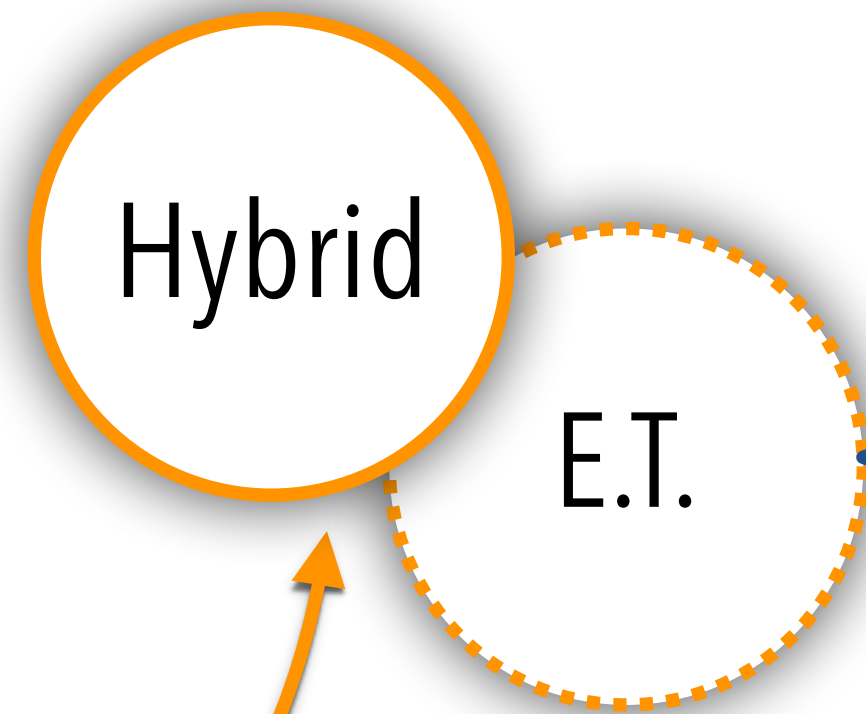
Hybrid

Phase 4



**Emotional Web**

Web 5.0



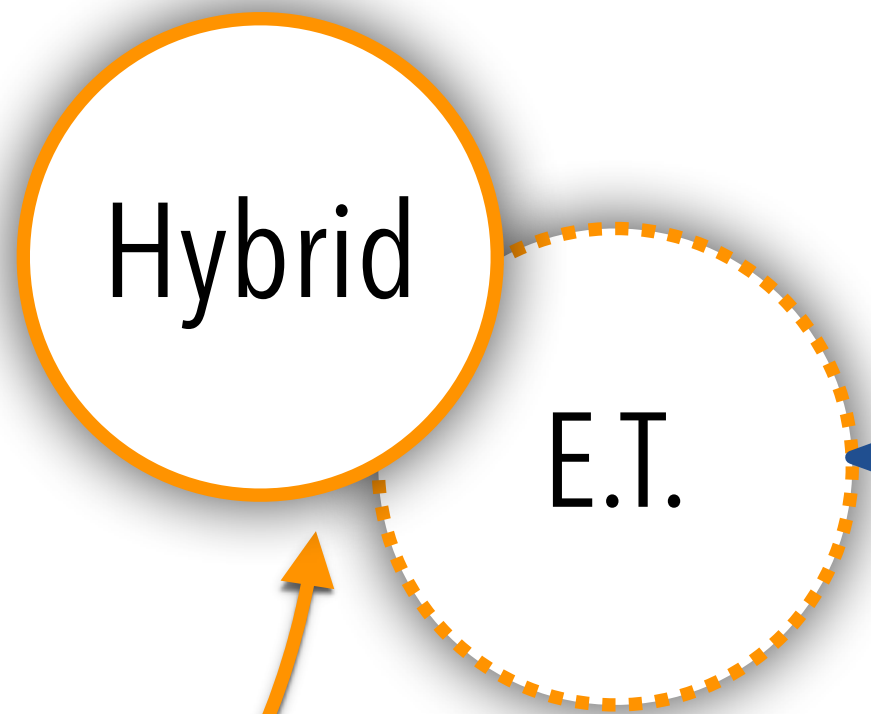
Emotional Technology (E.T.) stands for measuring biometric data in order to define emotions and then using these data as input for various digital applications.

Phase 4



# Emotional Web

Web 5.0



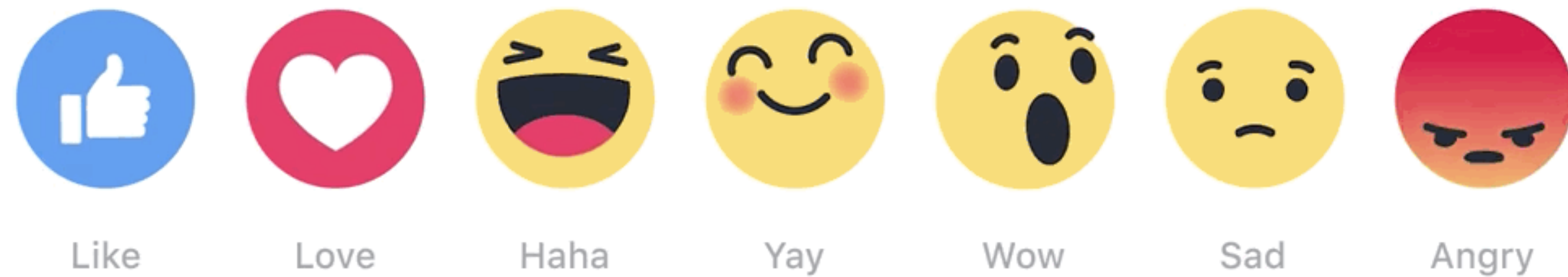
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Phase 4



# Emotional Web

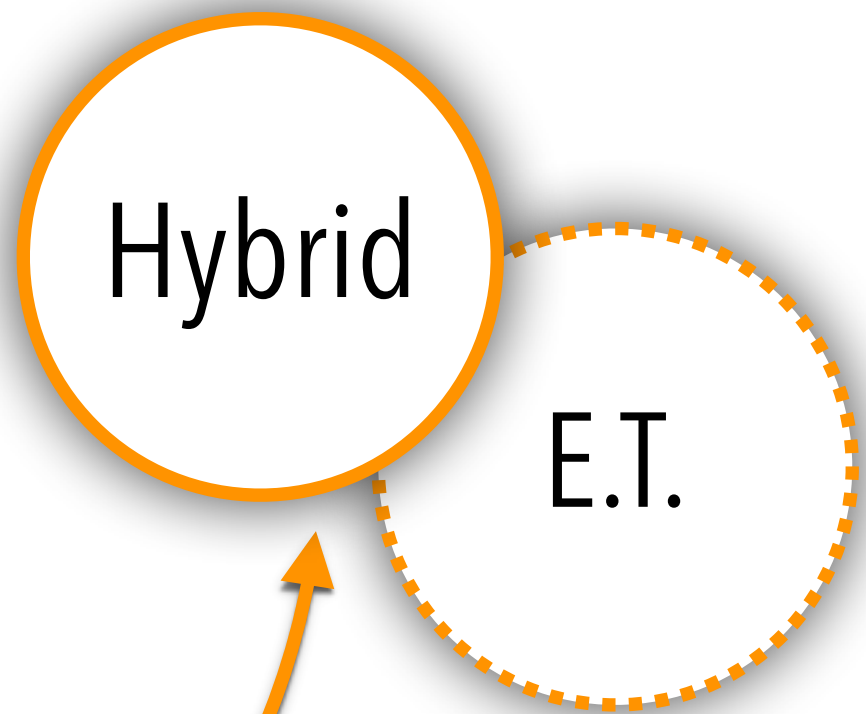
Web 5.0



Like Love Haha Yay Wow Sad Angry

There are so much more emotions!

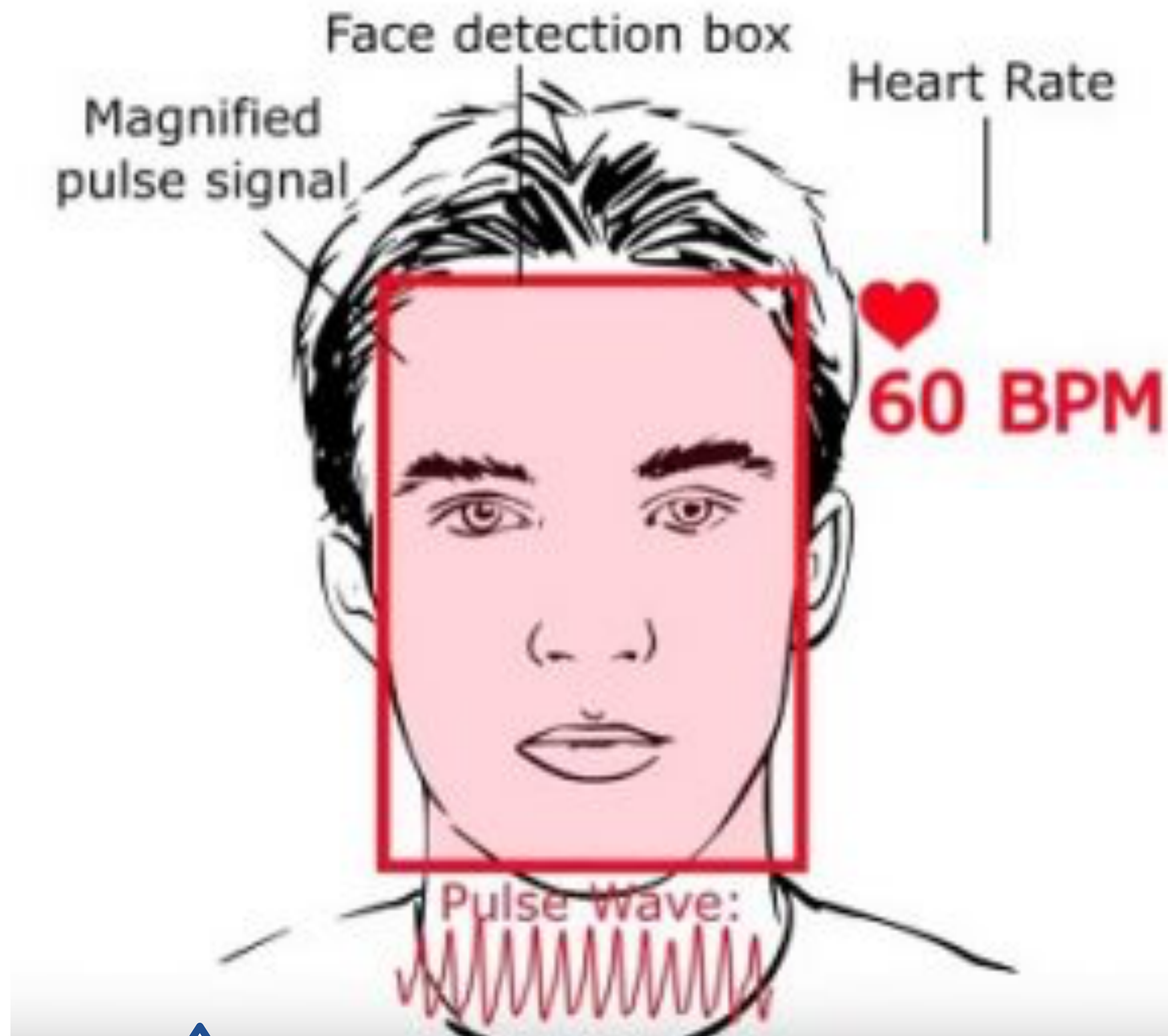
source: How cool brands stay hot (2016)



Phase 4

# Emotional Web

Web 5.0



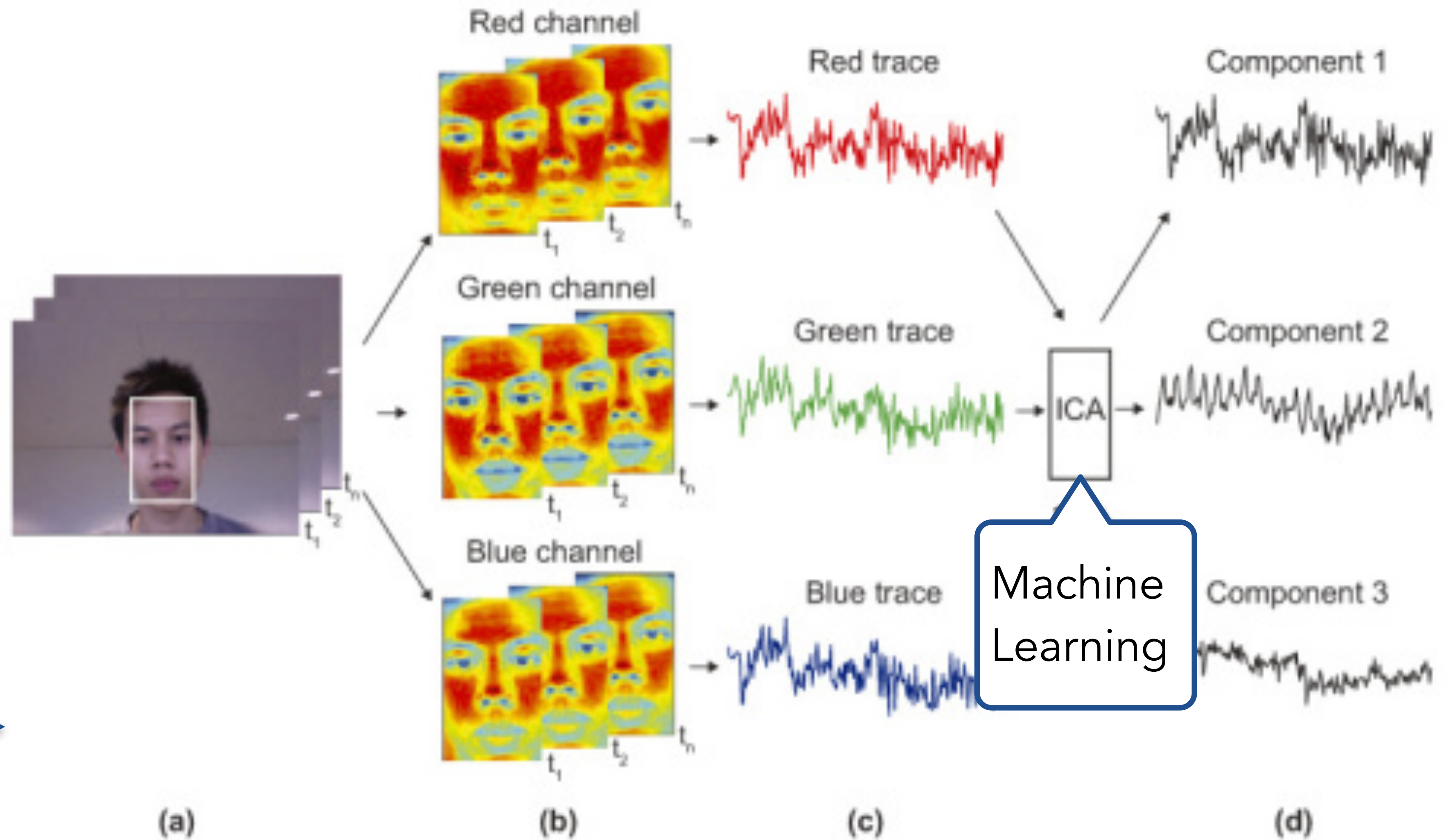
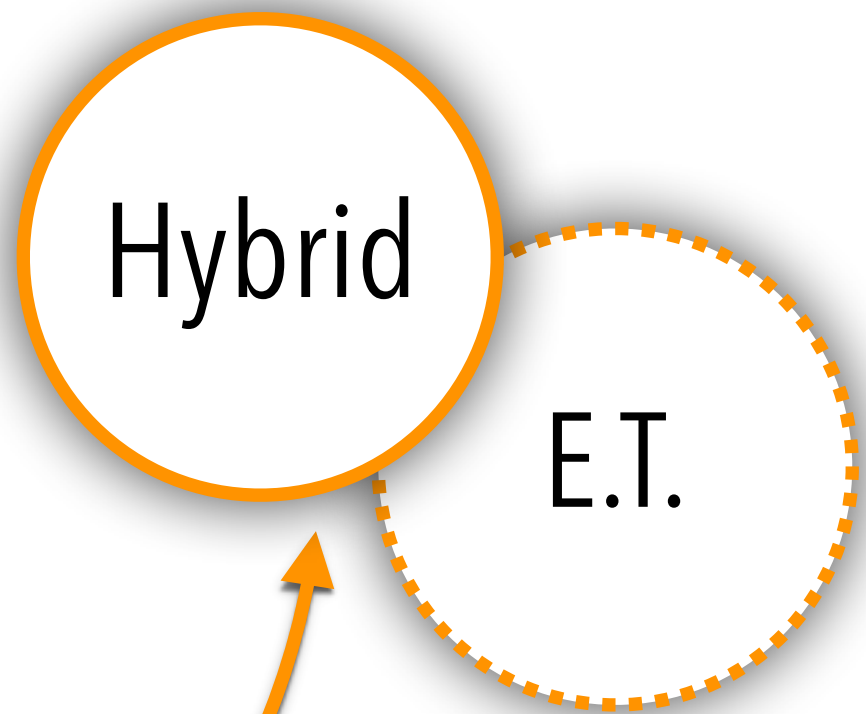
There are so much more emotions to cap



source: microsoft.com, Dann McDuff

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There are so much more emotions to capture!

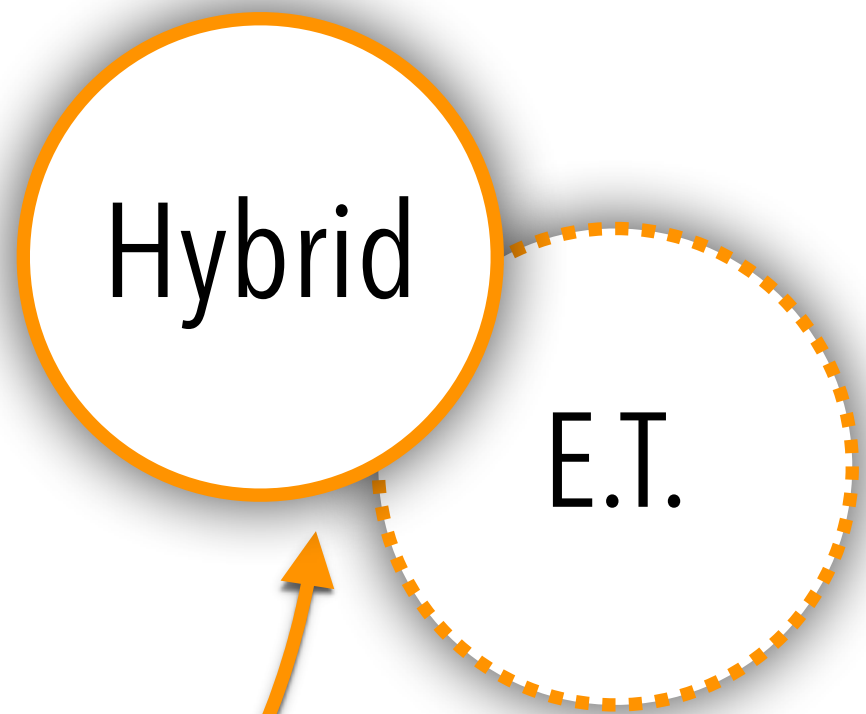
# Emotional Web

Web 5.0

source: microsoft.com, www.osapublishing.org, Dann McDuff,

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+32 495 65 50 90



## Emotional Web

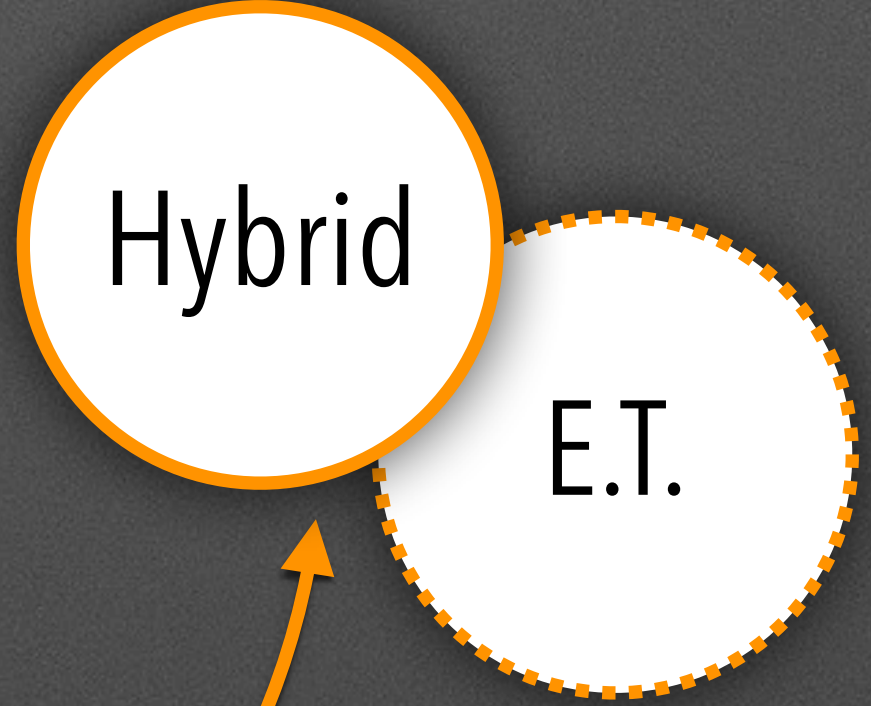
Web 5.0

EmotionCheck helpt people overcome there anxiety

source: [www.researchgate.net](http://www.researchgate.net)

Tom Flerackers - [tom@flatworldbusiness.com](mailto:tom@flatworldbusiness.com)

+32 495 65 50 90



Phase 4



Emotional Web

Web 5.0

Tom Flerackers - [tom@flatworldbusiness.com](mailto:tom@flatworldbusiness.com)

+32 495 65 50 90





Hybrid

E.T.

Phase 4

Emotional Web

Web 5.0

Tom Flerackers - tom@flatworldbusiness.com

+32 495 65 50 90

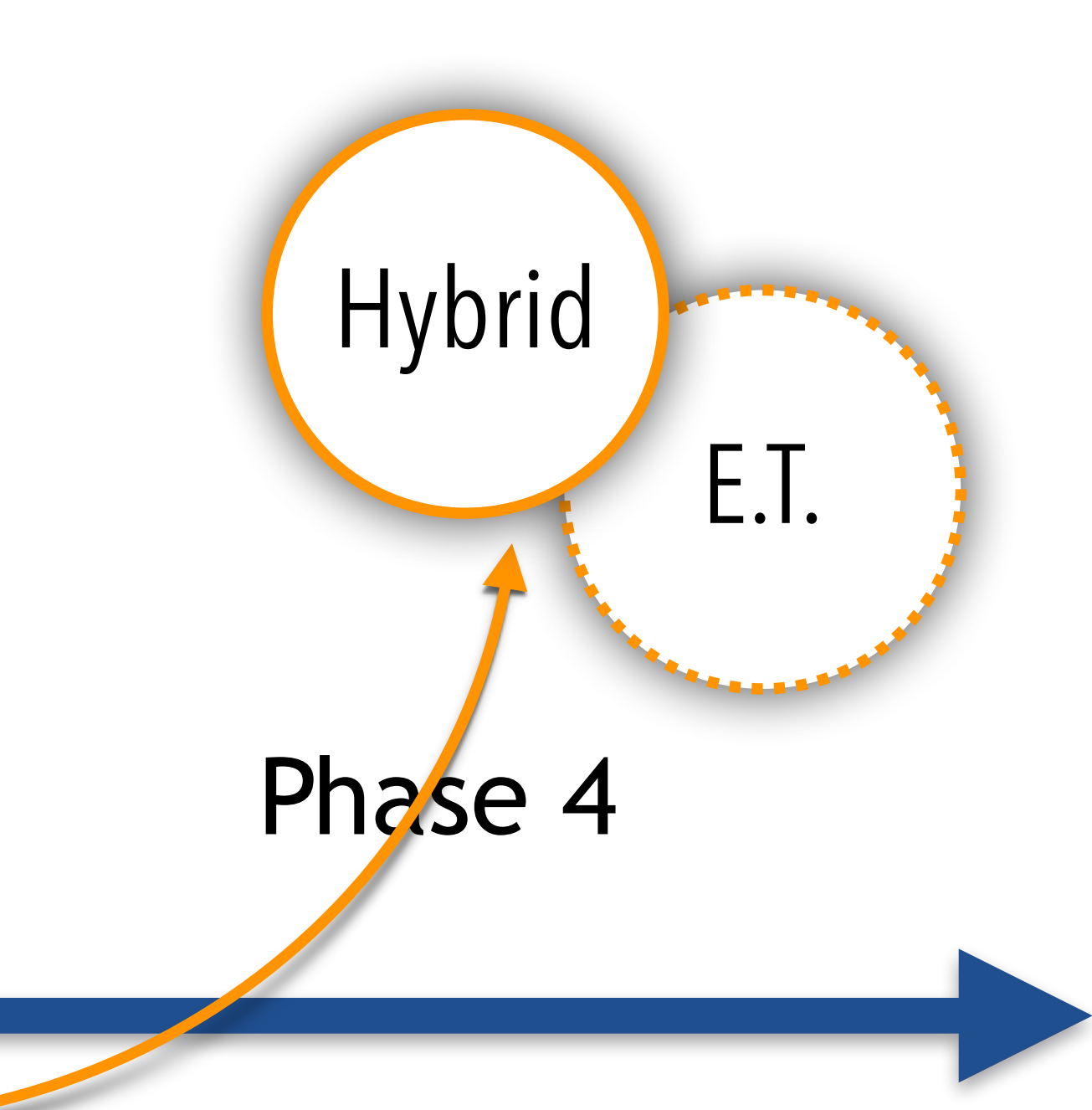
Flat

World

Business

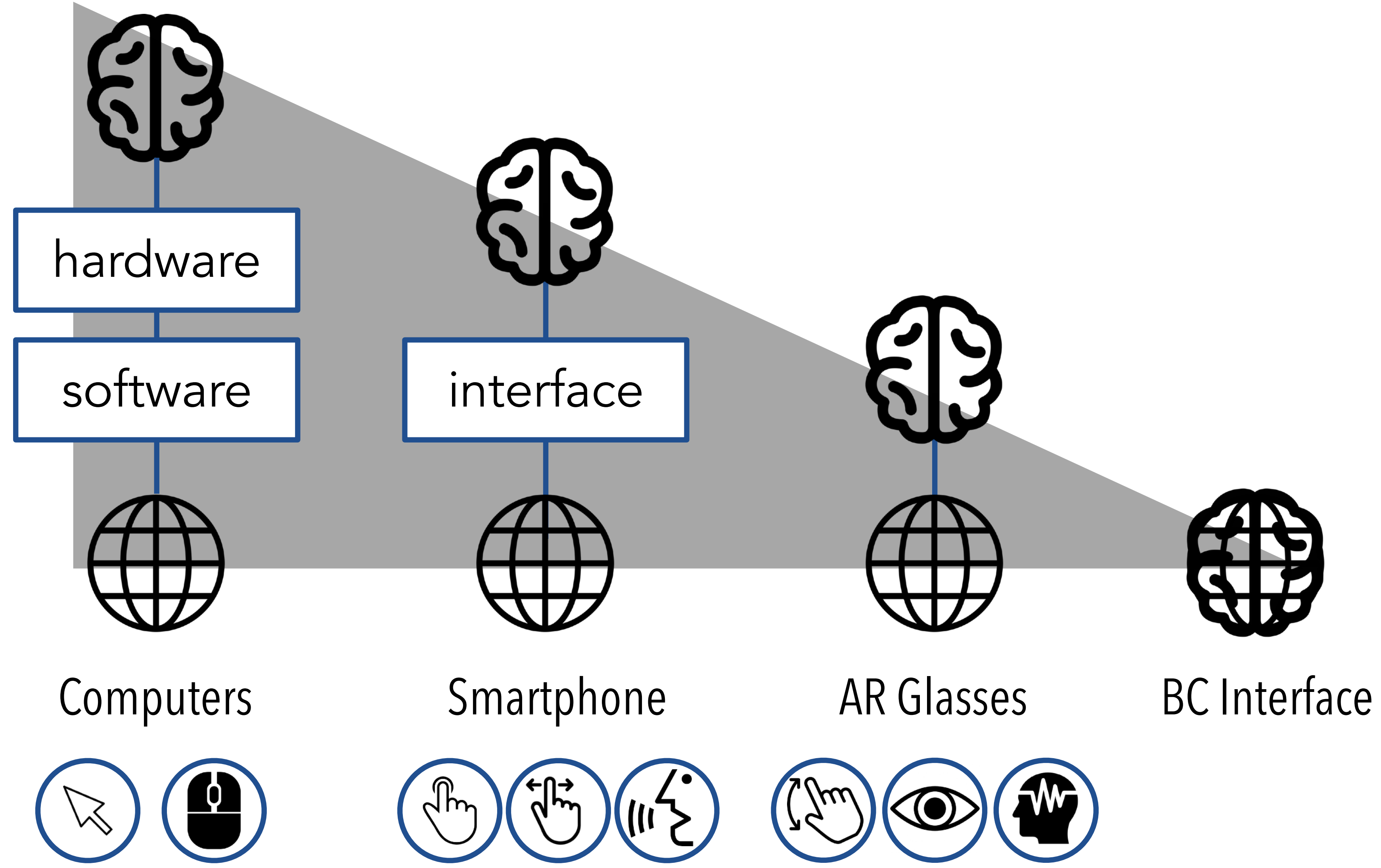
creating value in a digital world

Evolution of interaction

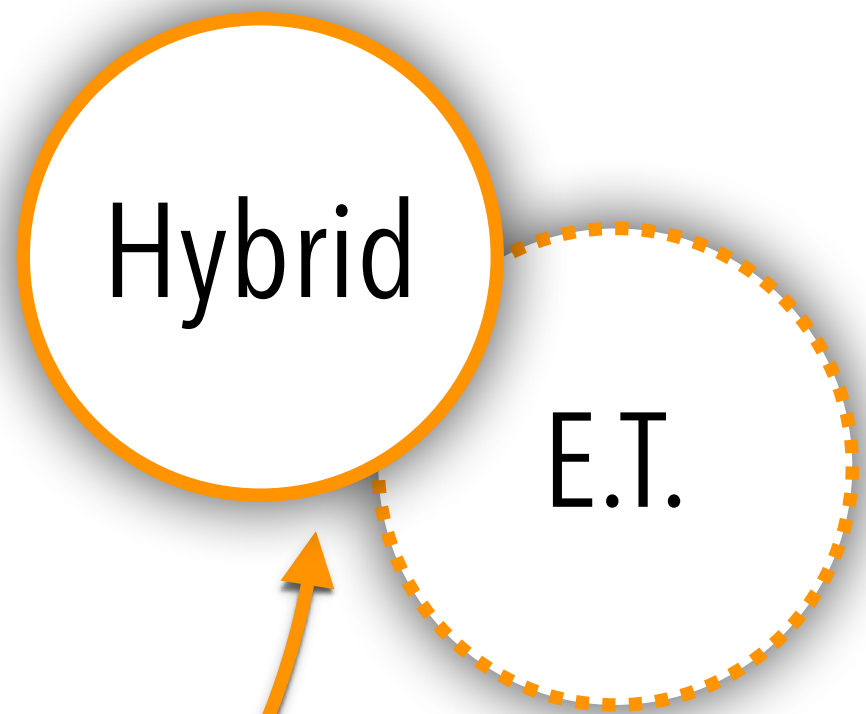


Emotional Web

Web 5.0



  
neurable



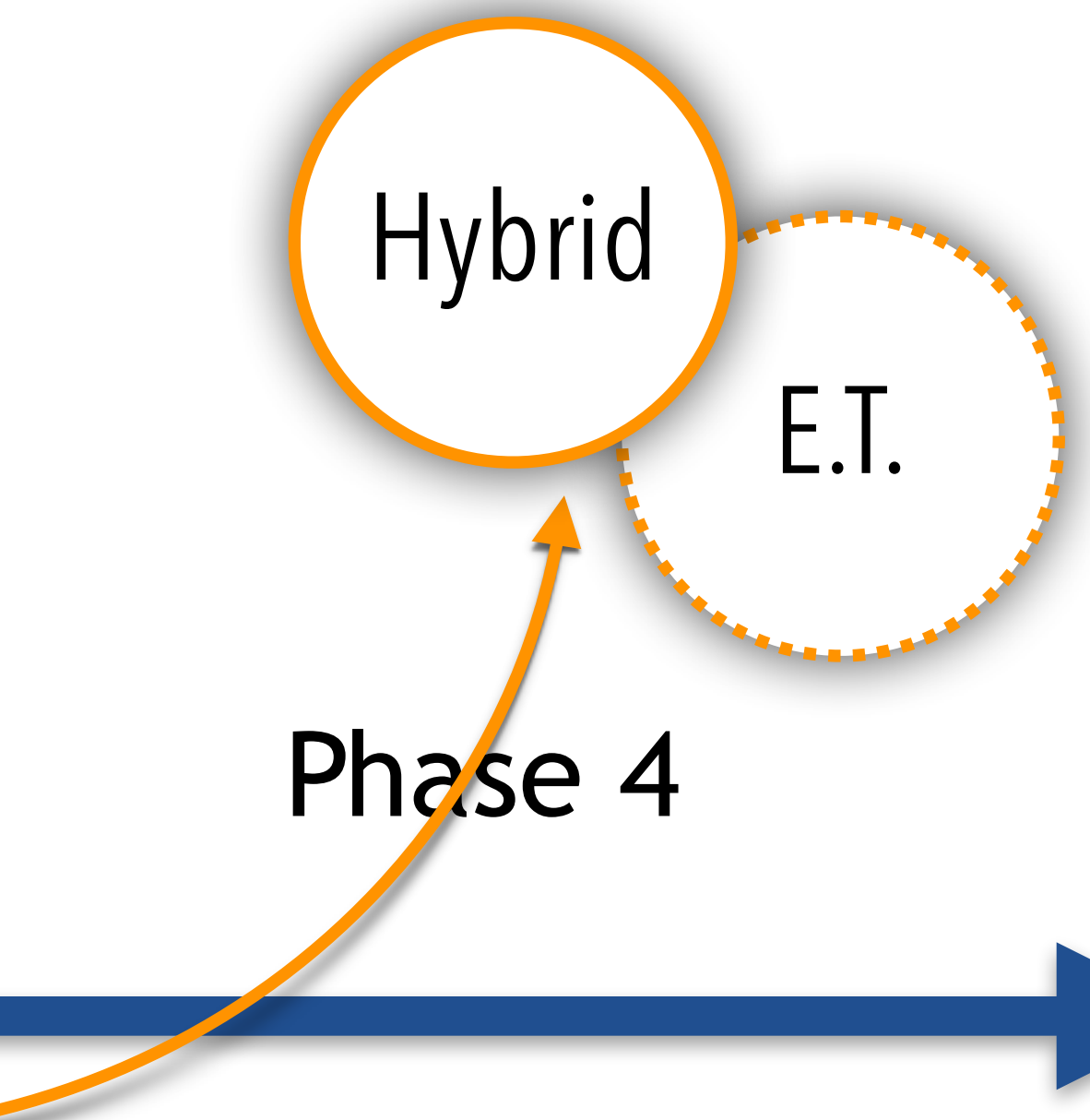
Phase 4

**Emotional Web**

Web 5.0

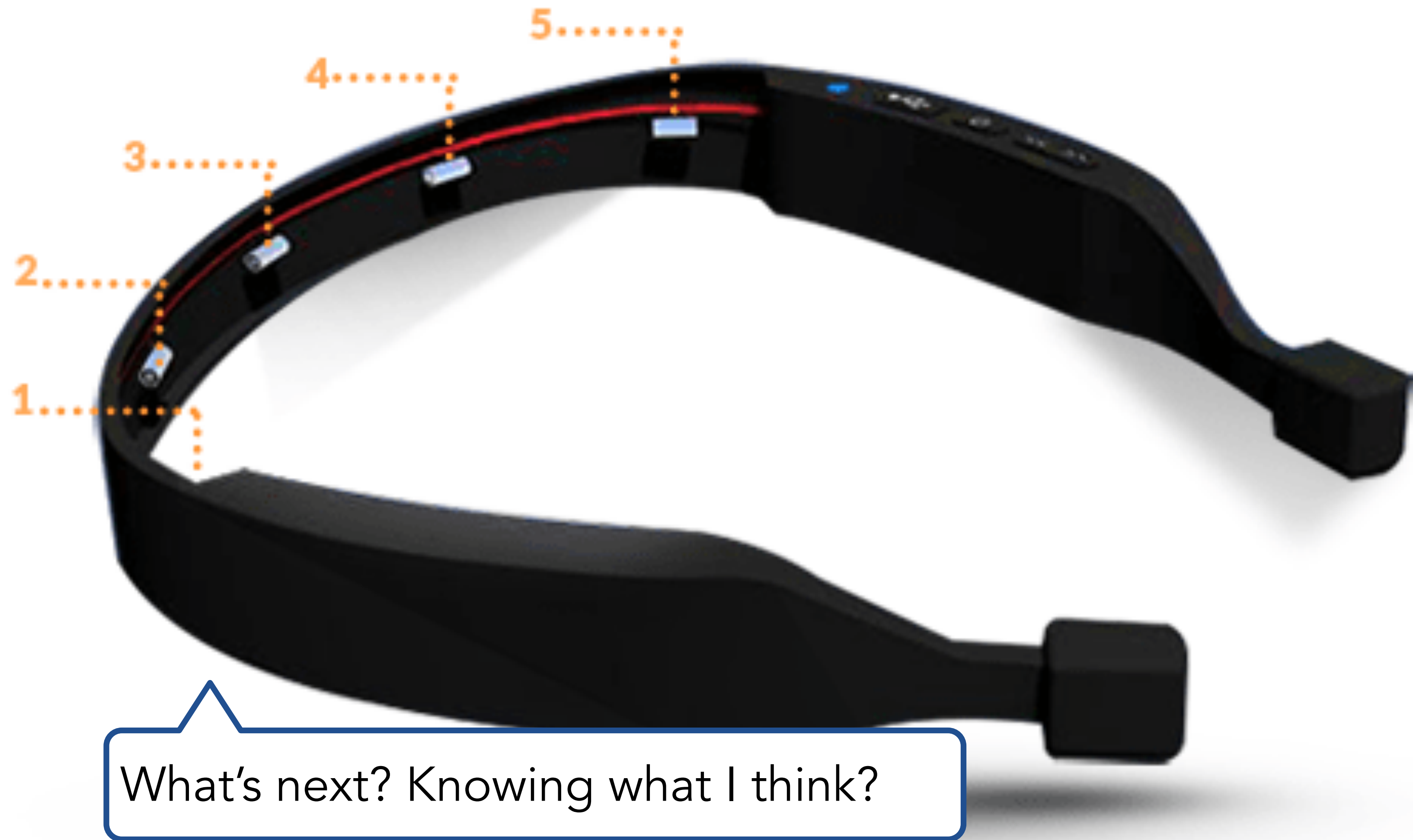


BC Interface



# Emotional Web

Web 5.0



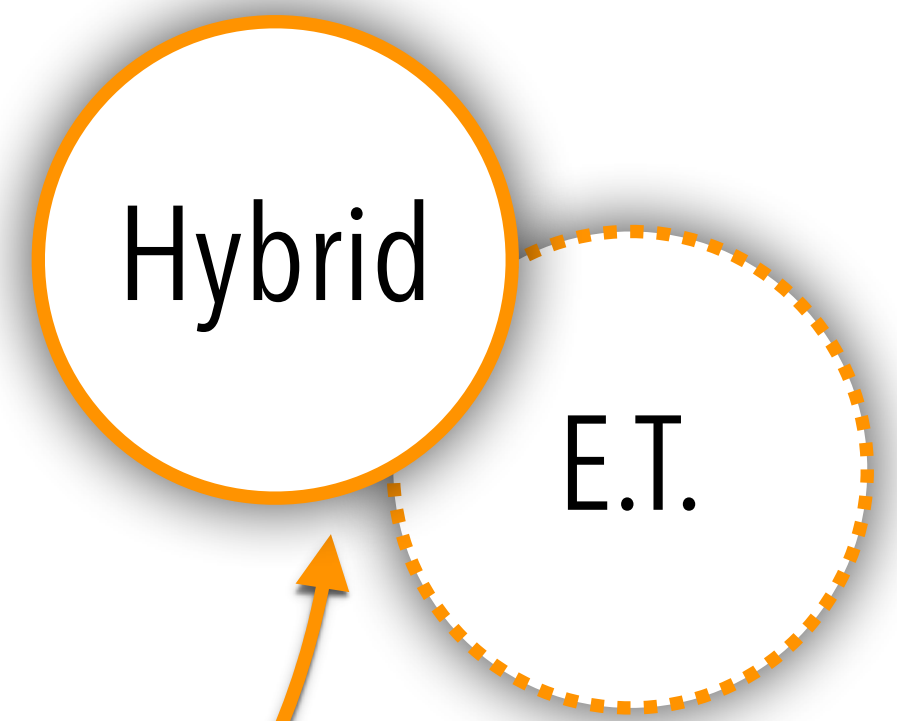
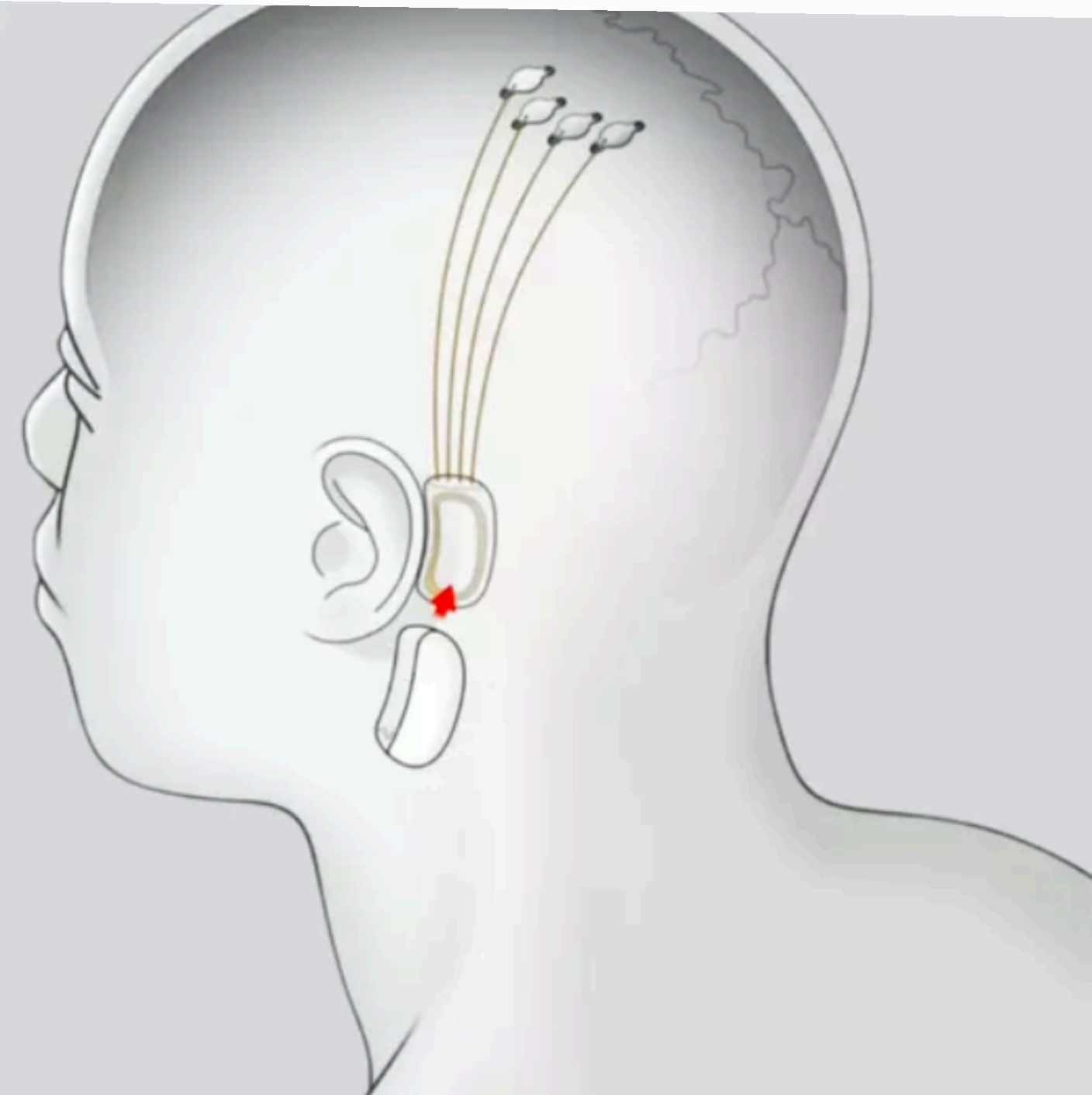


# Elon Musk says Neuralink plans 2020 human test of brain-computer interface

"A monkey has been able to control a computer with his brain," CEO Musk says of his startup's brain-machine interface.

BY STEPHEN SHANKLAND | JULY 17, 2019 11:20 AM PDT

N1 IMPLANT



Phase 4



**Emotional Web**

Web 5.0

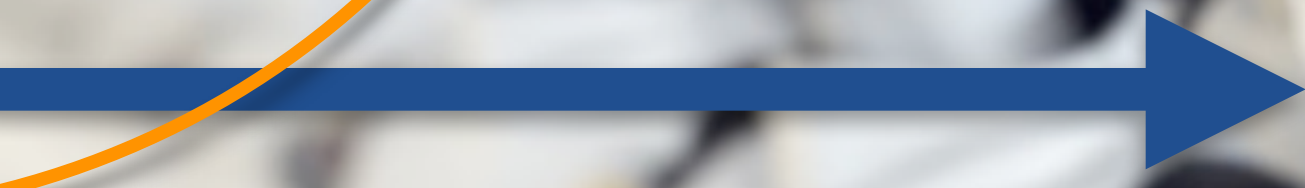
What's next? Uploading and downloading from our brain?



Hybrid

E.T.

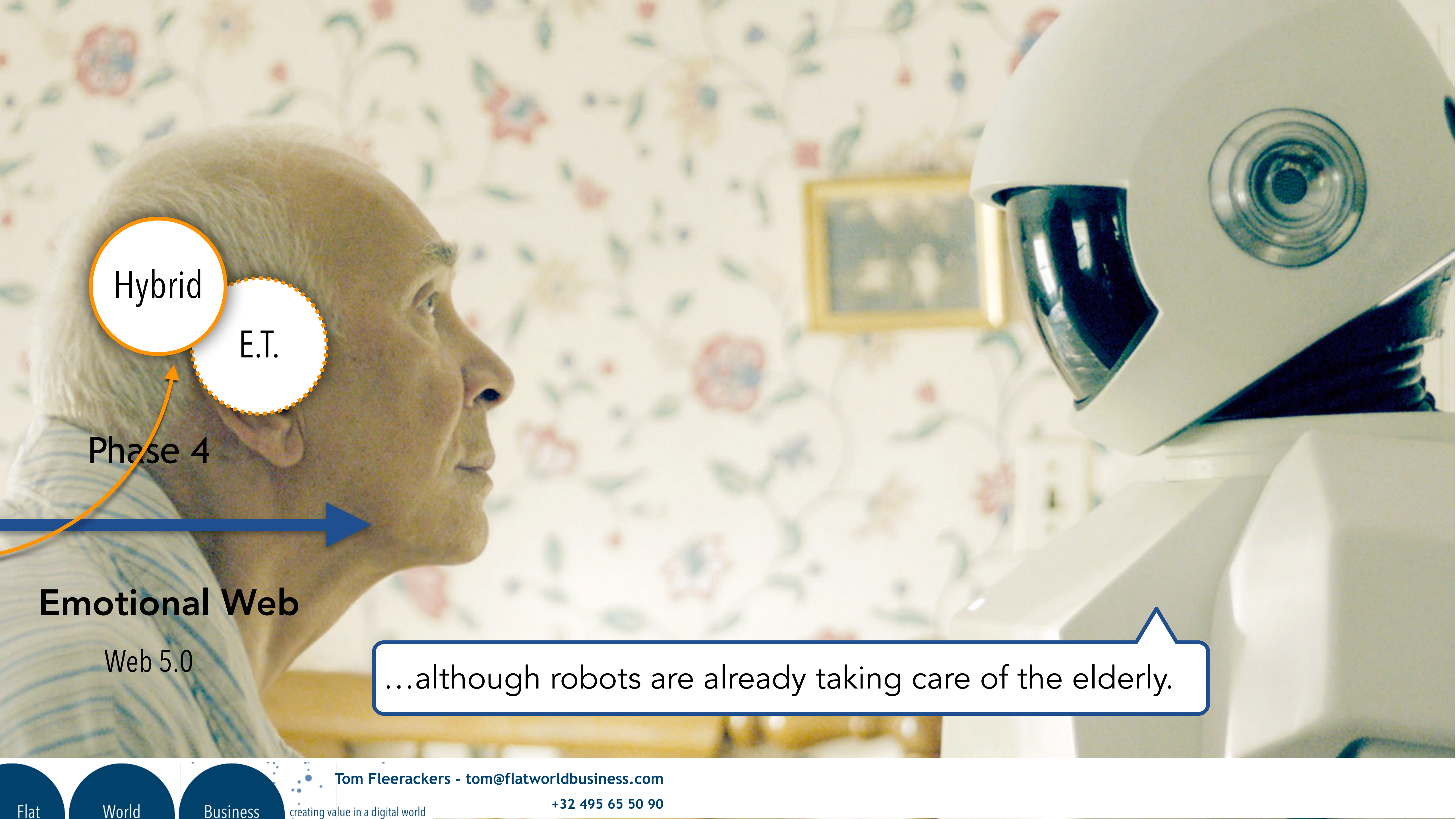
Phase 4



Emotional Web

Web 5.0

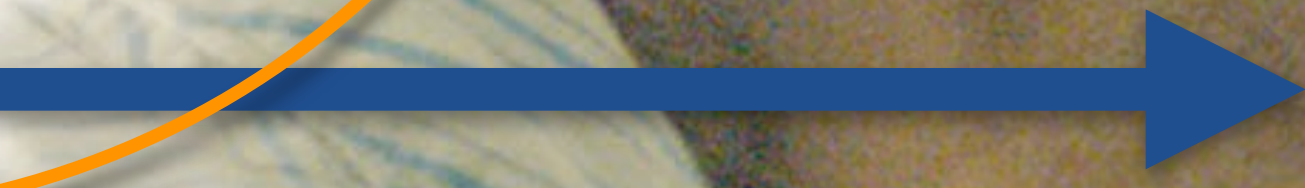
Humanoids are still far enough!!



Hybrid

E.T.

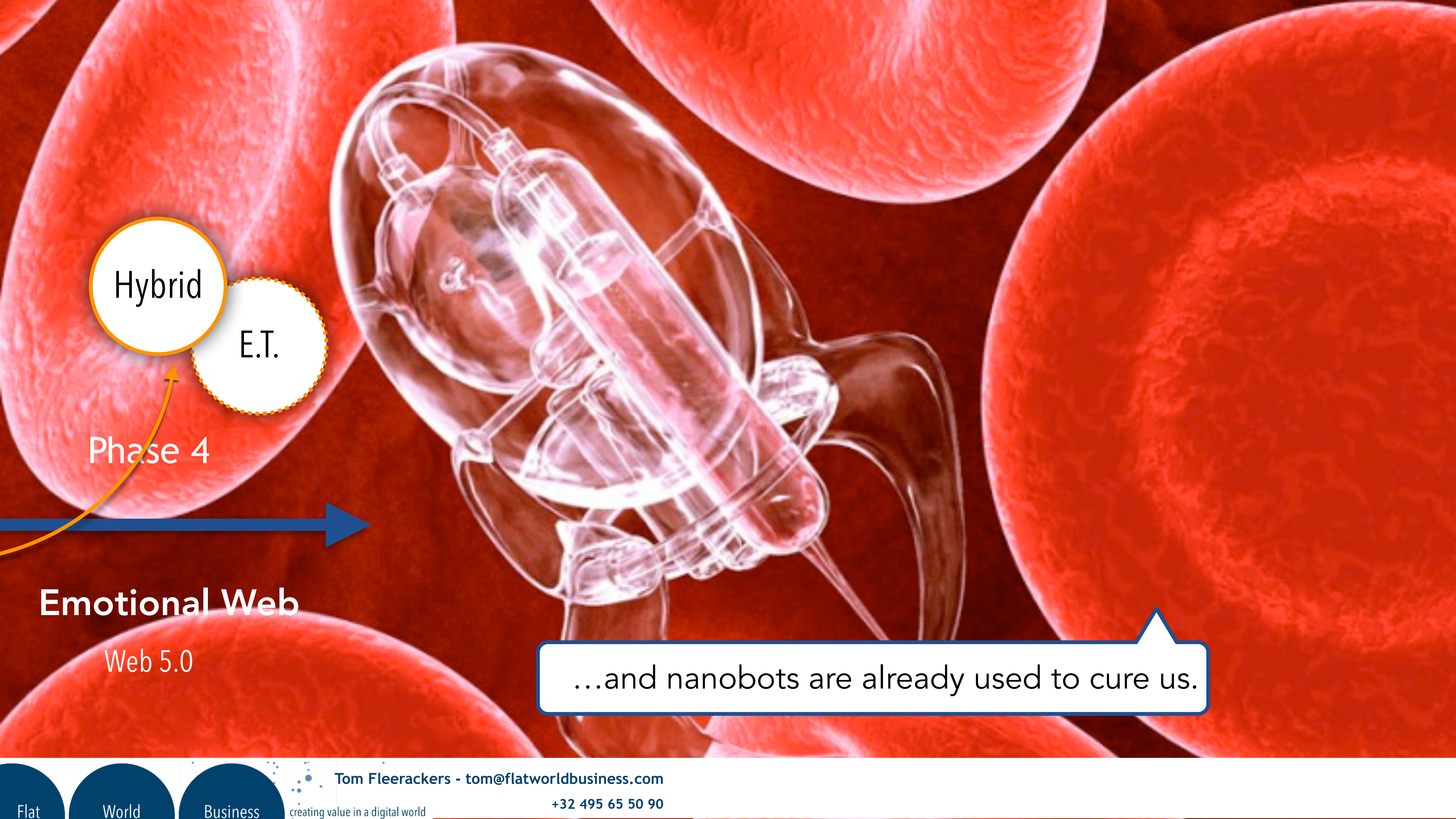
Phase 4



**Emotional Web**

Web 5.0

...although robots are already taking care of the elderly.



Hybrid

E.T.

Phase 4

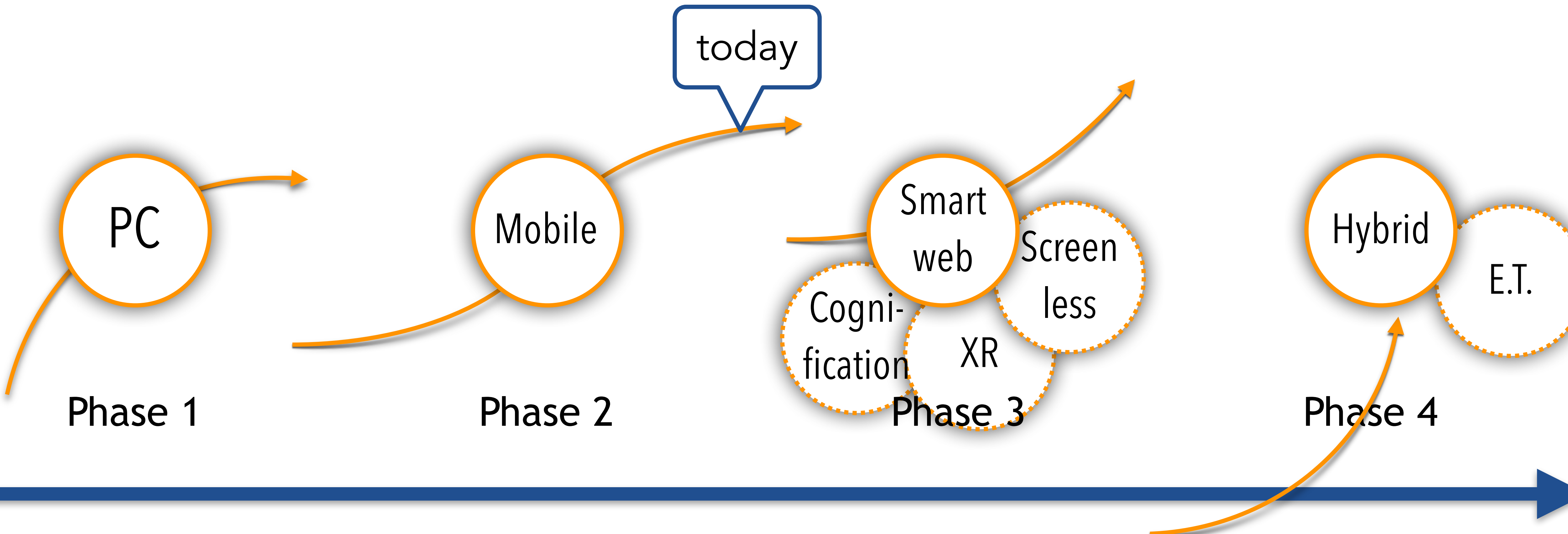


Emotional Web

Web 5.0

...and nanobots are already used to cure us.





**World Wide Web**

Web 1.0

**Internet**

**Social Web**

Web 2.0

**Mobile**

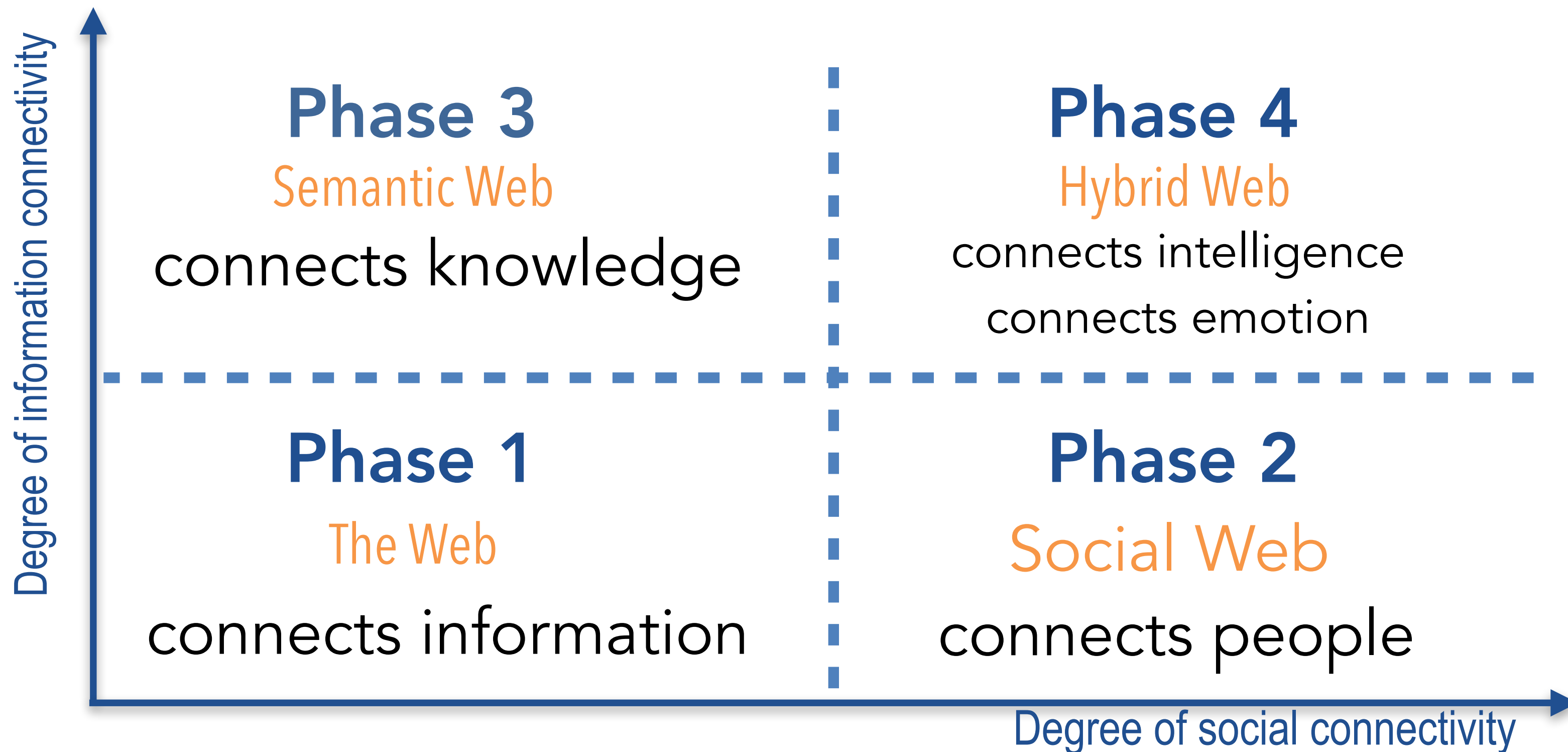
**Semantic Web**

Web 3.0

**AI/VR/AR**

**Emotional Web**

Web 5.0



Phase 1

Phase 2

Phase 3

Phase 4

**World Wide Web**

Web 1.0

**Internet**

**Social Web**

Web 2.0

**Mobile**

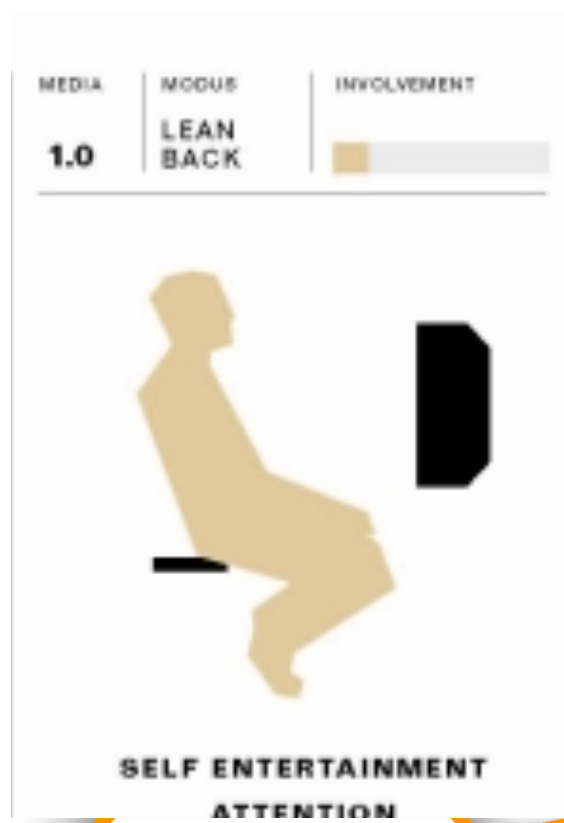
**Semantic Web**

Web 3.0

**AI/VR/AR**

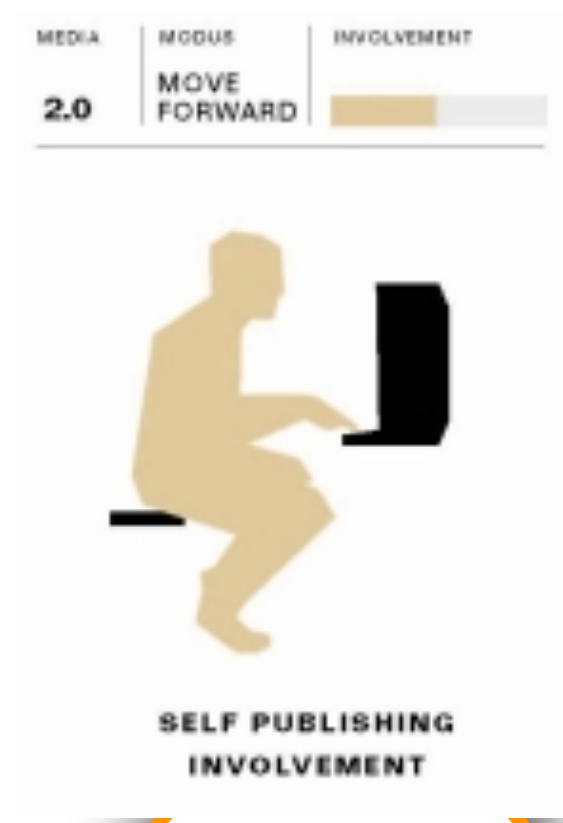
**Emotional Web**

Web 5.0



PC

Phase 1



Mobile

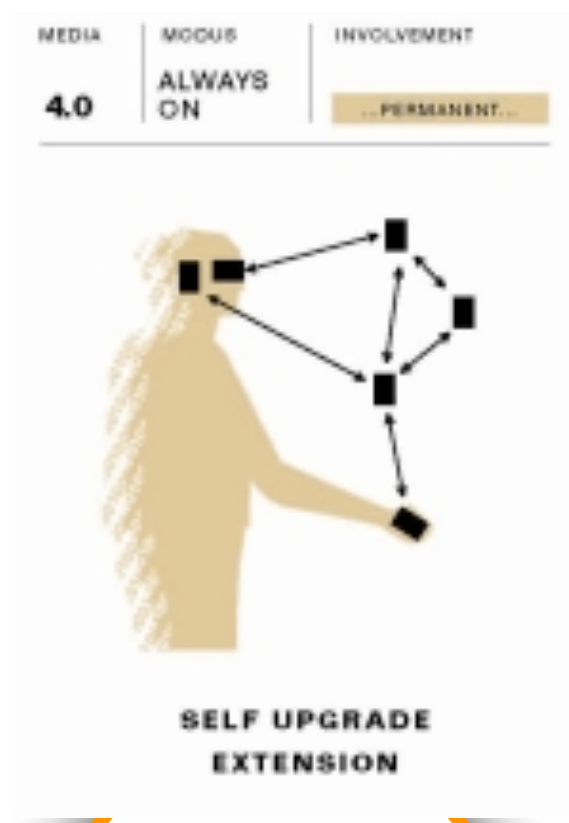
Phase 2

today



Smart web

Phase 3



Hybrid

Phase 4

World Wide Web

Web 1.0

Internet

Social Web

Web 2.0

Mobile

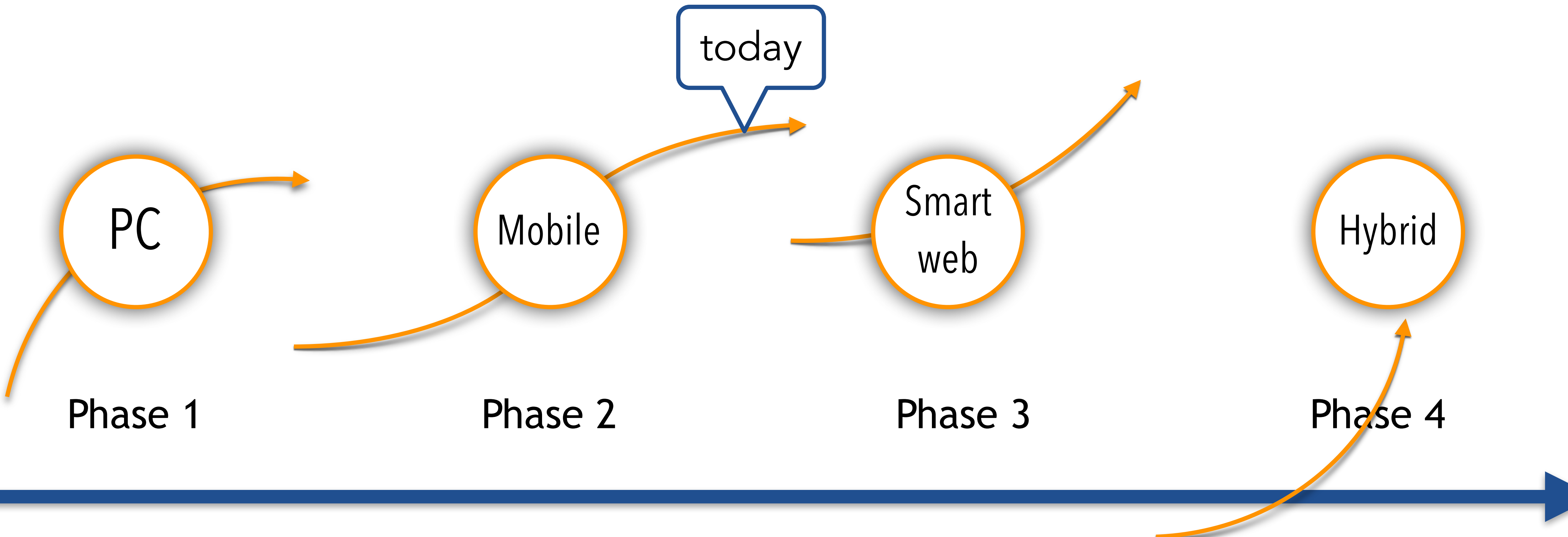
Semantic Web

Web 3.0

AI/VR/AR

Emotional Web

Web 5.0



Phase 1

Phase 2

Phase 3

Phase 4

today

**World Wide Web**

**Social Web**

**Semantic Web**

**Emotional Web**

Web 1.0

Web 2.0

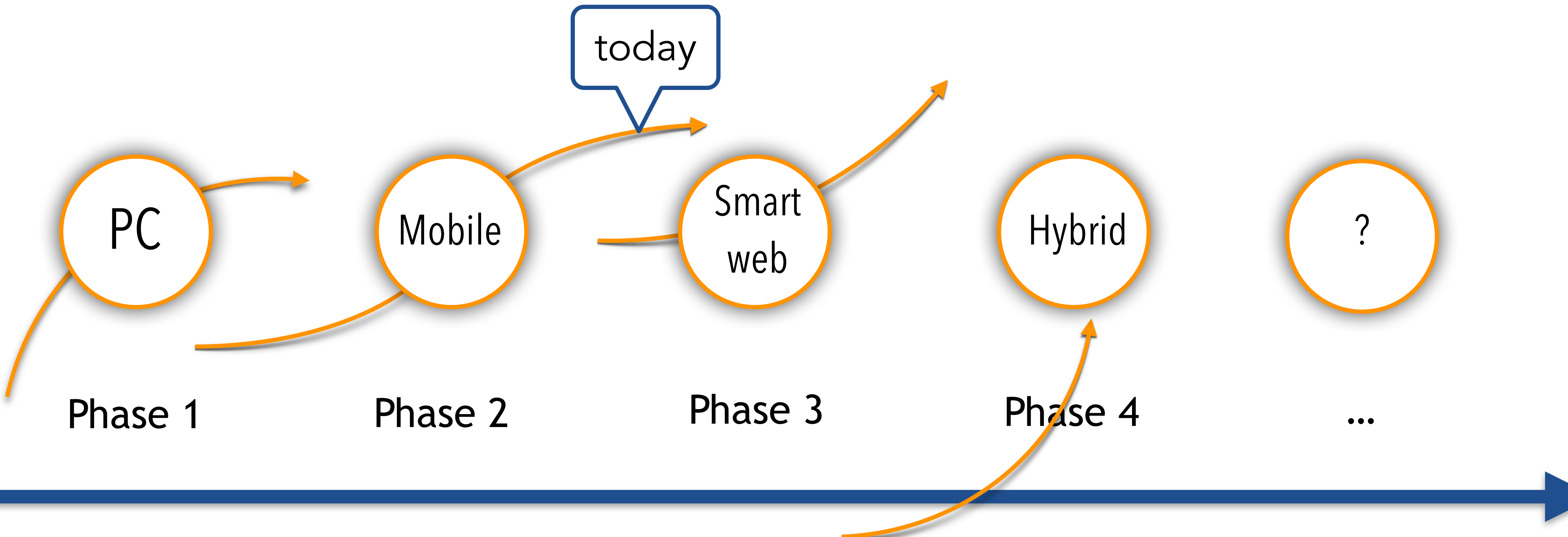
Web 3.0

Web 5.0

**Internet**

**Mobile**

**AI/VR/AR**



**World Wide Web**

Web 1.0

**Internet**

**Social Web**

Web 2.0

**Mobile**

**Semantic Web**

Web 3.0

**AI/VR/AR**

**Hybrid Web**

Web 5.0

?



The future is a process, not a destination.

— *Bruce Sterling* —

# Digital messed up Society

Understanding the (future) digital era



Tom Fleerackers  
[www.flatworldbusiness.wordpress.com](http://www.flatworldbusiness.wordpress.com)



# The future of auto(motive)



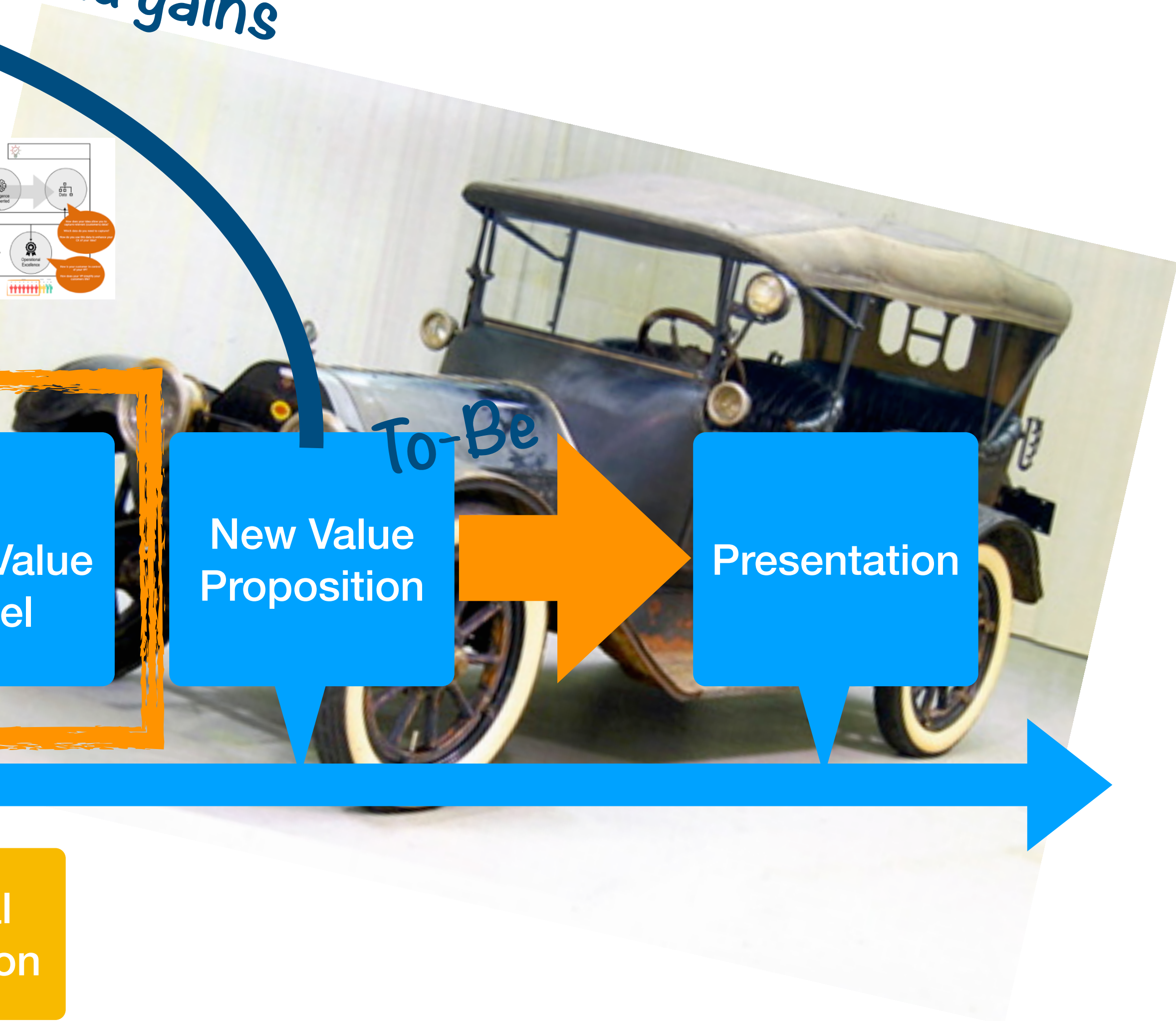
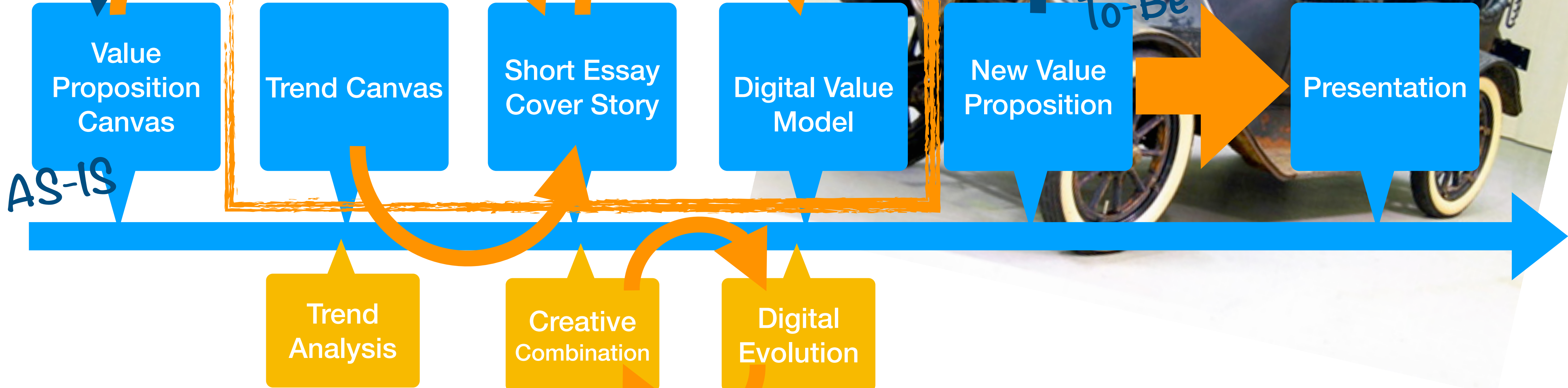
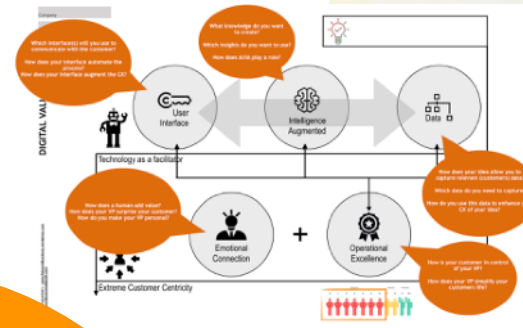
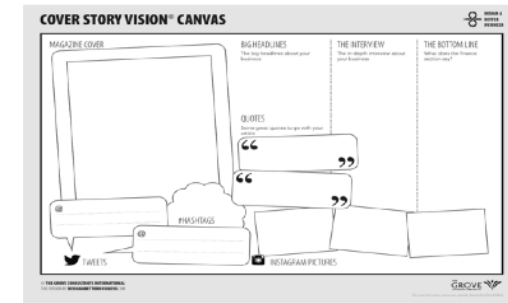
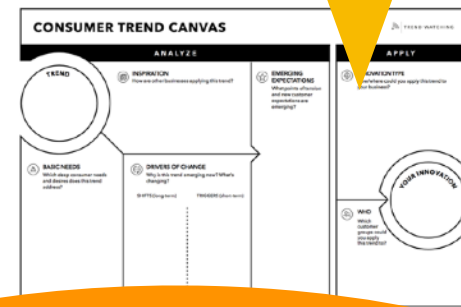
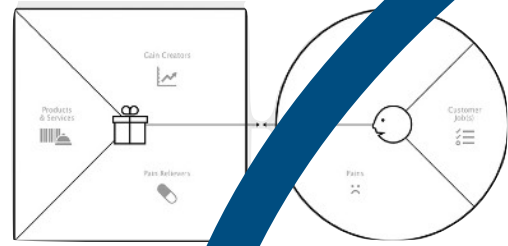


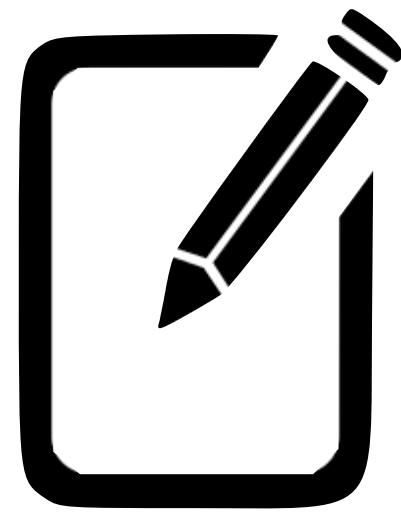


# The future of mobility

*Check on pains and gains*

minimum 2 trends





# The future of auto(motive)

What was the impact of each phase on mobility?

How does each phase affect customer gains and pains?

How does each phase affect the value proposition?

How can you create value in the future of mobility?

How will technology be used as a facilitator to create value?

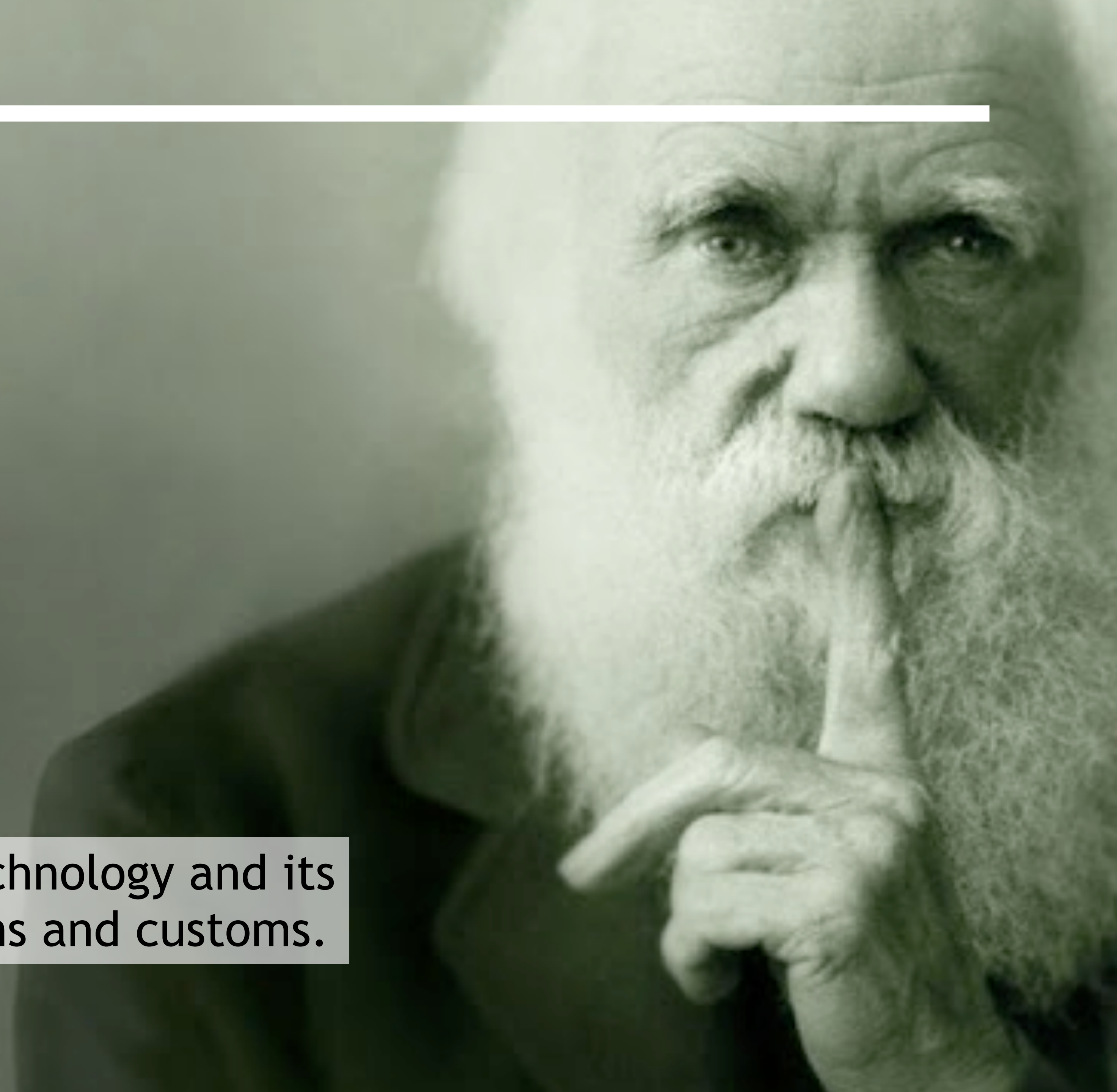
(think about data/user interface/data intelligence)

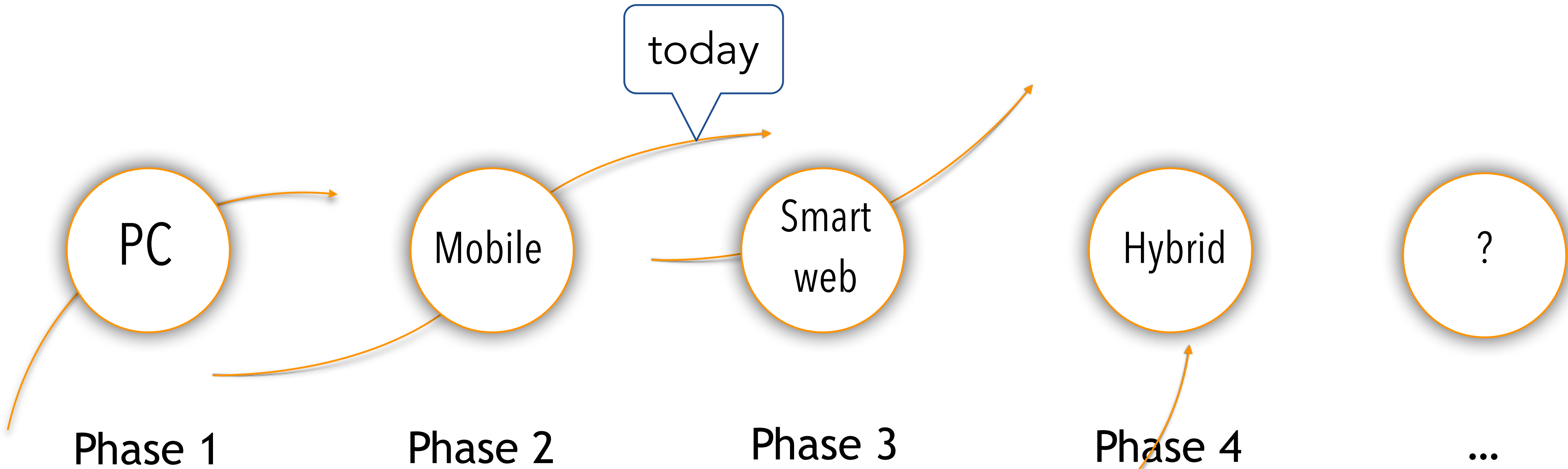


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## Digital Darwinism

The evolution of society and technology and its impact on behavior, expectations and customs.





**World Wide Web**

Web 1.0

**Internet**

**Social Web**

Web 2.0

**Mobile**

Web 4.0

**Semantic Web**

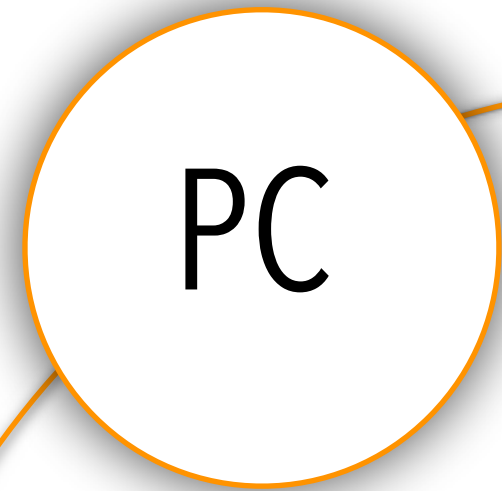
Web 3.0

**AI/VR/AR**

**Hybrid Web**

Web 5.0





Phase 1

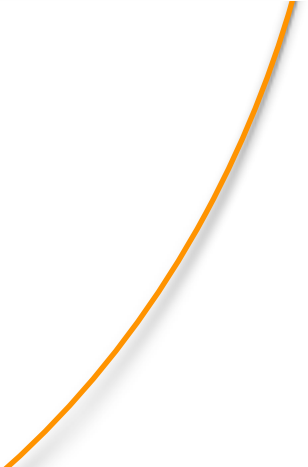


# World Wide Web

Web 1.0

**Internet**

Source: Toyota Europe (2009)





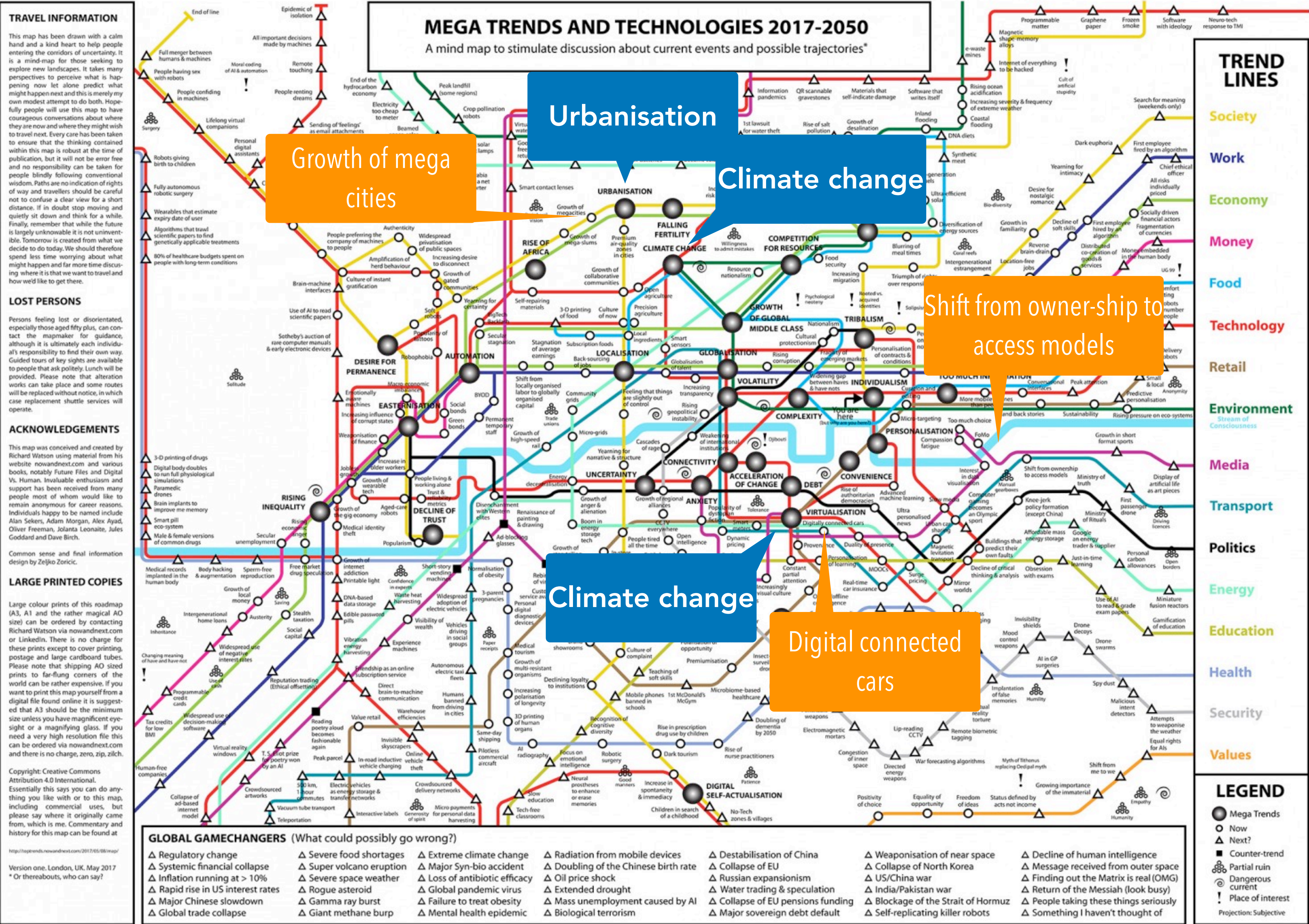
PC

Phase 1

World Wide Web

Web 1.0

Internet





**TRAVEL INFORMATION**  
 This map has been drawn with a calm hand and a kind heart to help people entering the corridors of uncertainty. It is a mind-map for those seeking to explore new landscapes. It takes many perspectives to perceive what is happening now let alone predict what might happen next and this is merely my own modest attempt to do both. Hopefully people will use this map to have courageous conversations about where they are now and where they might wish to travel next. Every care has been taken to ensure that the thinking contained within this map is robust at the time of publication, but it will not be error free and no responsibility can be taken for people blindly following conventional wisdom. Paths are no indication of rights of way and travellers should be careful not to confuse a clear view for a short distance. If in doubt stop moving and quietly sit down and think for a while. Finally, remember that while the future is largely unknowable it is not uninvitable. Tomorrow is created from what we do today.

# MEGA TRENDS AND TECHNOLOGIES 2017-2050

A mind map to stimulate discussion about current events and possible trajectories\*

Growth of mega cities

Urbanisation

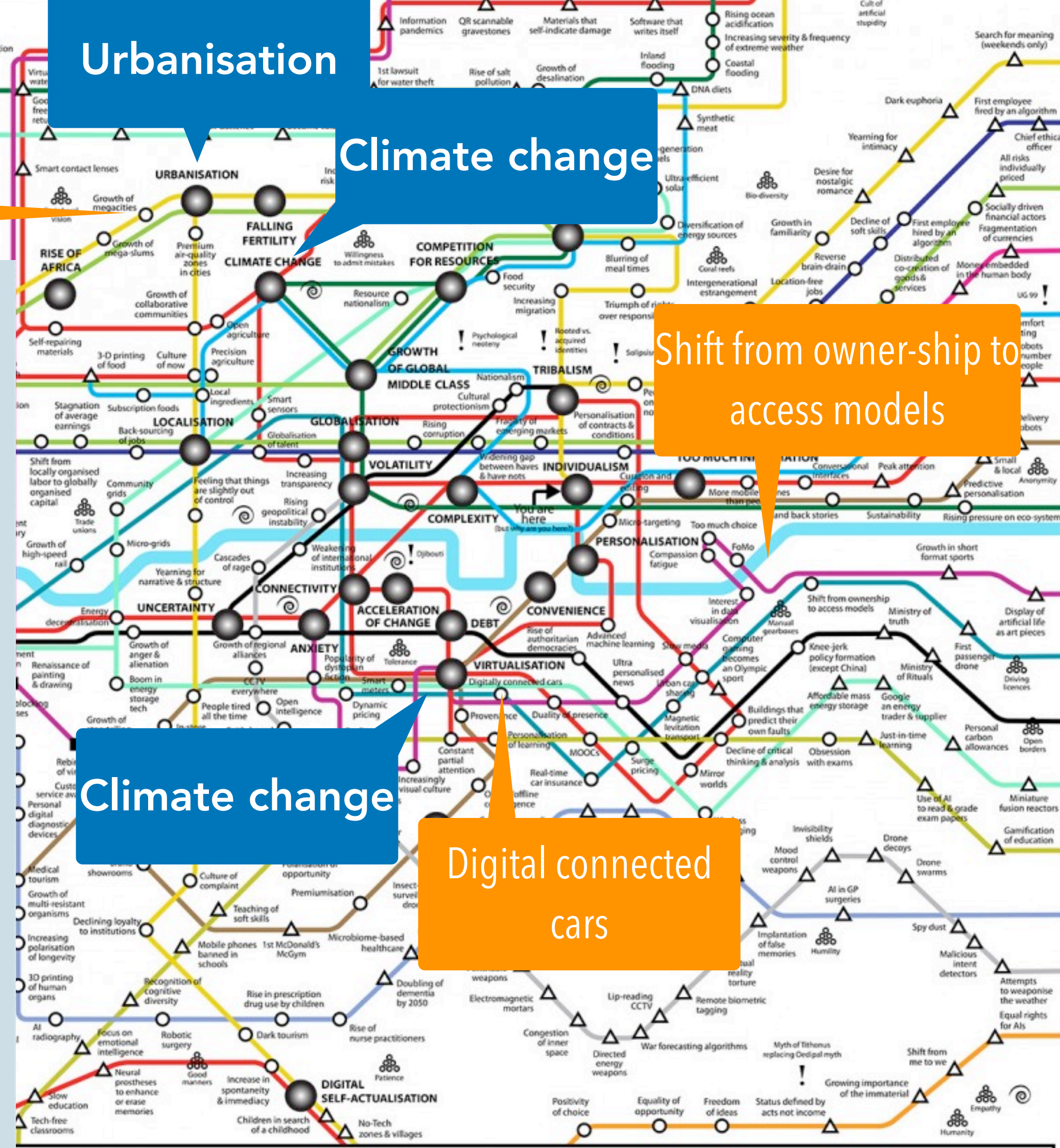
Climate change

## TREND LINES

- Society
- Work
- Economy
- Money
- Food
- Technology
- Retail
- Environment
- Media
- Transport
- Politics
- Energy
- Education
- Health
- Security
- Values

## LEGEND

- Mega Trends
- Now
- ▲ Next?
- Counter-trend
- ⊗ Partial ruin
- ⊙ Dangerous current
- ! Place of interest
- Projection: Subjective



Shift from ownership to access models

Climate change

Digital connected cars

PC

Phase 1

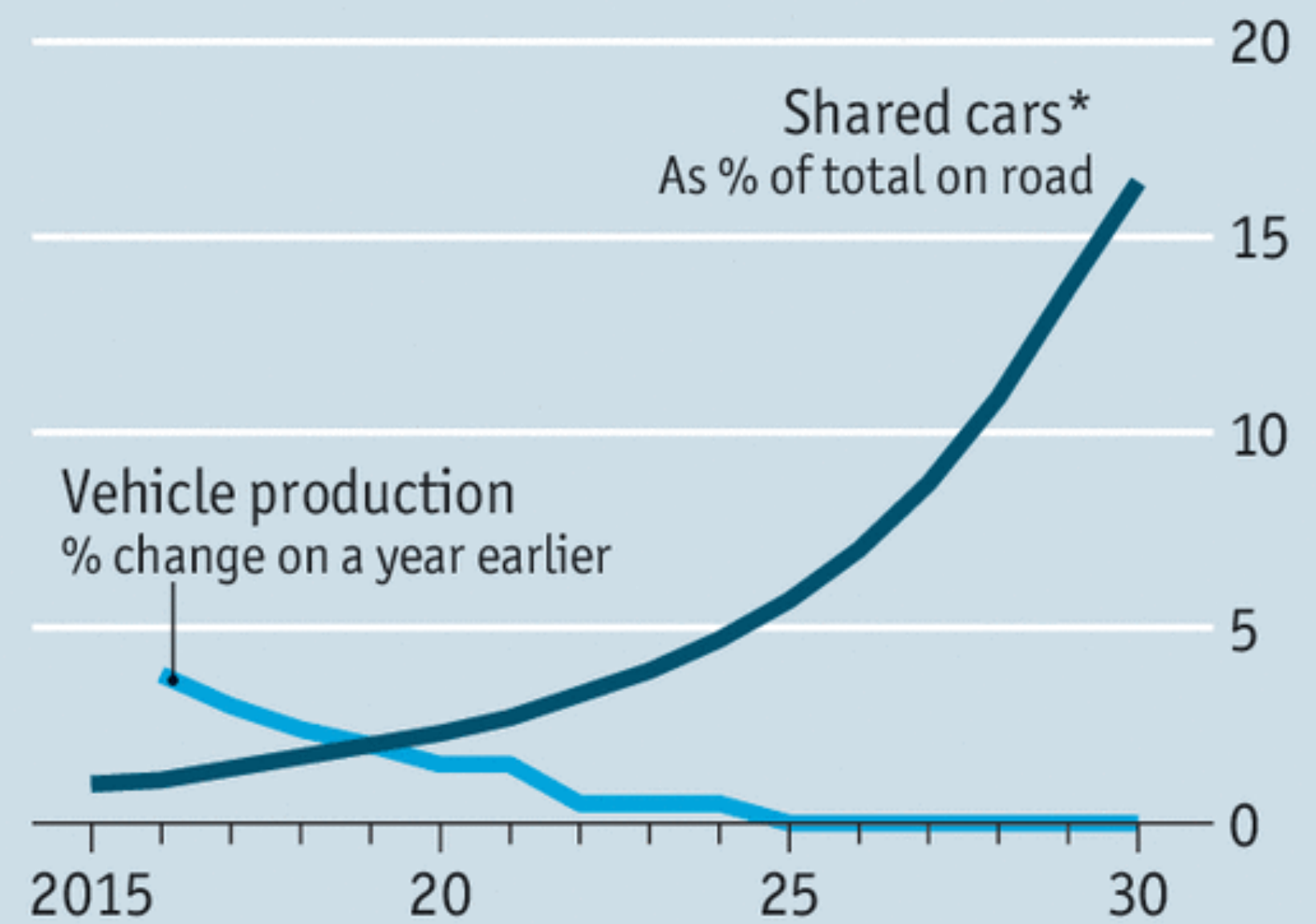
World Wide

Web 1.0

Internet

## Sharing, not growing

Worldwide forecast



Source: Morgan Stanley

\*Including taxis, excluding car rental

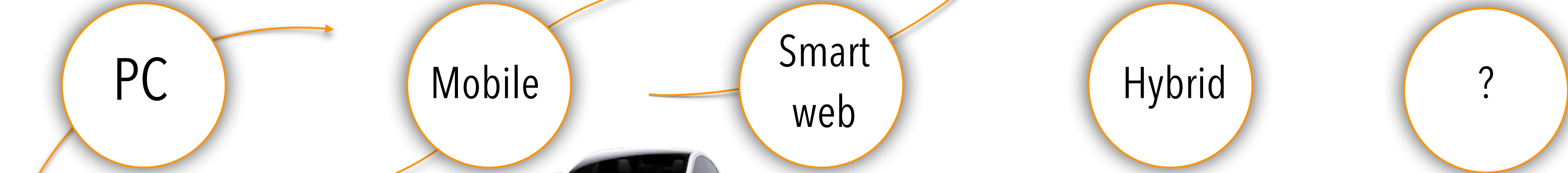
Economist.com

- |  |                                     |  |
|--|-------------------------------------|--|
| ▲ Rapid rise in US interest rates      | ▲ Rogue asteroid                    | ▲ Global pandemic virus                |
| ▲ Major Chinese slowdown               | ▲ Gamma ray burst                   | ▲ Failure to treat obesity             |
| ▲ Global trade collapse                | ▲ Giant methane burp                | ▲ Mental health epidemic               |
| ▲ Oil price shock                      | ▲ Extended drought                  | ▲ Mass unemployment caused by AI       |
| ▲ Biological terrorism                 | ▲ Biological terrorism              | ▲ Major sovereign debt default         |
| ▲ Destabilisation of China             | ▲ Collapse of EU                    | ▲ Russian expansionism                 |
| ▲ Water trading & speculation          | ▲ Collapse of EU pensions funding   | ▲ Blockage of the Strait of Hormuz     |
| ▲ Self-replicating killer robots       | ▲ Decline of human intelligence     | ▲ Message received from outer space    |
| ▲ Finding out the Matrix is real (OMG) | ▲ Return of the Messiah (look busy) | ▲ People taking these things seriously |
| ▲ Something I haven't thought of       |                                     |  |





today



Phase 1

Phase 2

Phase 3

Phase 4

...



**World Wide Web**

**Social Web**

**Semantic Web**

**Hybrid Web**

Web 1.0

Web 2.0

Web 3.0

Web 5.0

**Internet**

**Mobile**

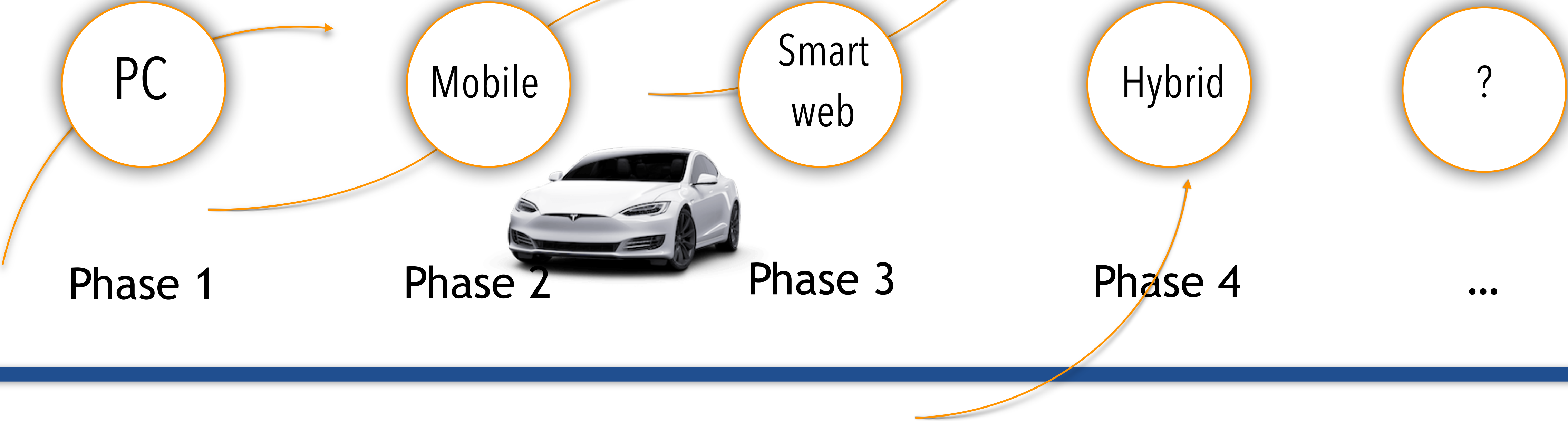
**AI/VR/AR**

Web 4.0





today



How will the future of mobility really look like?!

Vehicles hardly ever crash



How will the future of mobility really look like?!

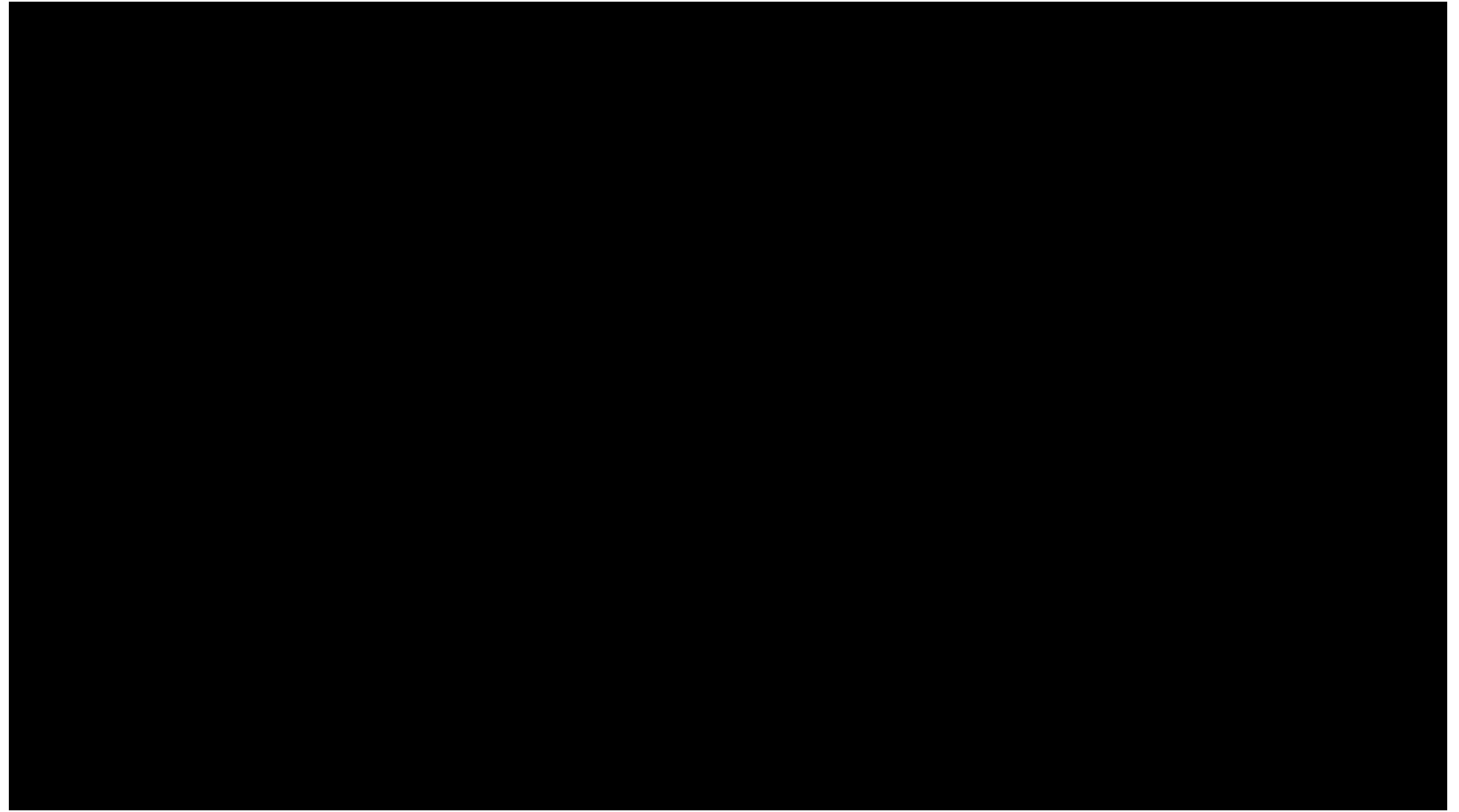
**A new business ecosystem**

Vehicles hardly ever crash



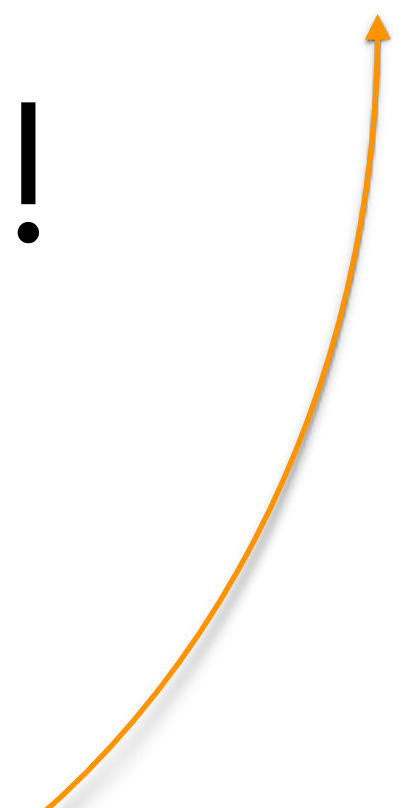
How will the future of mobility really look like?!  
**A new business ecosystem**

Vehicles hardly ever crash



How will the future of mobility really look like?!

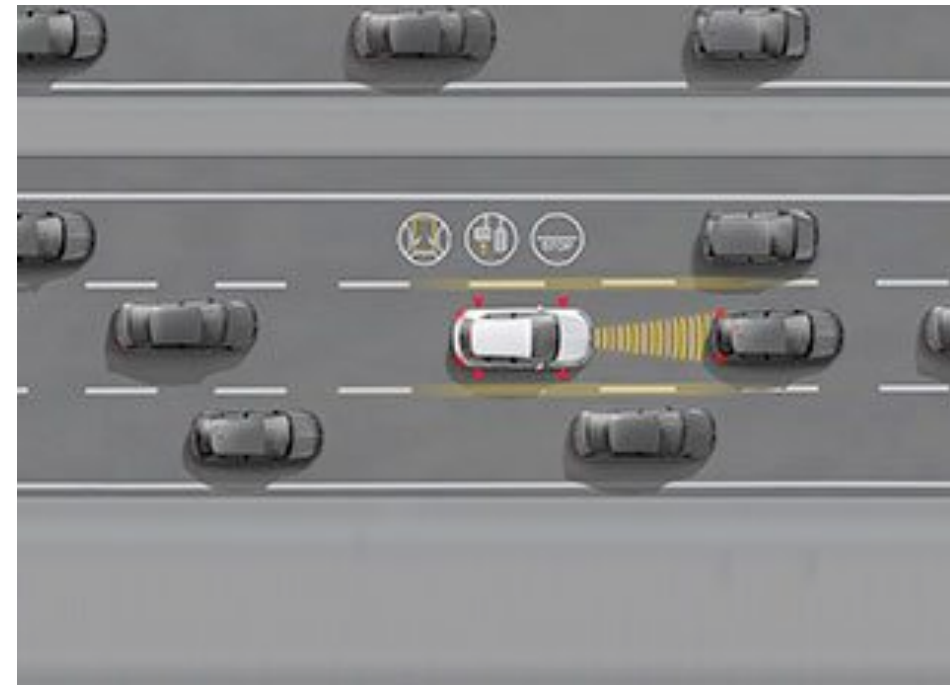
**A new business ecosystem**



Vehicles hardly ever crash



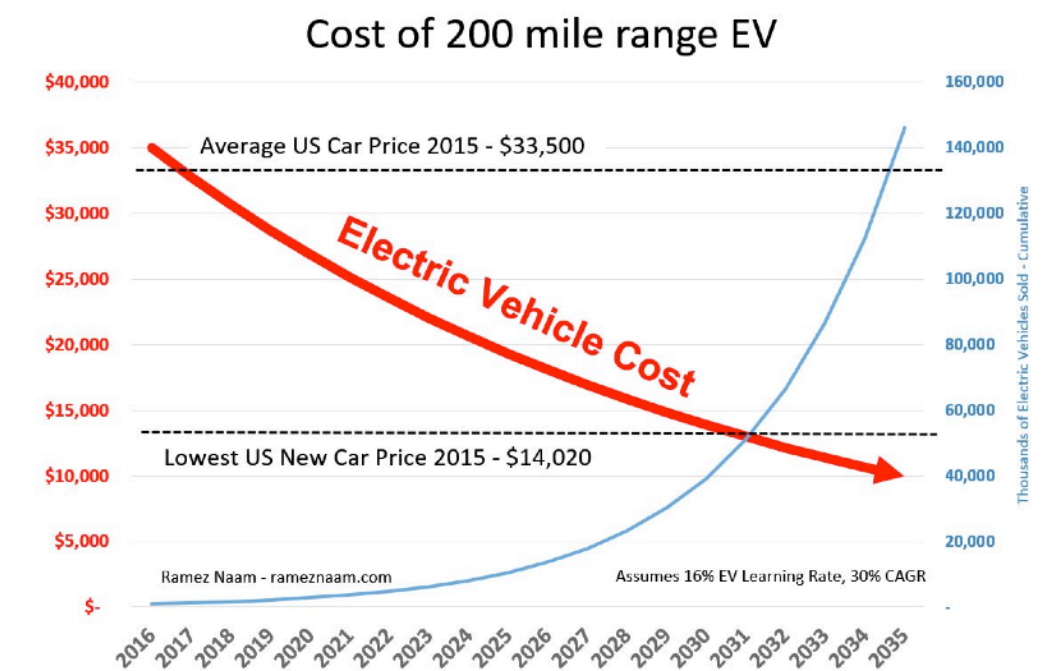
No more traffic jams



Energy Demand Drops



Trip costs plummet



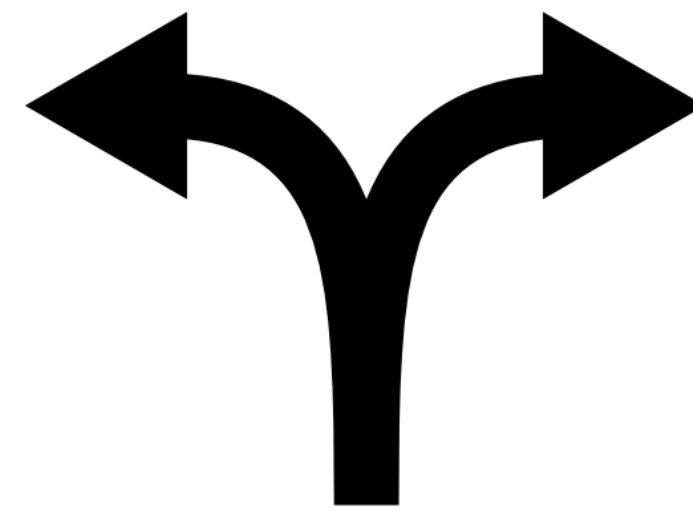
Emerge of autonomous vehicles



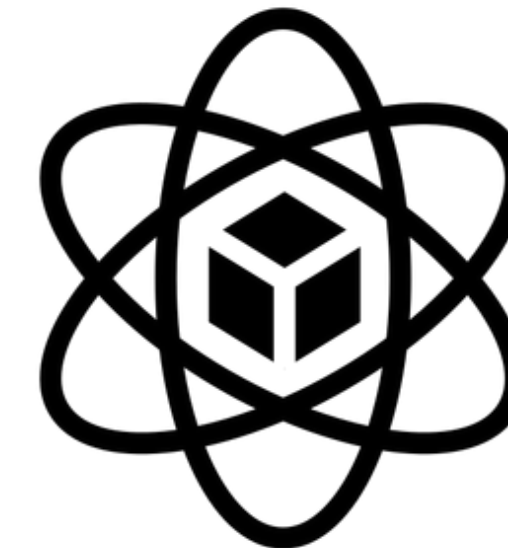
Rise of connected cars



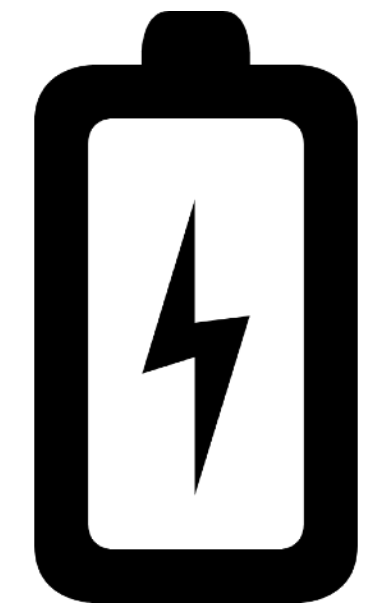
Preference in Mobility preferences



Light Weight Materials

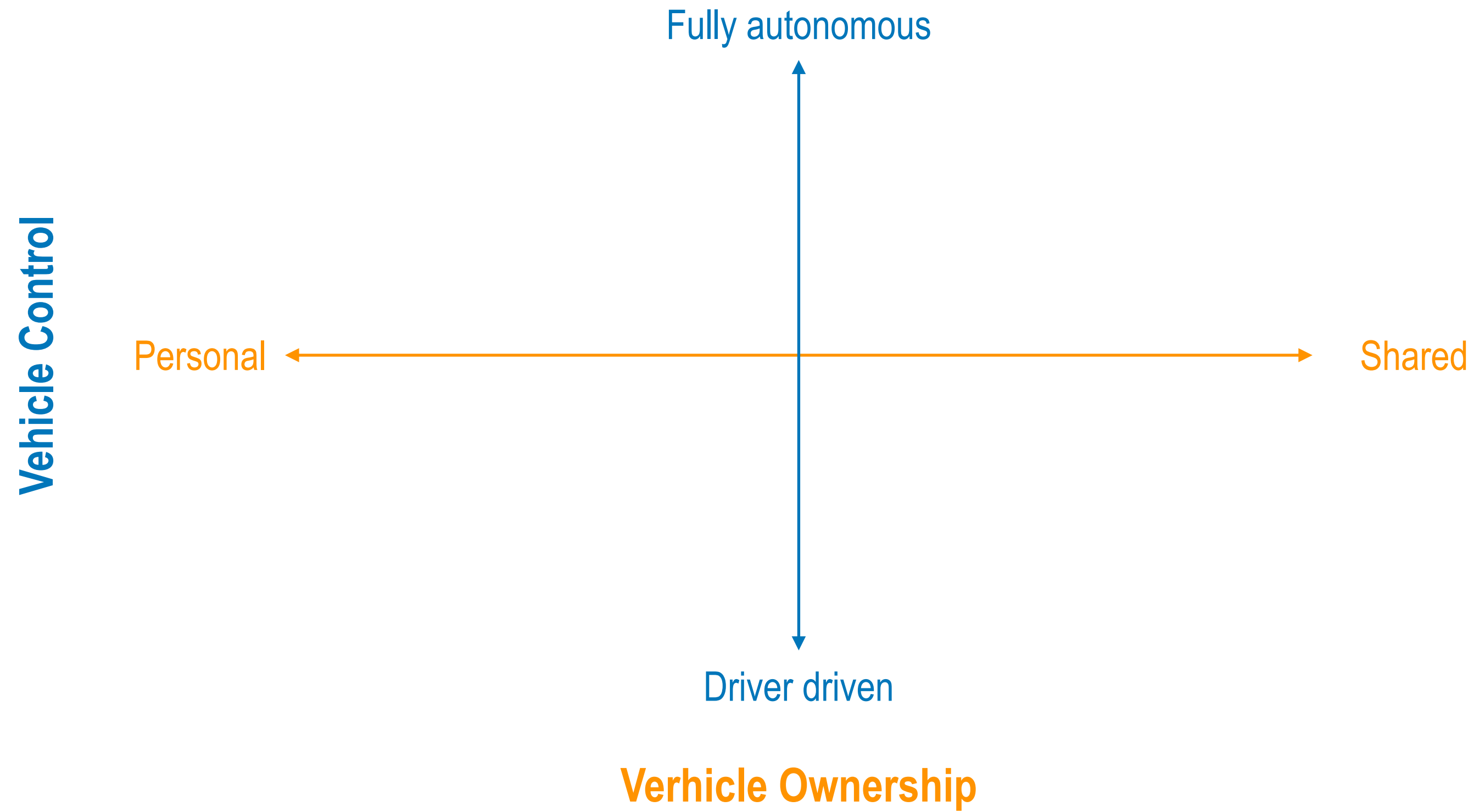


Maturing Power Train



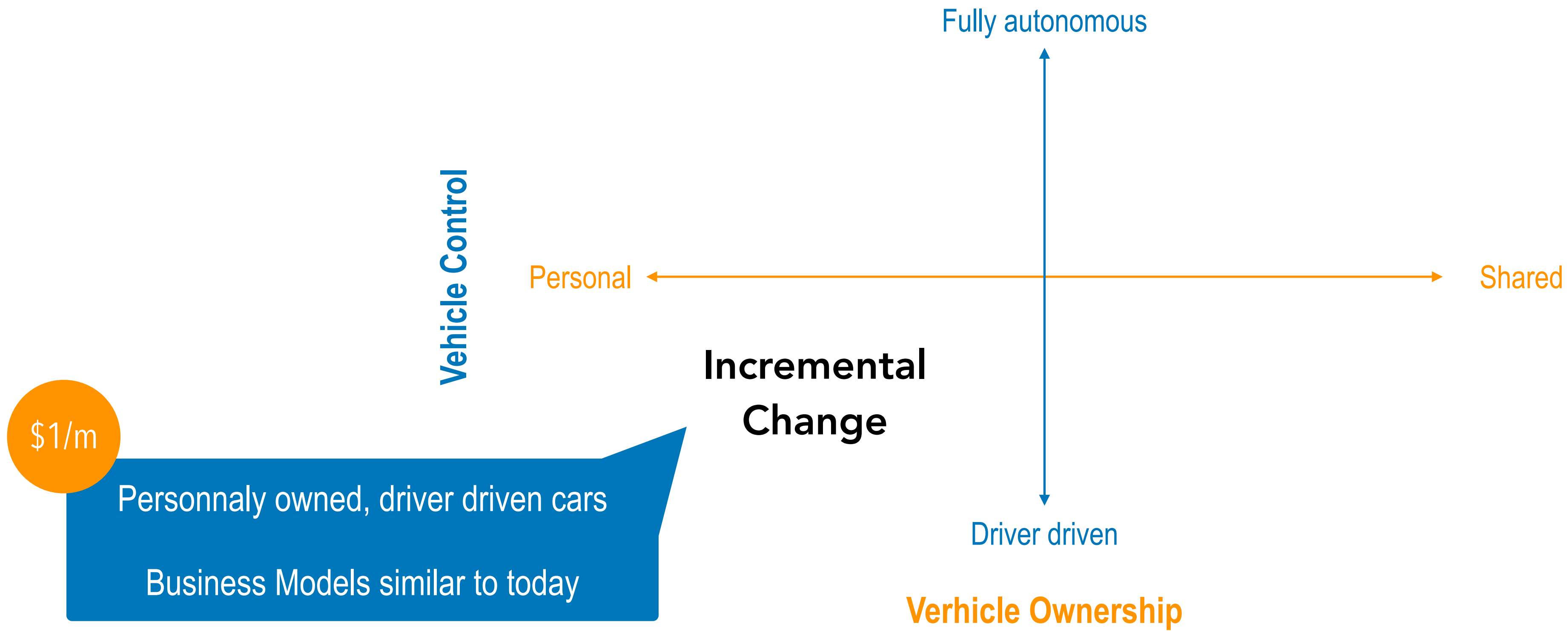
# How will the future of mobility really look like?!

## A new business ecosystem



How will the future of mobility really look like?!

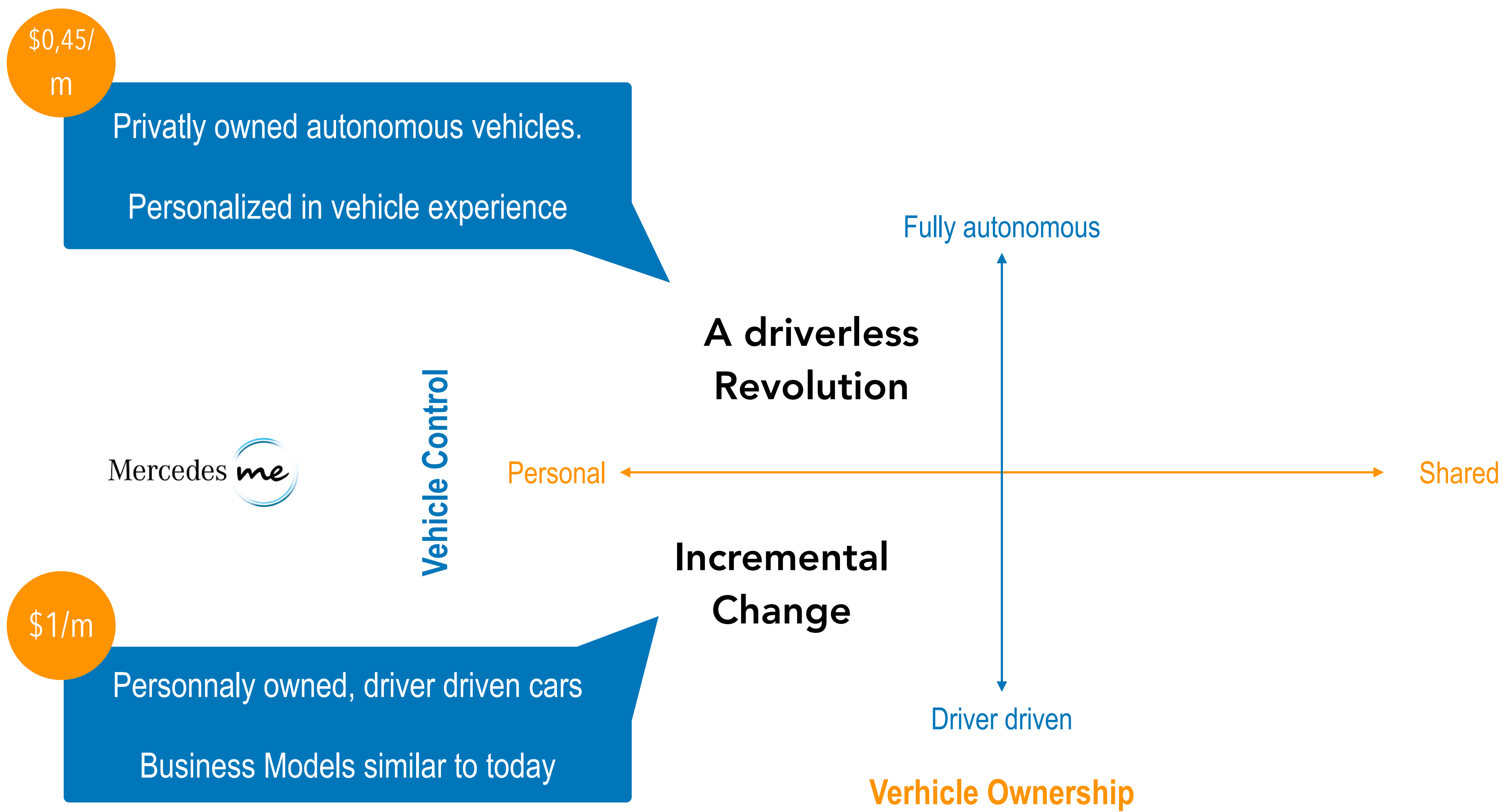
## **A new business ecosystem**



How will the future of mobility really look like?!

## A new business ecosystem

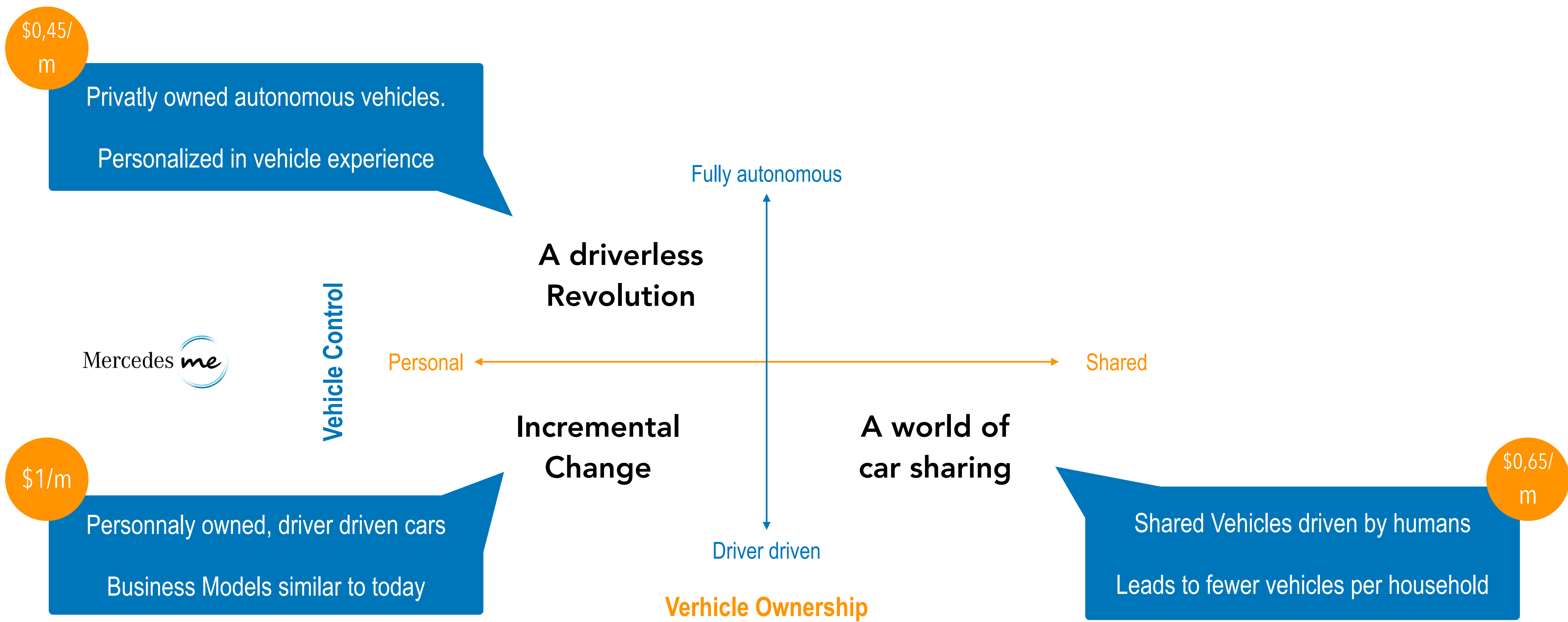




How will the future of mobility really look like?!

**A new business ecosystem**

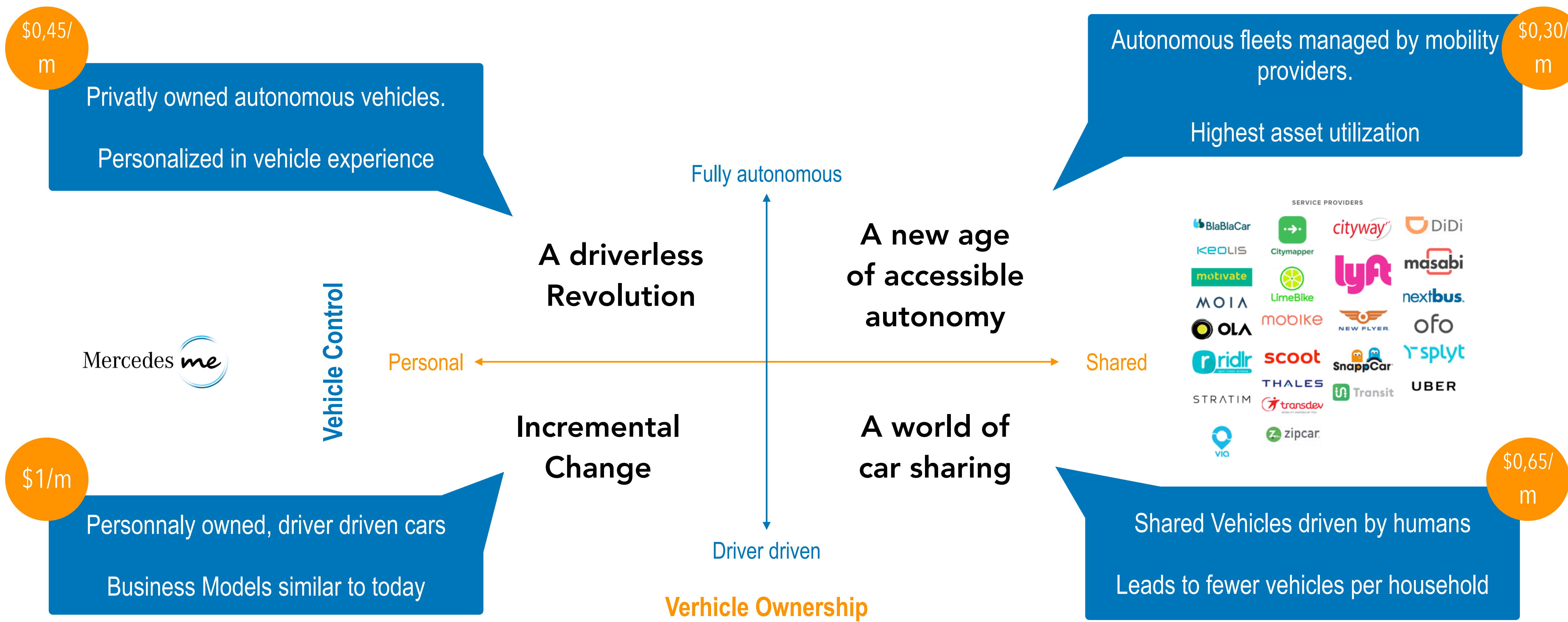
Source: Deloitte University Press (2016)



How will the future of mobility really look like?!

**A new business ecosystem**

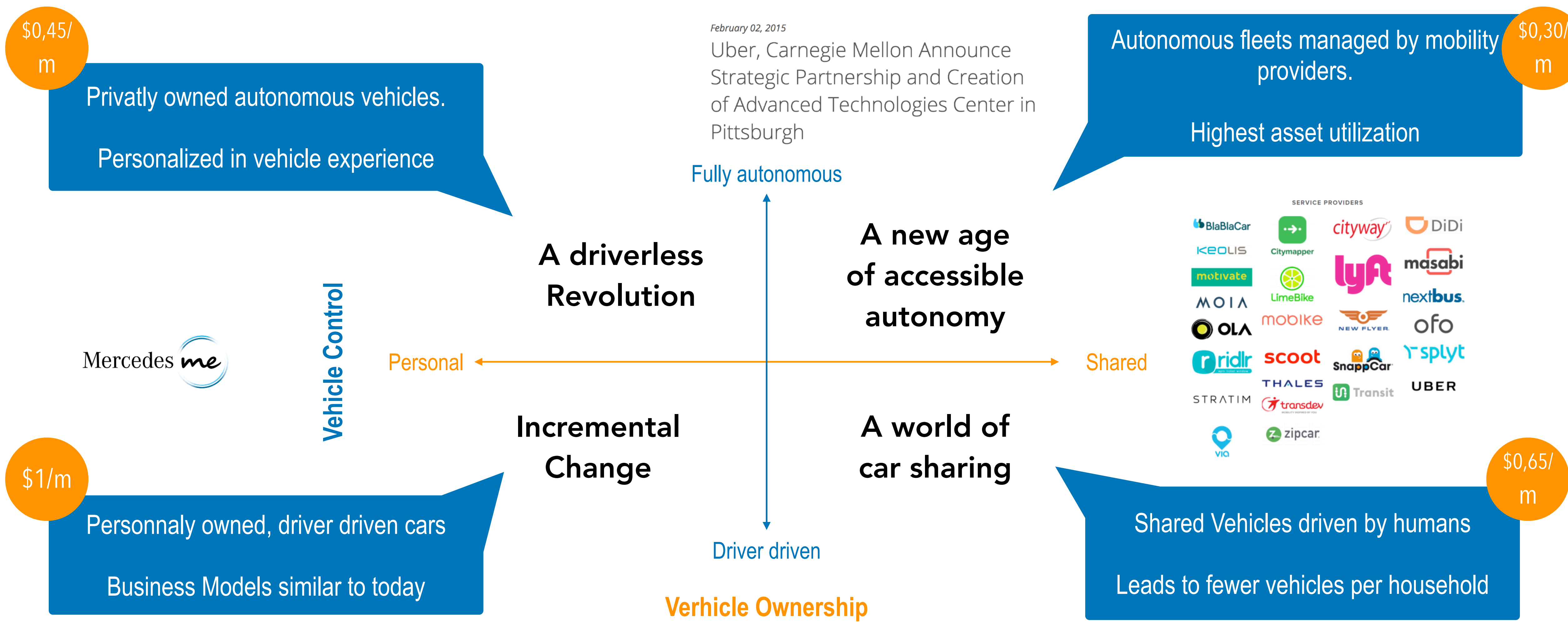
Source: Deloitte University Press (2016)



How will the future of mobility really look like?!

# A new business ecosystem

Source: Deloitte University Press (2016)



How will the future of mobility really look like?!

**A new business ecosystem**

Source: Deloitte University Press (2016)

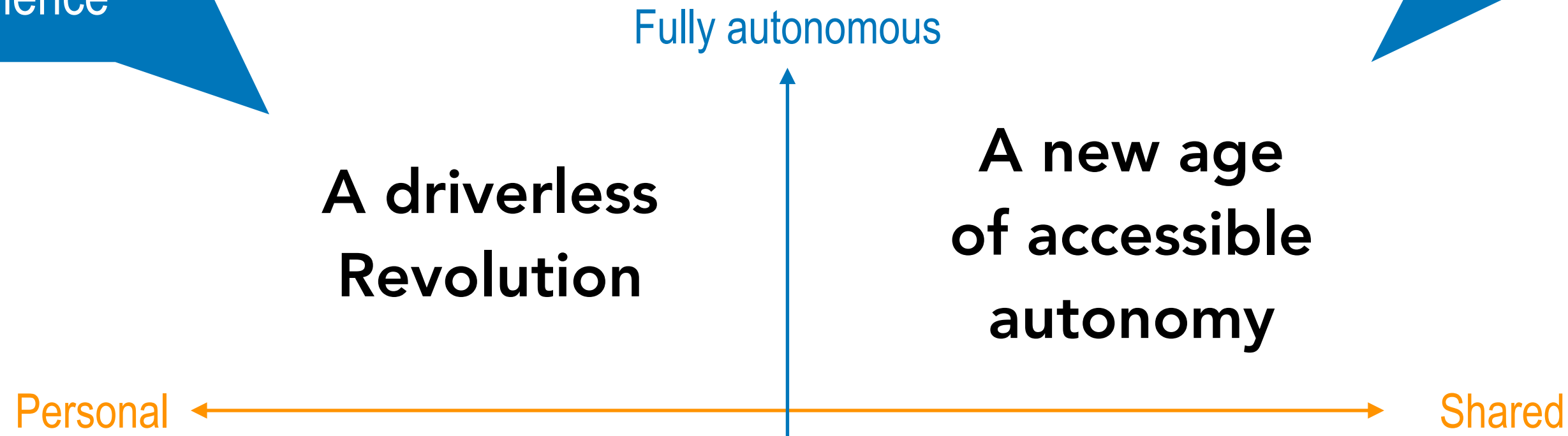
\$0,45/m

Privately owned autonomous vehicles.  
Personalized in vehicle experience

February 02, 2015  
Uber, Carnegie Mellon Announce Strategic Partnership and Creation of Advanced Technologies Center in Pittsburgh

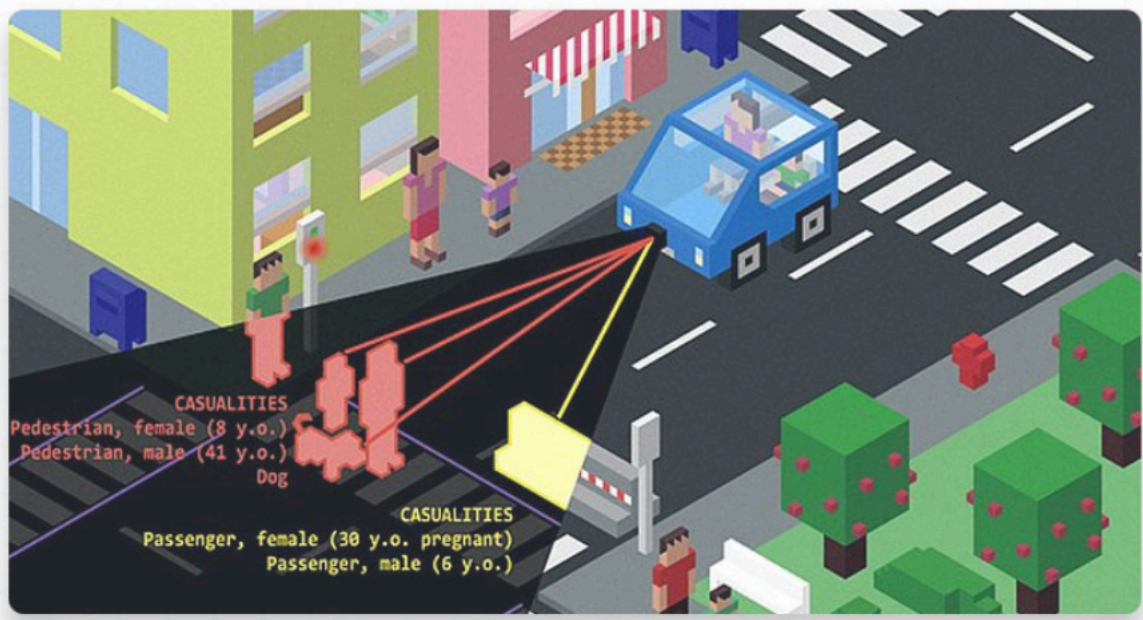
Autonomous fleets managed by mobility providers.  
Highest asset utilization

\$0,30/m

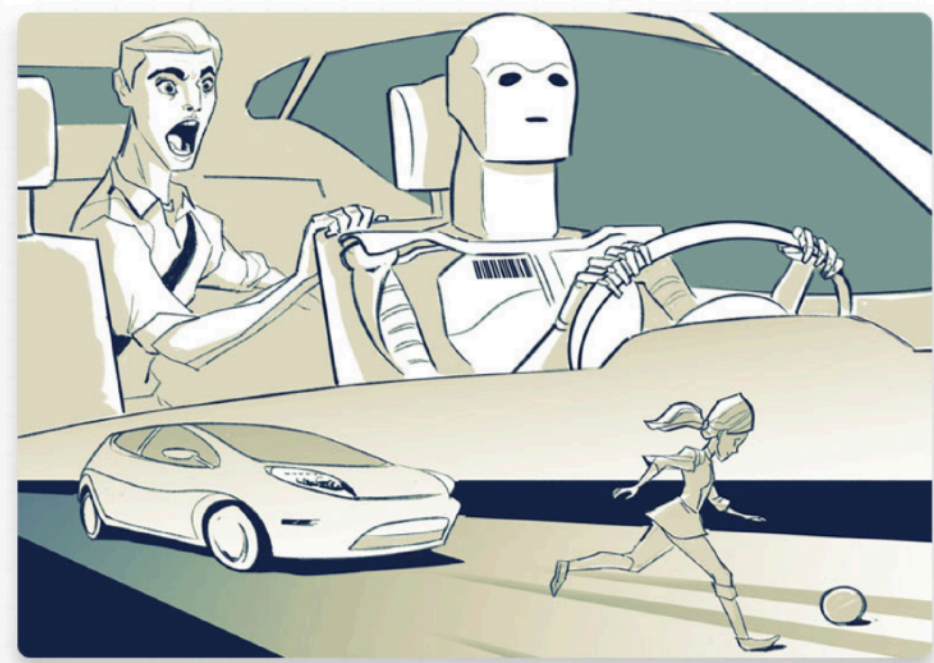


- SERVICE PROVIDERS
- BlaBlaCar
  - KEOLIS
  - motivate
  - MOIA
  - OLA
  - ridlr
  - STRATIM
  - Citymapper
  - LimeBike
  - mobike
  - scoot
  - THALES
  - transdev
  - cityway
  - DiDi
  - masabi
  - nextbus.
  - ofo
  - splyt
  - SnappCar
  - Transit
  - UBER

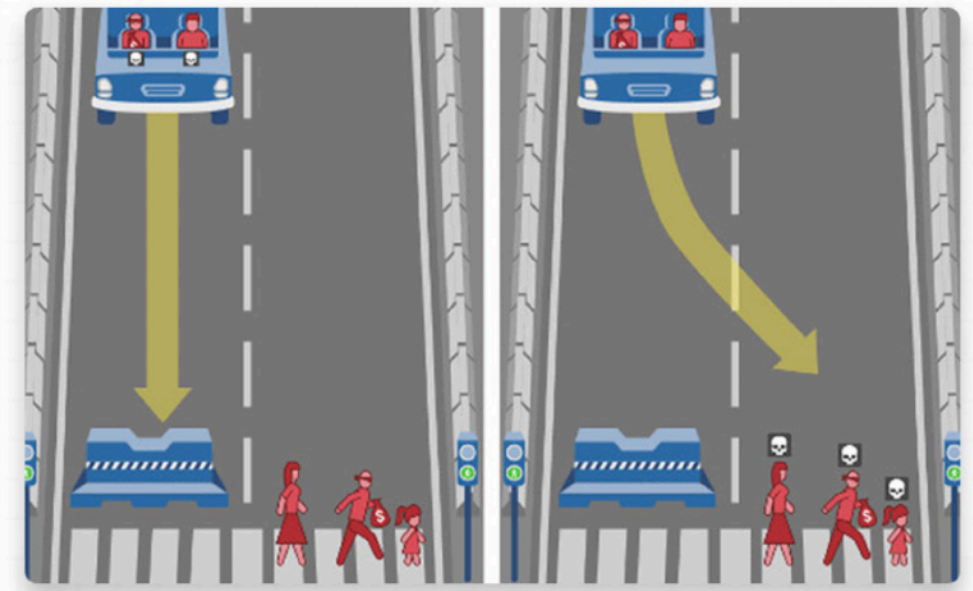
Unequal valuation of lives



AVs using judgment to break the law



"No-Win" Scenarios



# How will the future of mobility really look like?!

## New Challenges! - The social dilemma of driverless cars

Source: & YouTube (Tedx TalkThe Social Dilemma Of Driverless Cars | Iyad Rahwan) (2016)



The future is a process, not a  
destination.

— *Bruce Sterling* —