MANIPAL
ACADEMY of HIGHER EDUCATION
DUBAI CAMPUS
(Institution of Eminence Deemed to be University)

Introduction to Intelligent Analytics

Session Plan

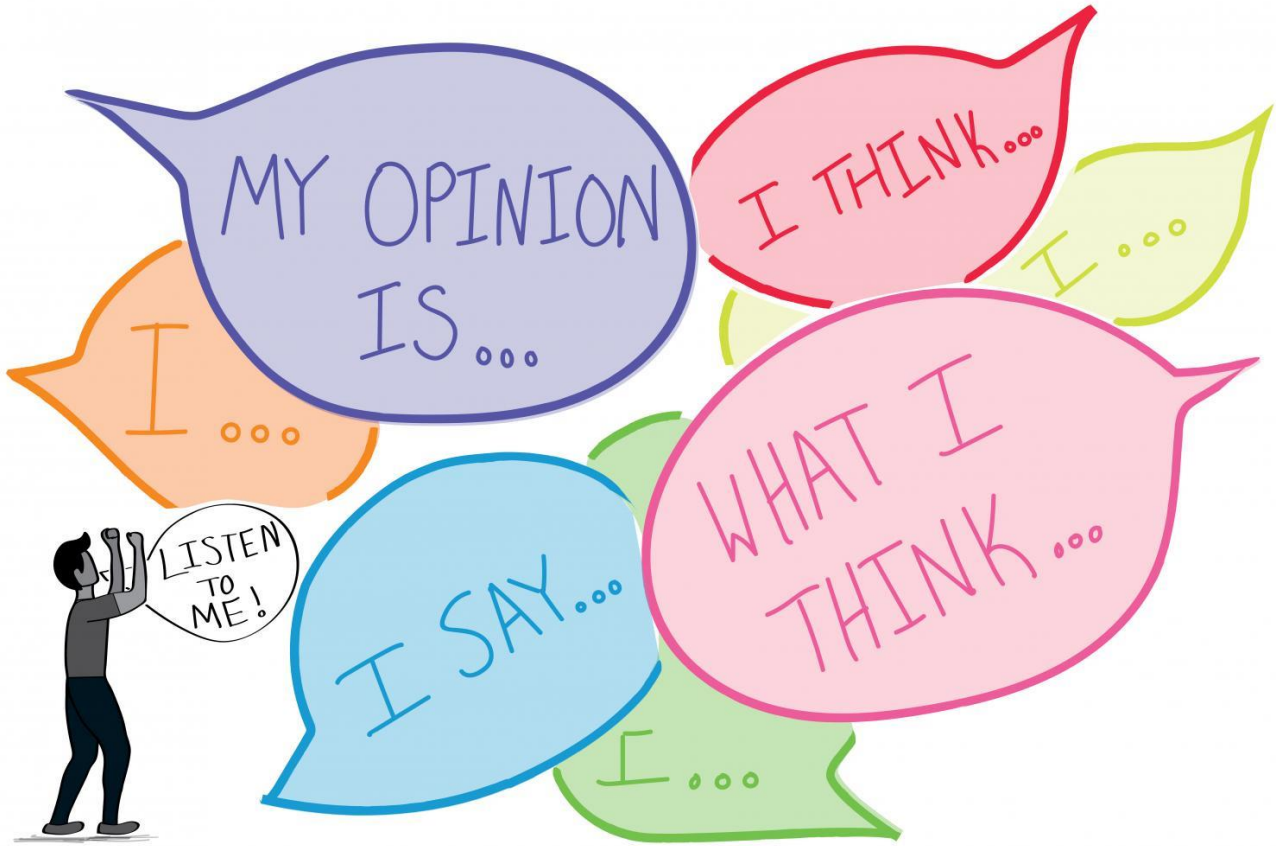
Learning Objective:
By the end of the session you will be

- Able to explain the significance of data visualization.
- Understand the story telling of data visualization
- Will be able to see the best visuals of 2021

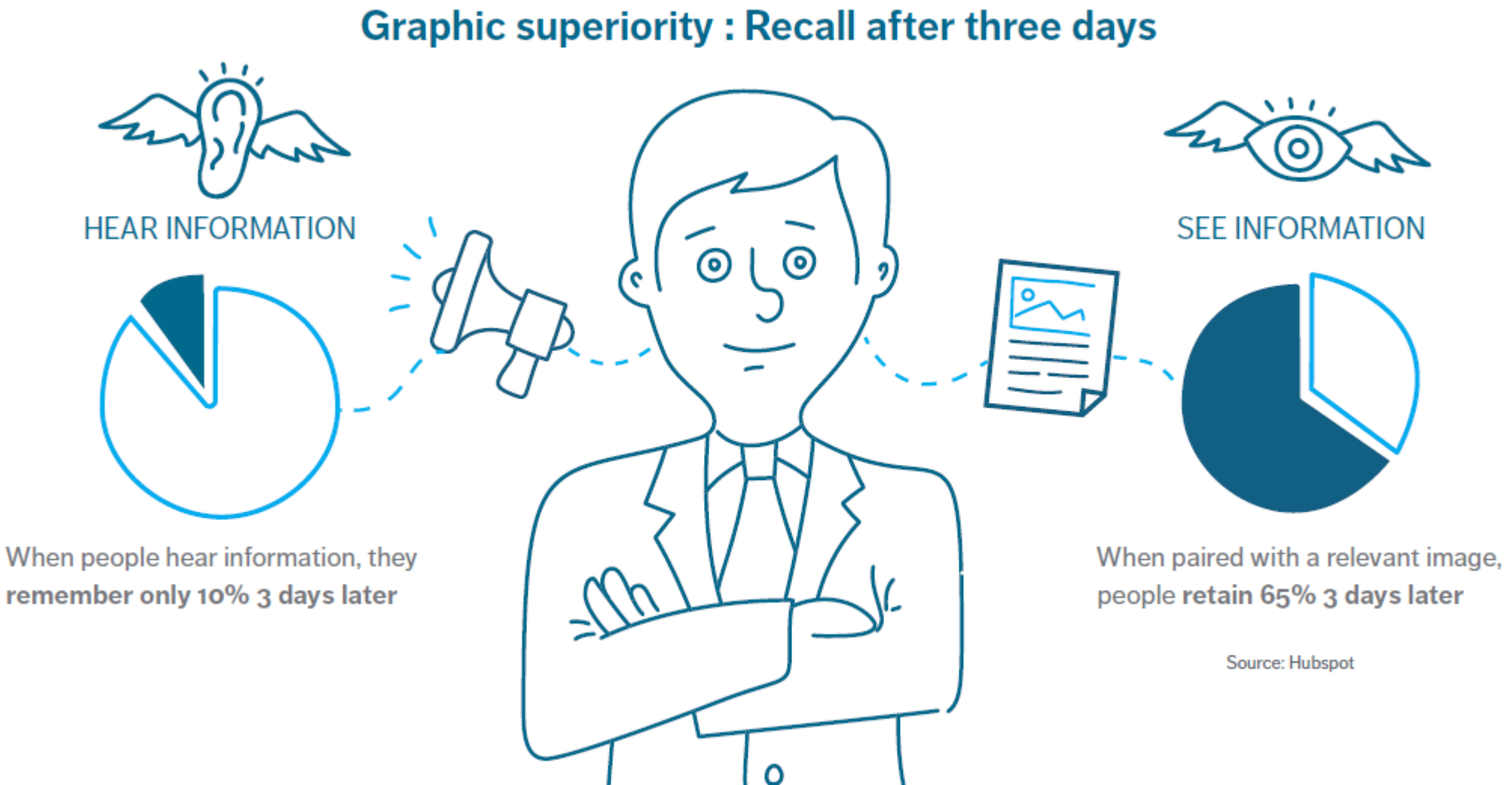
Research Insights

- We typically process images 60,000 times faster than a table or a text - SHIFT Disruptive Learning participants retained between 10% and 20% of written or spoken information, compared with 65% of visual information.
- Another research suggested that human mind can see an image for just 13 milliseconds and store the information, provided that it is associated with a concept.
- Our eyes can take in 36,000 visual messages per hour.
- 40% of nerve fibers are connected to the retina.
- Humans have an attention span of just eight seconds – Gartner
- Ninety-nine percent of all sensory data gets filtered out of the brain immediately. Visual data is in the 1% that is left. This is known as the "picture superiority effect." – Gartner
- Cognitive psychologist Jerome Bruner suggests we are 22 times more likely to remember a fact when it has been wrapped in a story. Why? Because stories are memorable.

Your opinion matters



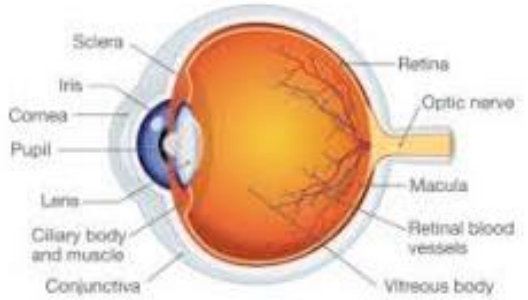
Visualize helps to recall



Can you recall what we discussed now

Process image faster

Stories are memorable



40% of nerve connected to retina

Attention Span

Human Perception

How many 7's do you see?

98734672174900123847859087465968716335409239438759097285710294857183650 1

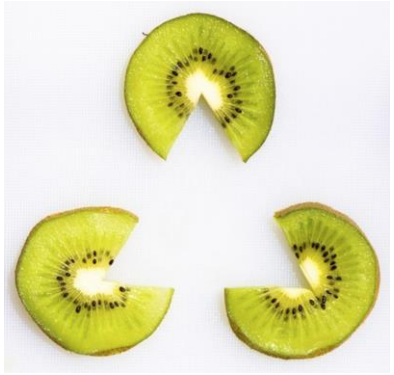
How many 7's do you see?

98734672174900123847859087465968716335409239438759097285710294857183650 1

How many 7's do you see?

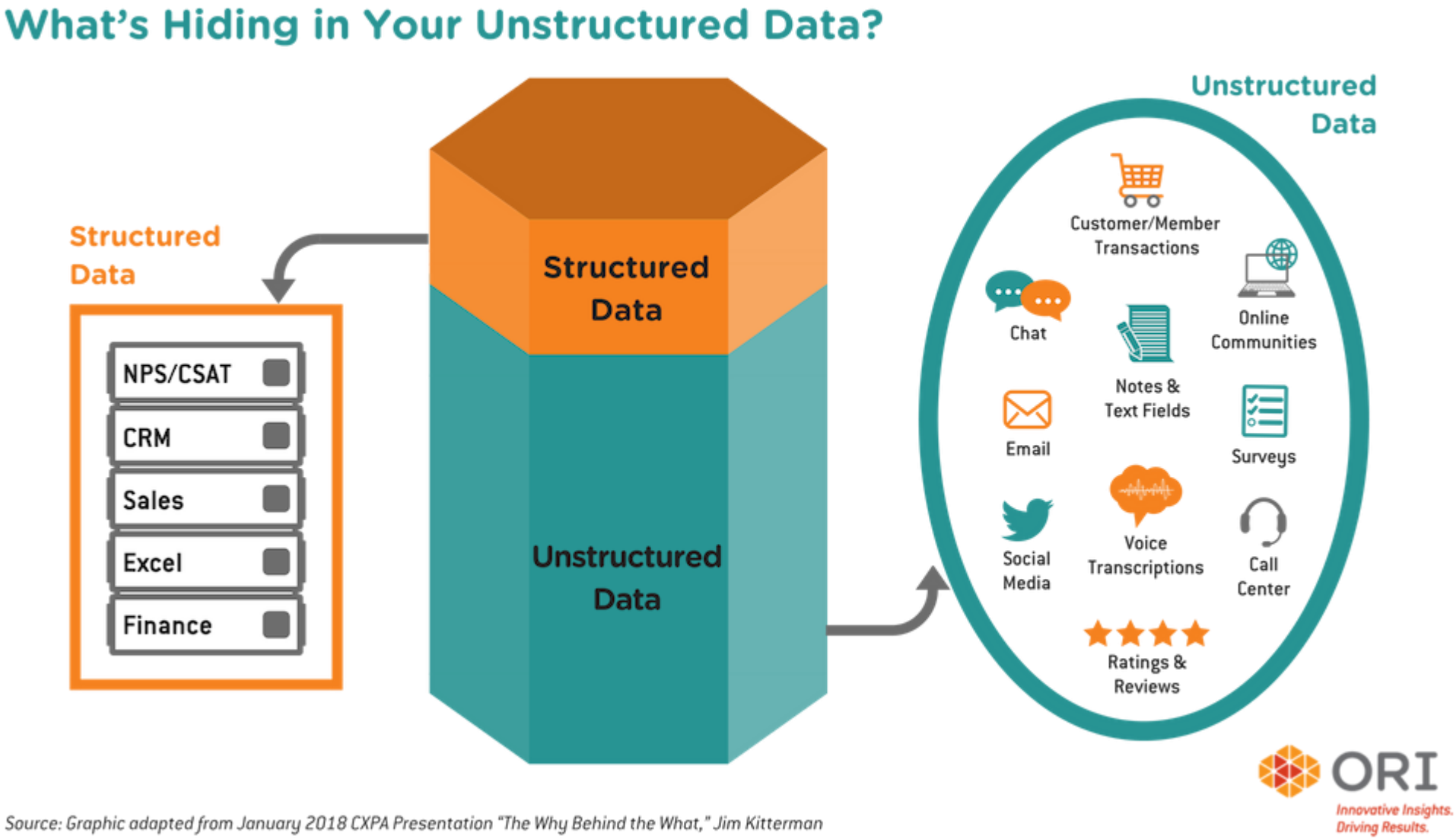
98734672174900123847859087465968716335409239438759097285710294857183650 1

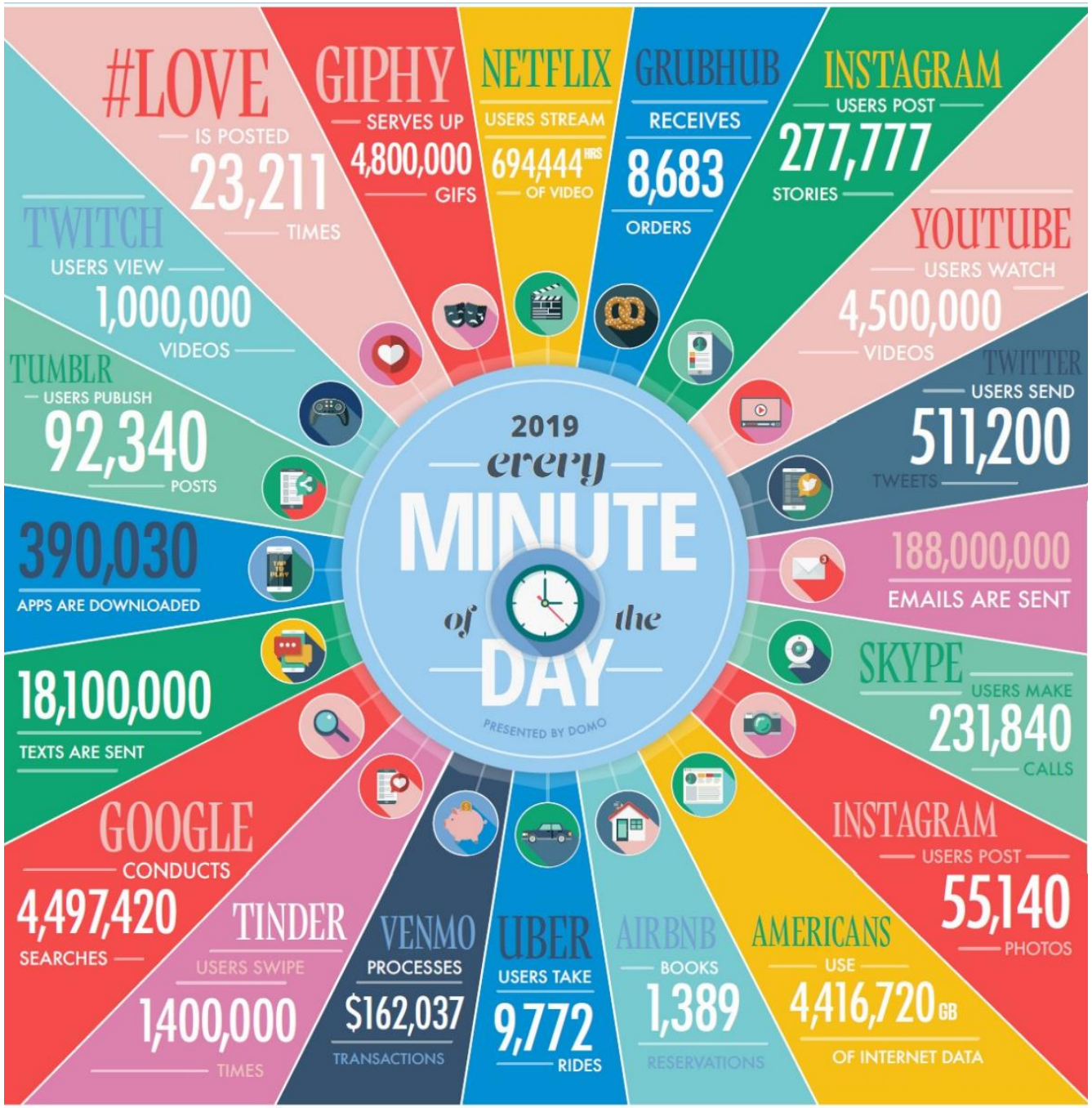
Pre attentive processing – Information is subconsciously obtained from the environment before being processed.



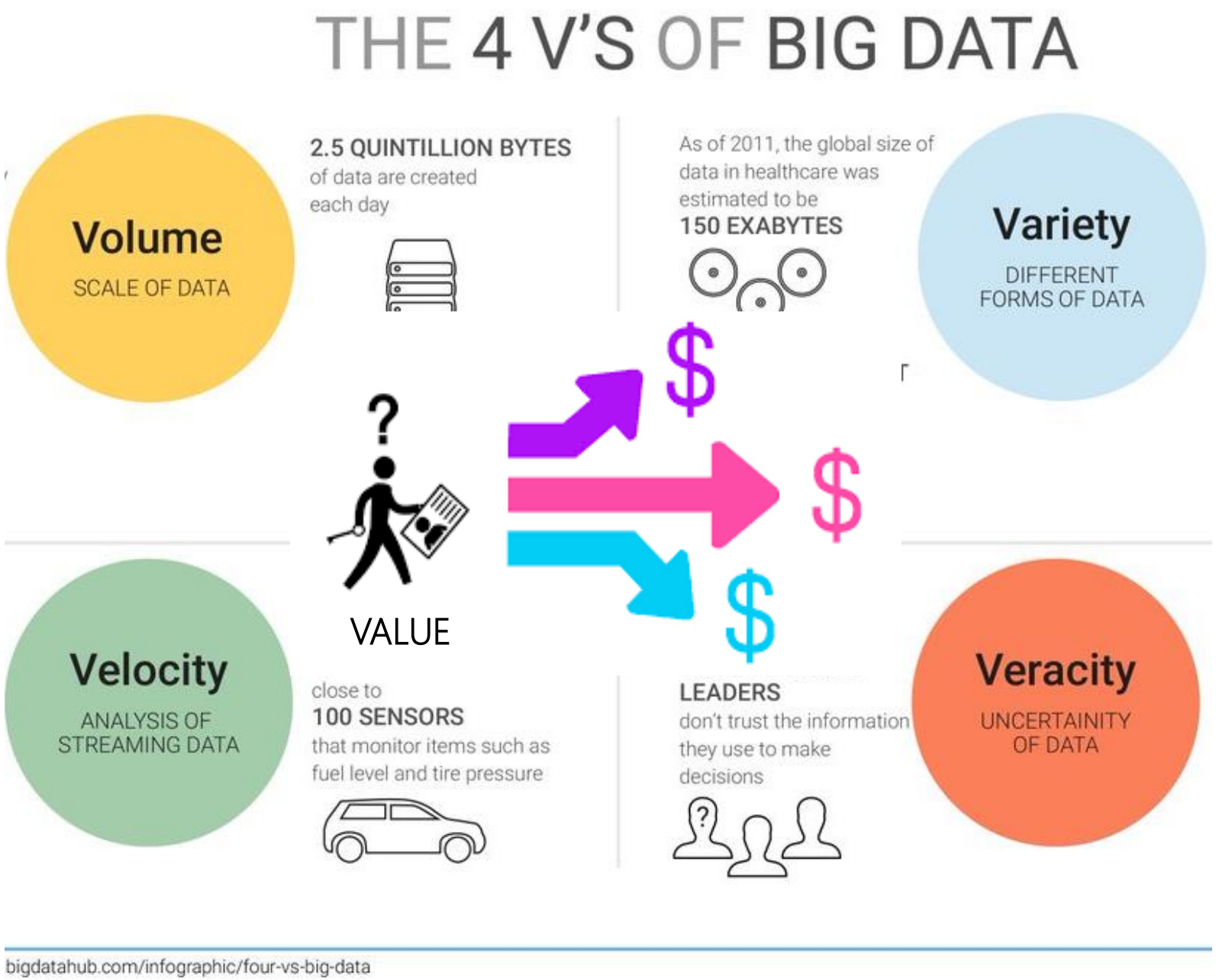
Color, form, spatial and movement

Interested in knowing what is Data….Lets get started




2019
every
MINUTE
of the
DAY
PRESENTED BY DOMO
#LOVE
IS POSTED
23,211
TIMES
GIPHY
SERVES UP
4,800,000
GIFS
NETFLIX
USERS STREAM
694,444 HRS
OF VIDEO
GRUBHUB
RECEIVES
8,683
ORDERS
INSTAGRAM
USERS POST
277,777
STORIES
YOUTUBE
USERS WATCH
4,500,000
VIDEOS
TWITCH
USERS VIEW
1,000,000
VIDEOS
TUMBLR
USERS PUBLISH
92,340
POSTS
TWITTER
USERS SEND
511,200
TWEETS
390,030
APPS ARE DOWNLOADED
188,000,000
EMAILS ARE SENT
18,100,000
TEXTS ARE SENT
SKYPE
USERS MAKE
231,840
CALLS
GOOGLE
CONDUCTS
4,497,420
SEARCHES
INSTAGRAM
USERS POST
55,140
PHOTOS
TINDER
USERS SWIPE
1,400,000
TIMES
VENMO
PROCESSES
$162,037
TRANSACTIONS
UBER
USERS TAKE
9,772
RIDES
AIRBNB
BOOKS
1,389
RESERVATIONS
AMERICANS
USE
4,416,720 GB
OF INTERNET DATA

5 v's of Data


THE 4 V'S OF BIG DATA
Volume
SCALE OF DATA
2.5 QUINTILLION BYTES
of data are created
each day
As of 2011, the global size of
data in healthcare was
estimated to be
150 EXABYTES
Variety
DIFFERENT
FORMS OF DATA
VALUE
Velocity
ANALYSIS OF
STREAMING DATA
close to
100 SENSORS
that monitor items such as
fuel level and tire pressure
LEADERS
don't trust the information
they use to make
decisions
Veracity
UNCERTAINITY
OF DATA
bigdatahub.com/infographic/four-vs-big-data

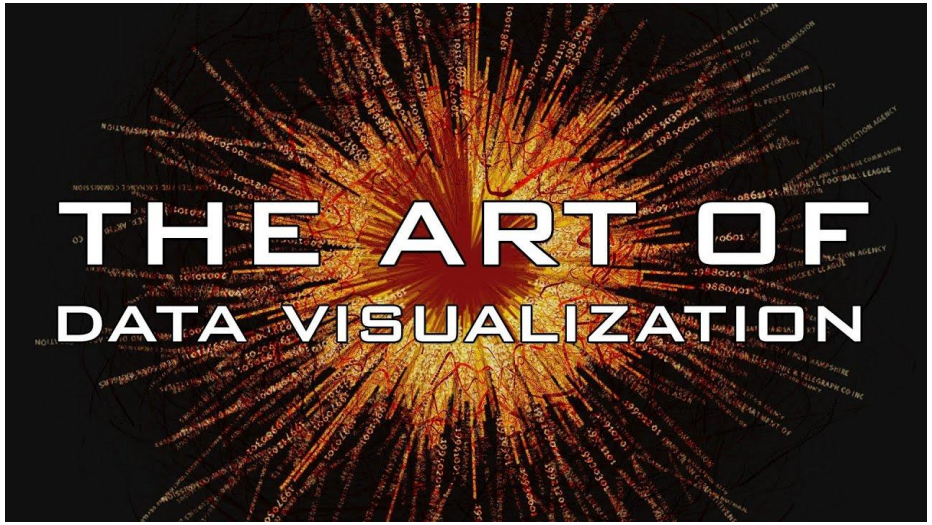
But here is a caveat…any guesses?

Abundance of Data has its own challenges

- Human brain has not advanced at the same rate of data.
- Comprehensive and expansive (sometime expensive as well) are worthless without a way to understand their qualities and to translate those qualities into actionable insights.
- Good comprehension of methods and data will make the best productive use of the data and the information.

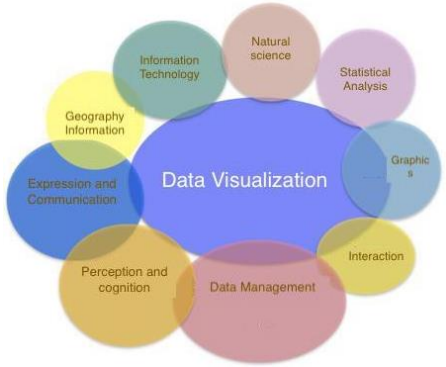
Turning Data into Art

- The purpose of visualization is insight, not pictures- **Henry D Hubbard**
- Visualization acts as a campfire around which we gather to tell stories – **AL Shalloway**
- Words may be mightier than the sword, but in a battle for our brains, visual images win every time - **Colin Ware.**



Can you Interpret this visual?

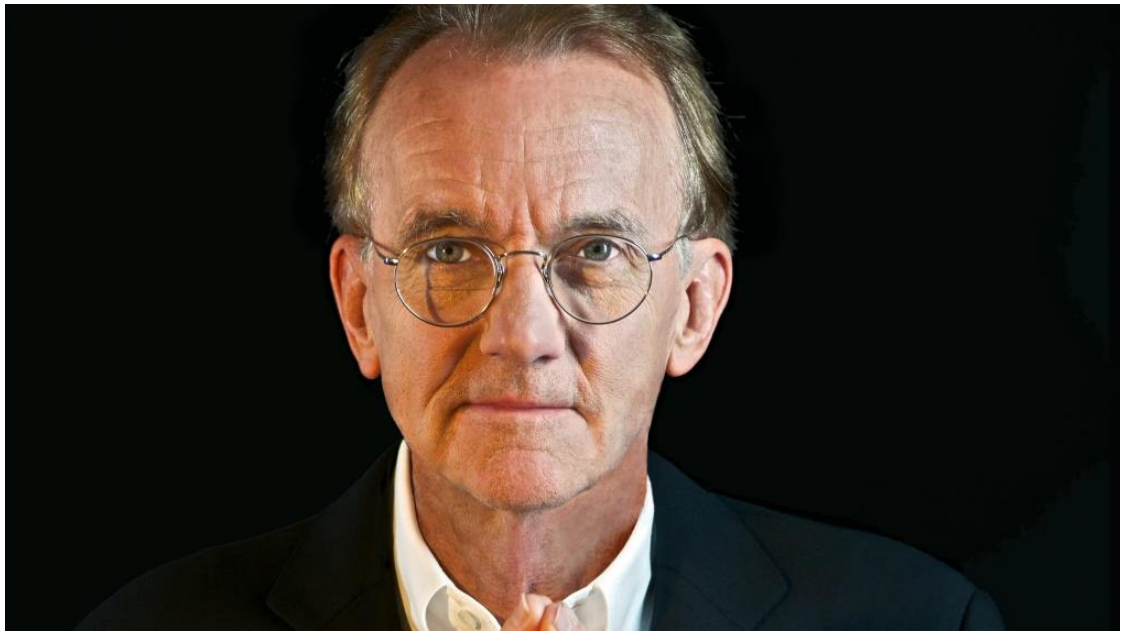
Data visualization



- Data is an ingredient and the visualization is the art that adds value, richness and engagement to it.
- It democratizes data access, interpretation, and analysis.
- Data Visualization is a tool that can help us explore complex patterns in large quantities of data that cannot be directly perceived.
- As 4 V's of data, like Visualization have an acronym PEPP (Projections, explanations, perception and a plan)

Galileo of Graphics – Blooms Berg

Bloomberg Business



Edward Tufte

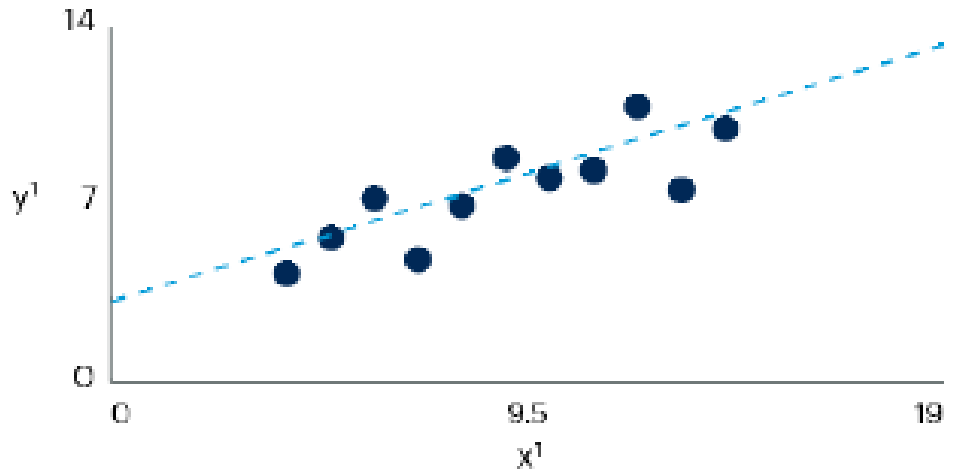
“Indeed graphics can be more precise and revealing than conventional statistical computations.”

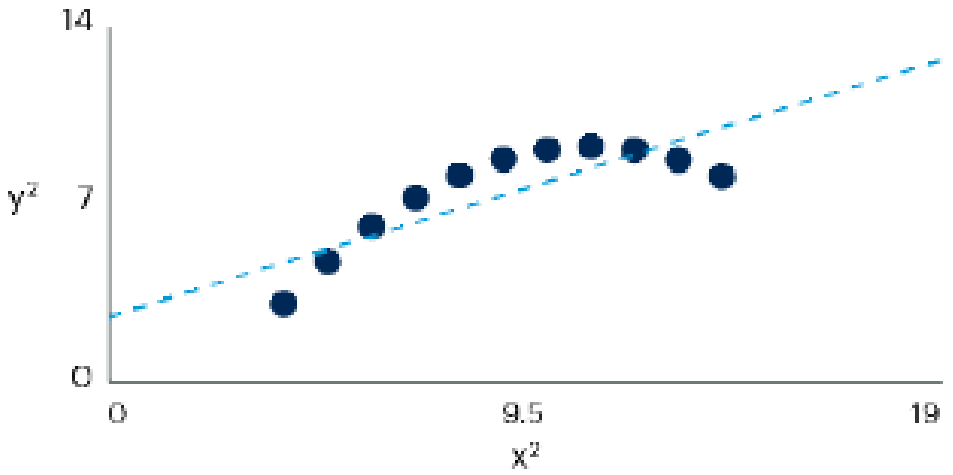
Graphical excellence is that which gives to the viewer the greatest number of ideas in the shortest time with the least ink in the smallest space.”

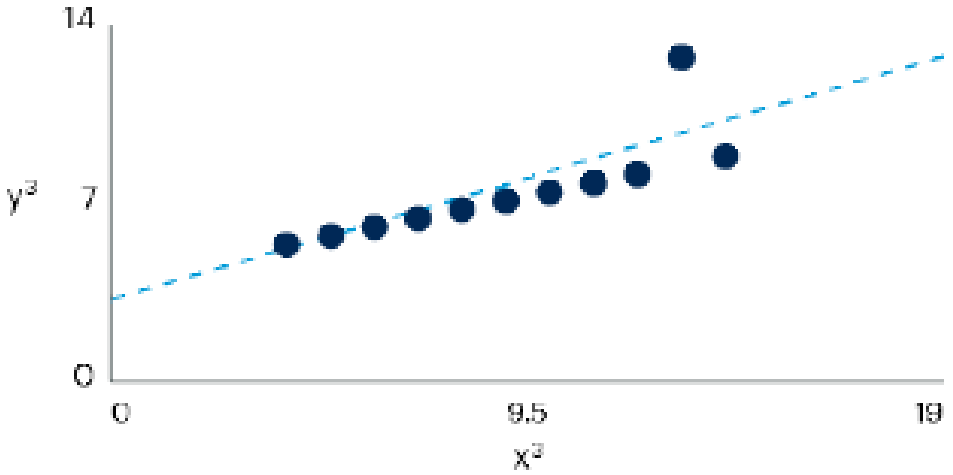
Anscombe's Quartet Showing the Importance of Visualization

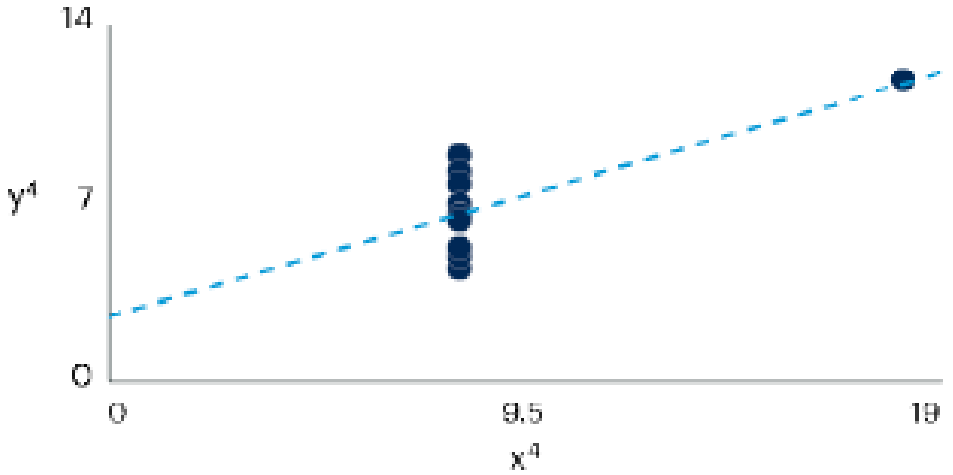
1		2		3		4	
X	Y	X	Y	X	Y	X	Y
10	8.04	10	9.14	10	7.46	8	6.58
8	6.95	8	8.14	8	6.77	8	5.76
13	7.58	13	8.74	13	12.74	8	7.71
9	8.81	9	8.77	9	7.11	8	8.84
11	8.33	11	9.26	11	7.81	8	847
14	9.96	14	8.1	14	8.84	8	7.04
6	7.24	6	6.13	6	6.08	8	5.25
4	4.26	4	3.1	4	5.39	19	12.5
12	10.84	12	9.13	12	8.15	8	5.56
7	4.82	7	7.26	7	6.42	8	7.91
5	5.68	5	4.74	5	5.73	8	6.89

N = 11
mean of X's = 9.0
mean of Y's = 7.5
equation of regression line: $Y = 3 + 0.5X$
standard error of estimate of slope = 0.118
t = 4.24
sum of squares $X - \overline{X} = 110.0$
regression sum of squares = 27.50
residual sum of squares of Y = 13.75
correlation coefficient = .82
$r^2 = .67$

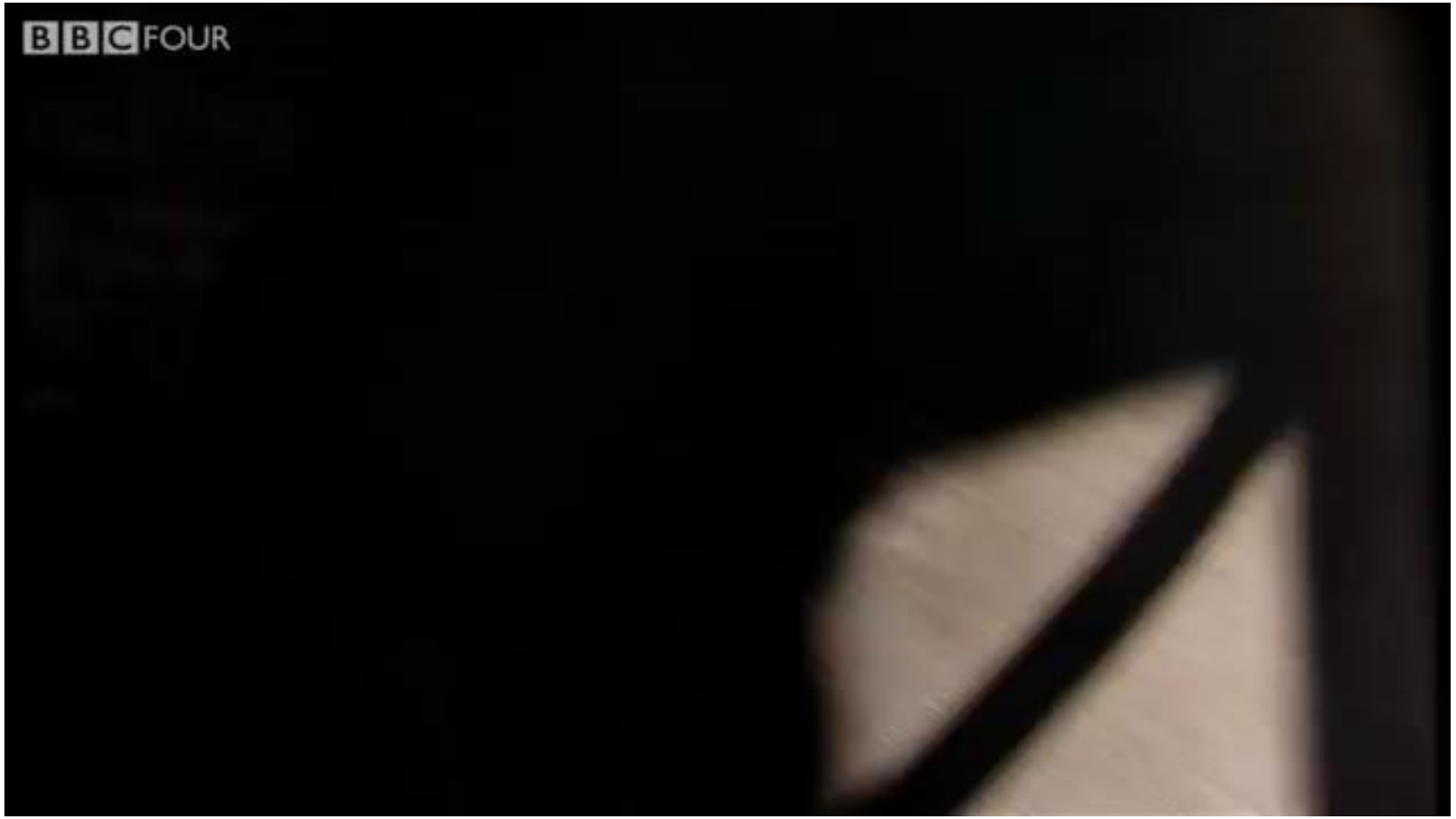

14
7
0
y¹
0
9.5
19
x¹


14
7
0
y²
0
9.5
19
x²


14
7
0
y³
0
9.5
19
x³


14
7
0
y⁴
0
9.5
19
x⁴

Dive into a panoramic view

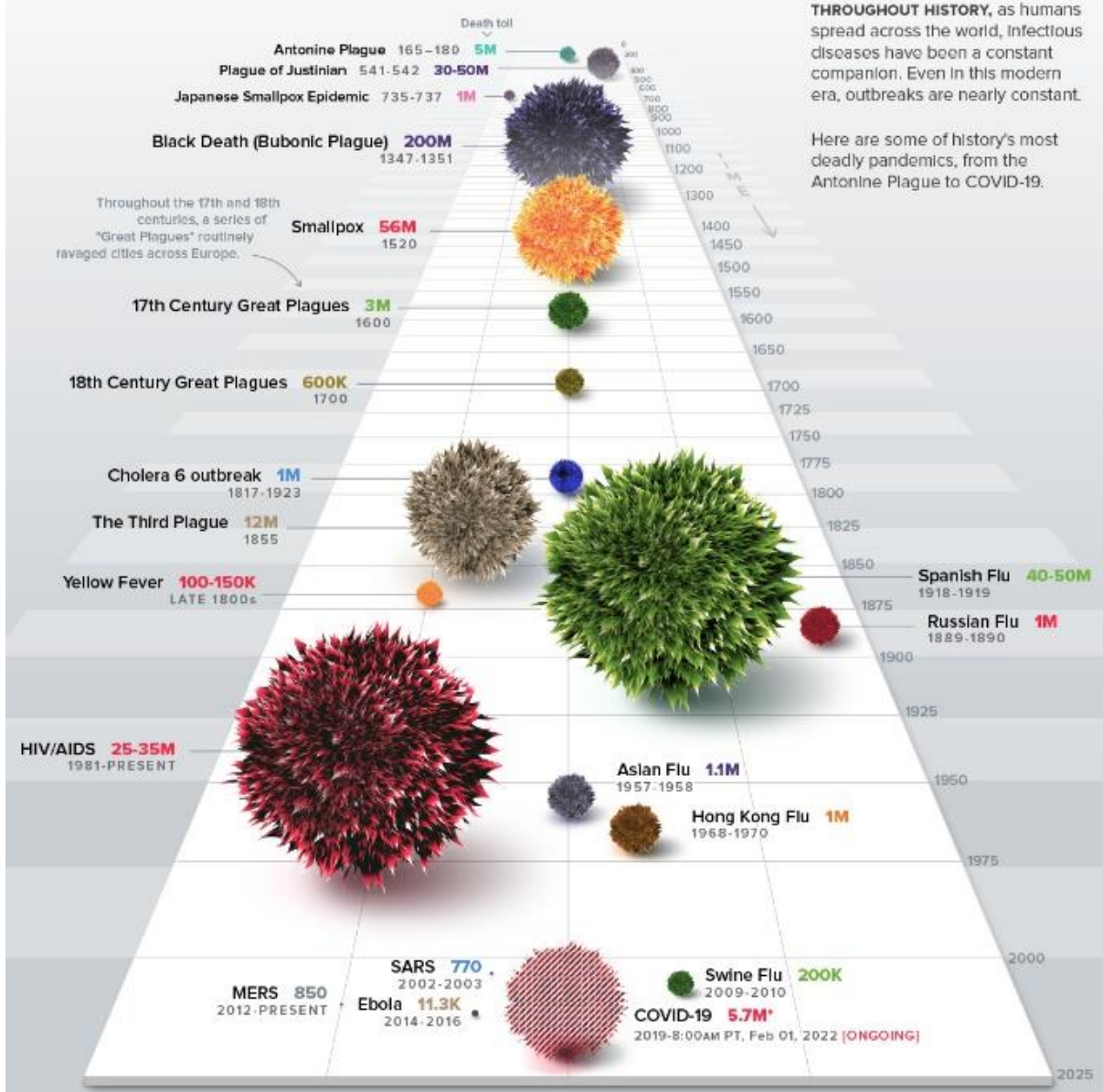


HISTORY OF **PANDEMICS**

PAN-DEM-IC (of a disease) prevalent over a whole country or the world.

THROUGHOUT HISTORY, as humans spread across the world, infectious diseases have been a constant companion. Even in this modern era, outbreaks are nearly constant.

Here are some of history's most deadly pandemics, from the Antonine Plague to COVID-19.



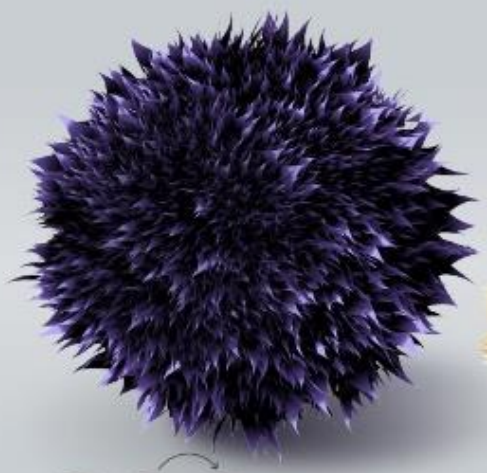
DEATH TOLL

[HIGHEST TO LOWEST]

WHO officially declared COVID-19 a pandemic on Mar 11, 2020.

It is hard to calculate and forecast the impact of COVID-19 because the disease is new to medicine, and data is still coming in.

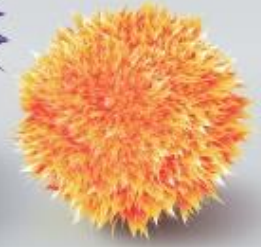
*Johns Hopkins University estimates



200M
Black Death (Bubonic Plague)
1347-1351

The plague originated in rats and spread to humans via infected fleas.

The outbreak wiped out 30-50% of Europe's population. It took more than 200 years for the continent's population to recover.



56M
Smallpox
1520

Smallpox killed an estimated 90% of Native Americans. In Europe during the 1800s, an estimated 400,000 people were being killed by smallpox annually. The first ever vaccine was created to ward off smallpox.

40-50M
Spanish Flu
1918-1919

30-50M
Plague of Justinian
541-542

The death toll of this plague is still under debate as new evidence is uncovered, but many think it may have helped hasten the fall of the Roman Empire.

25-35M
HIV/AIDS
1981-PRESENT

12M
The Third Plague
1855

6.7M*
COVID-19
2019-8:00AM PT, FEB 01, 2022
[ONGOING]

5M
Antonine Plague
165-180

3M
17th Century Great Plagues
1600

1.1M
Asian Flu
1957-1958

1M
Russian Flu
1889-1890

1M
Hong Kong Flu
1968-1970

1M
Cholera 6 outbreak
1817-1923

1M
Japanese Smallpox Epidemic
735-737

600K
18th Century Great Plagues
1700

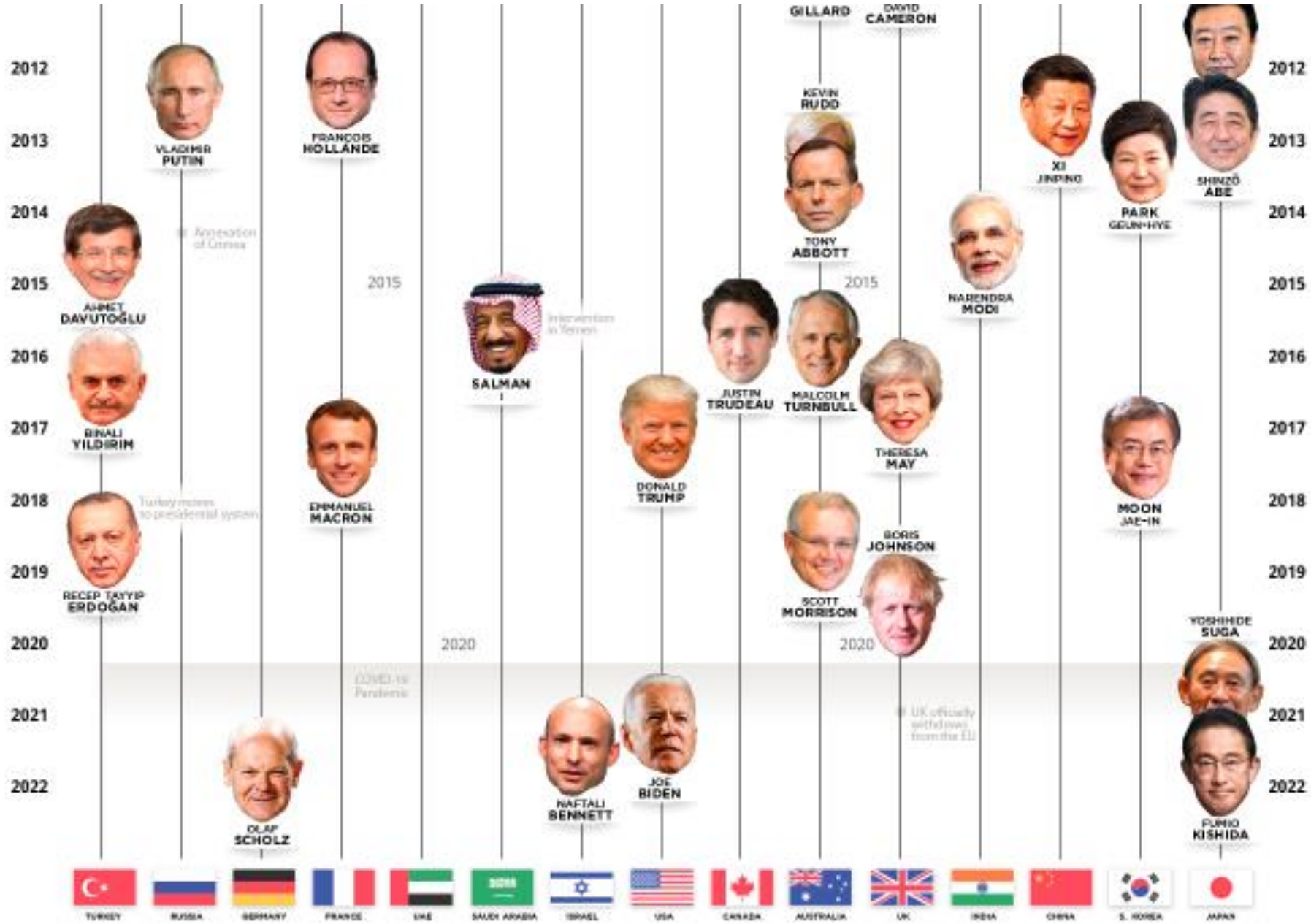
200K
Swine Flu
2009-2010

100-150K
Yellow Fever
LATE 1800s

11.3K
Ebola
2014-2016

850
MERS
2012-PRESENT

770
SARS
2002-2003


2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
VLADIMIR PUTIN
FRANÇOIS HOLLANDE
AHMET DAVUTOĞLU
BINALI YILDIRIM
RECEP TAYYIP ERDOĞAN
EMMANUEL MACRON
OLAF SCHOLZ
SALMAN
DONALD TRUMP
NAFTALI BENNETT
JOE BIDEN
JULIA GILLARD
KEVIN RUDD
TONY ABBOTT
JUSTIN TRUDEAU
MALCOLM TURNBULL
SCOTT MORRISON
DAVID CAMERON
THERESA MAY
BORIS JOHNSON
NARENDRA MODI
XI JINPING
PARK GEUN-HYE
MOON JAE-IN
SHINZŌ ABE
YOSHIHIDE SUGA
FUMIO KISHIDA
Annexation of Crimea
Turkey moves to presidential system
Intervention in Yemen
COVID-19 Pandemic
UK officially withdraws from the EU
TURKEY
RUSSIA
GERMANY
FRANCE
UAE
SAUDI ARABIA
ISRAEL
USA
CANADA
AUSTRALIA
UK
INDIA
CHINA
S. KOREA
JAPAN

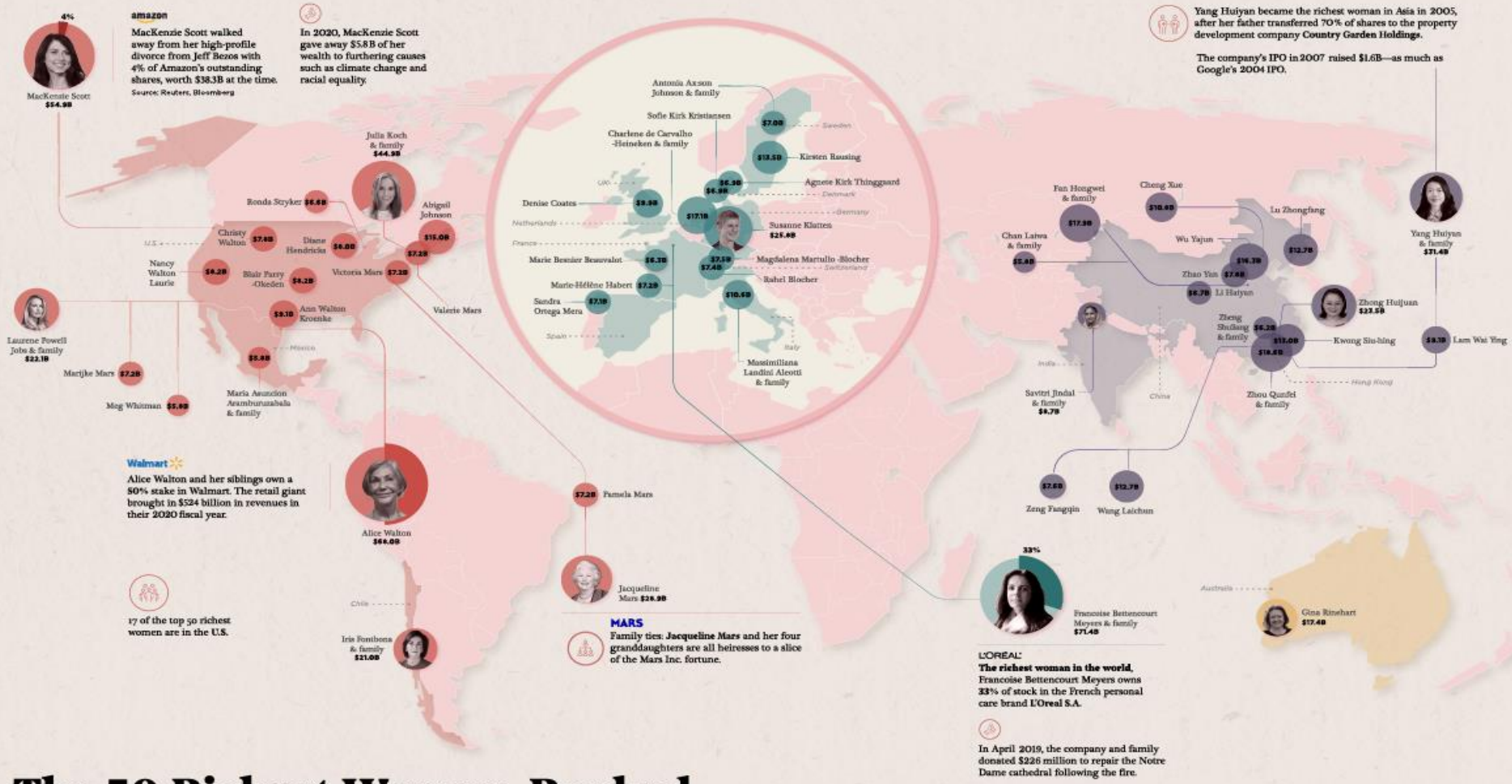
The 50 Richest Women in 2021

According to a recent census, about 12% of global billionaires are women.

Source: Wealth-X

Here, we used Forbes data to examine the net worth of the 50 richest women, and which country they're from.

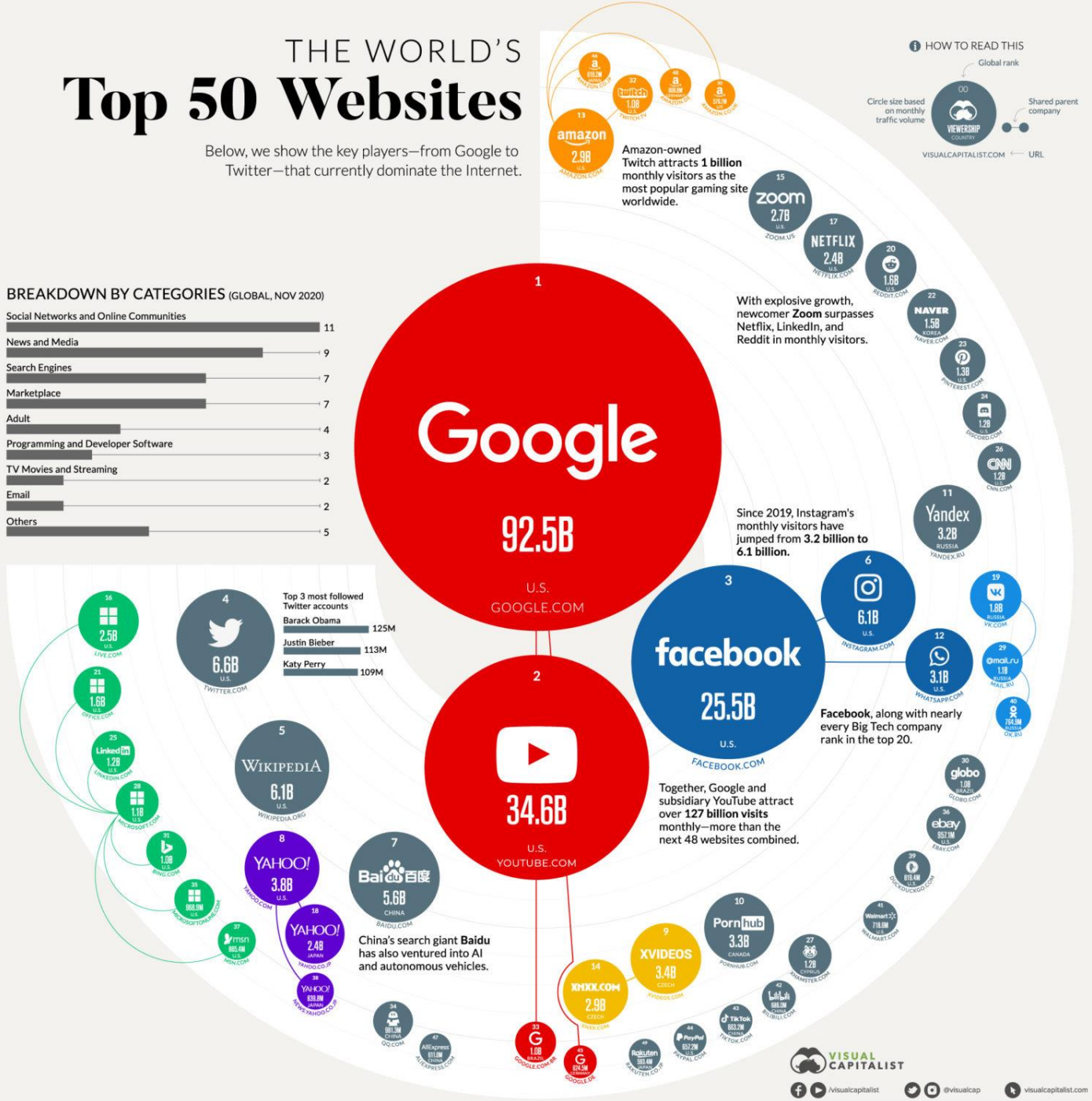
Americas Europe Asia Oceania



The 50 Richest Women, Ranked

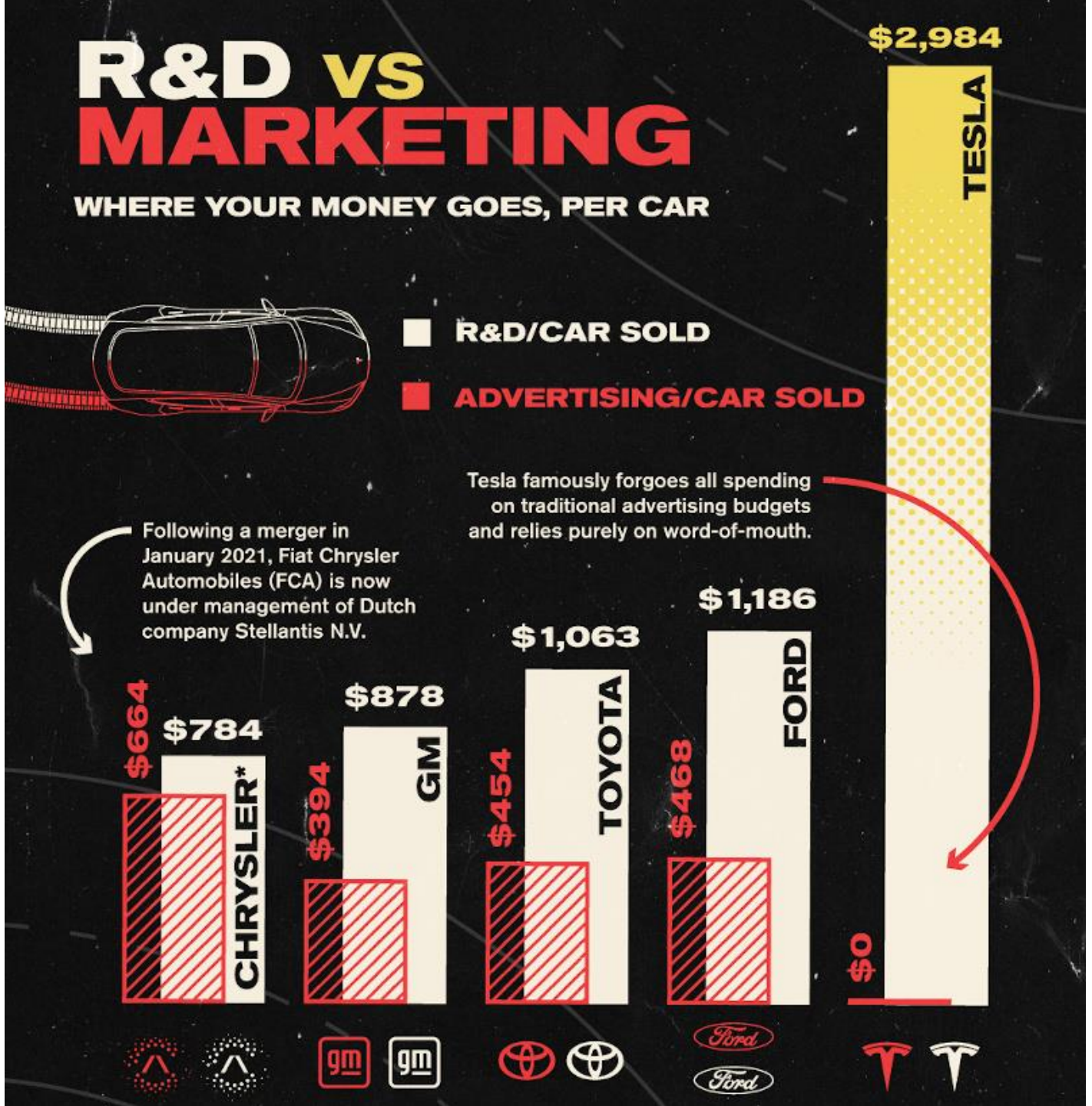
THE WORLD'S Top 50 Websites

Below, we show the key players—from Google to Twitter—that currently dominate the Internet.



SOURCE: SIMILARWEB

Tesla's R&D and Marketing Per Car vs. Other Automakers



Richest People in the World

1 2 3 4 5 6 7 8 9 10

Top 10 Overall

$305B — $1B

1	2	3	4	5	6	7	8	9	10
Elon **Musk**	Jeff **Bezos**	Bernard **Arnault & family**	Bill **Gates**	Larry **Ellison**	Larry **Page**	Sergey **Brin**	Mark **Zuckerberg**	Steve **Ballmer**	Warren **Buffett**
$304.3B	$201.5B	$197.2B	$138.6B	$129.9B	$127.0B	$122.4B	$121.1B	$106.0B	$104.9B

1. Elon Musk

With a cult-like following, Elon Musk witnessed his wealth grow over ten-fold in the last year and a half.

2. Jeff Bezos

Bezos' total wealth has grown 79% since March 2020. After 26 years, he stepped down as CEO of Amazon to become executive chairman.

Top 10 in Finance

$305B — $1B

1	2	3	4	5	6	7	8	9	10
Warren **Buffett**	Stephen **Schwarzman**	Daniel **Gilbert**	Abigail **Johnson**	Sam **Bankman-Fried**	Jim **Simons**	Thomas **Peterffy**	R. Budi **Hartono**	Ken **Griffin**	Ray **Dalio**
$104.9B	$40.5B	$30.6B	$26.8B	$26.5B	$24.4B	$22.4B	$22.0B	$21.1B	$20.0B

1. Warren Buffett

Warren Buffett confirms his successor will be Greg Abel, vice-chairman at Berkshire Hathaway. Abel, who heads Berkshire Hathaway Energy, was born in Edmonton, Canada.

5. Sam Bankman-Fried

With a fortune of $22.8B, Sam Bankman-Fried is not only the richest person in crypto—but the youngest on this list at 29. Much of this wealth derives from his crypto derivatives trading firm, FTX.

Top 10 in China

$305B — $1B

1	2	3	4	5	6	7	8	9	10
Zhong Shanshan	**Zhang** Yiming	**Ma** Huateng	Jack **Ma**	William Lei **Ding**	**He** Xiangjian	**Wei** Jianjun & family	Colin Zheng **Huang**	**Wang** Wei	**Huang** Shilin
$66.5B	$59.4B	$46.2B	$40.9B	$32.3B	$31.9B	$31.2B	$29.3B	$27.0B	$26.7B

1. Zhong Shanshan

Before Zhong Shanshan took his bottled water firm Nongfu Spring public last year, he was largely unknown by the media.

4. Jack Ma

Formerly the richest in China, Jack Ma disappeared for three months after Ant Group's IPO was blocked by Chinese regulators. The company has since lost $334B in market value.

Top 10 World Excluding U.S. & China

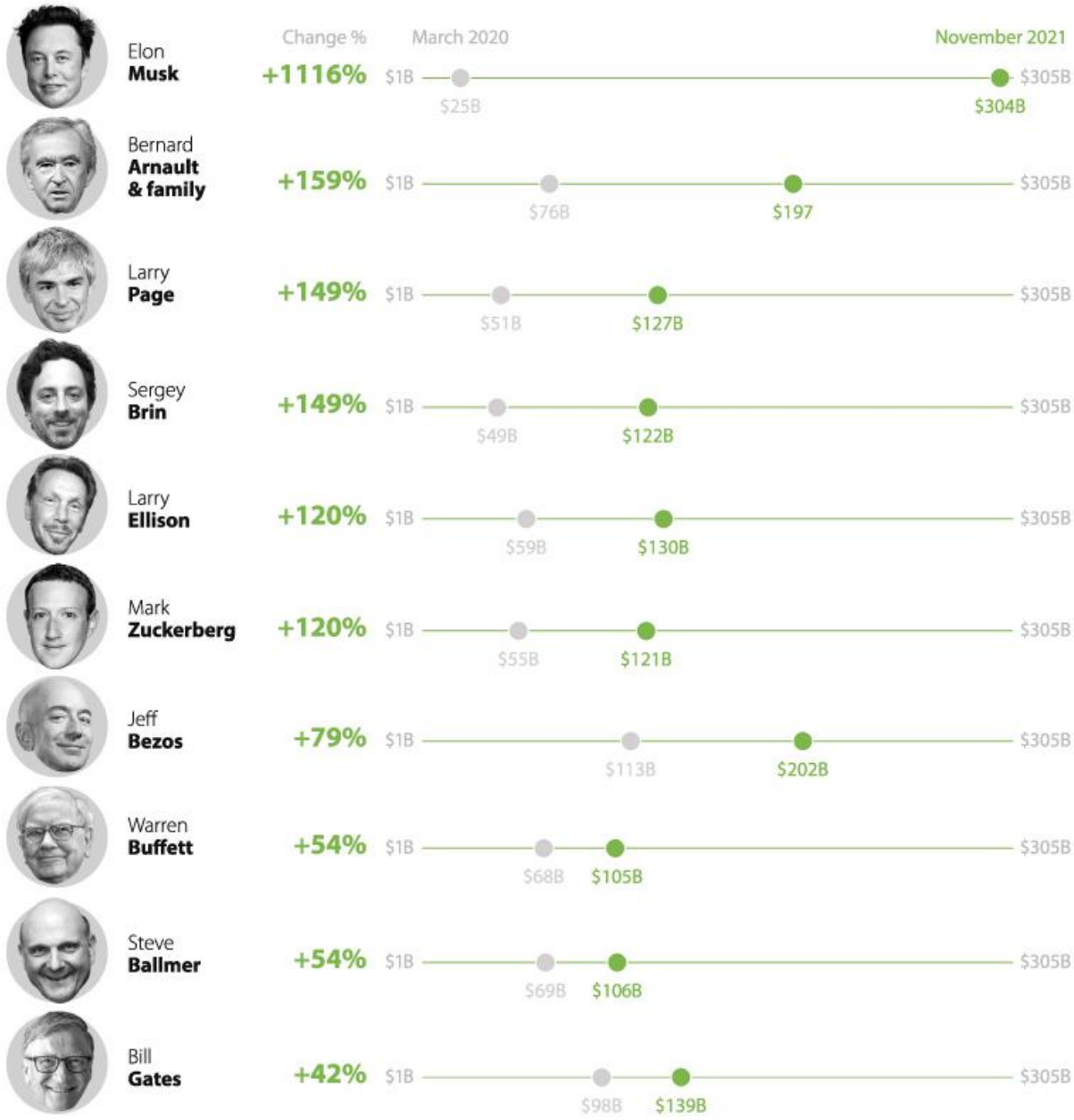
$305B — $1B

1	2	3	4	5	6	7	8	9	10
Bernard **Arnault & family**	Mukesh **Ambani**	Françoise Bettencourt **Meyers & family**	Amancio **Ortega**	Carlos Slim **Helú & family**	Gautam **Adani & family**	Robin **Zeng**	David **Thomson & family**	François **Pinault & family**	Beate **Heister** & Karl **Albrecht Jr.**
$197.2B	$95.7B	$93.6B	$82.8B	$78.1B	$75.9B	$59.2B	$52.9B	$50.0B	$43.4B

1. Bernard Arnault
3. Françoise Bettencourt
9. François Pinault

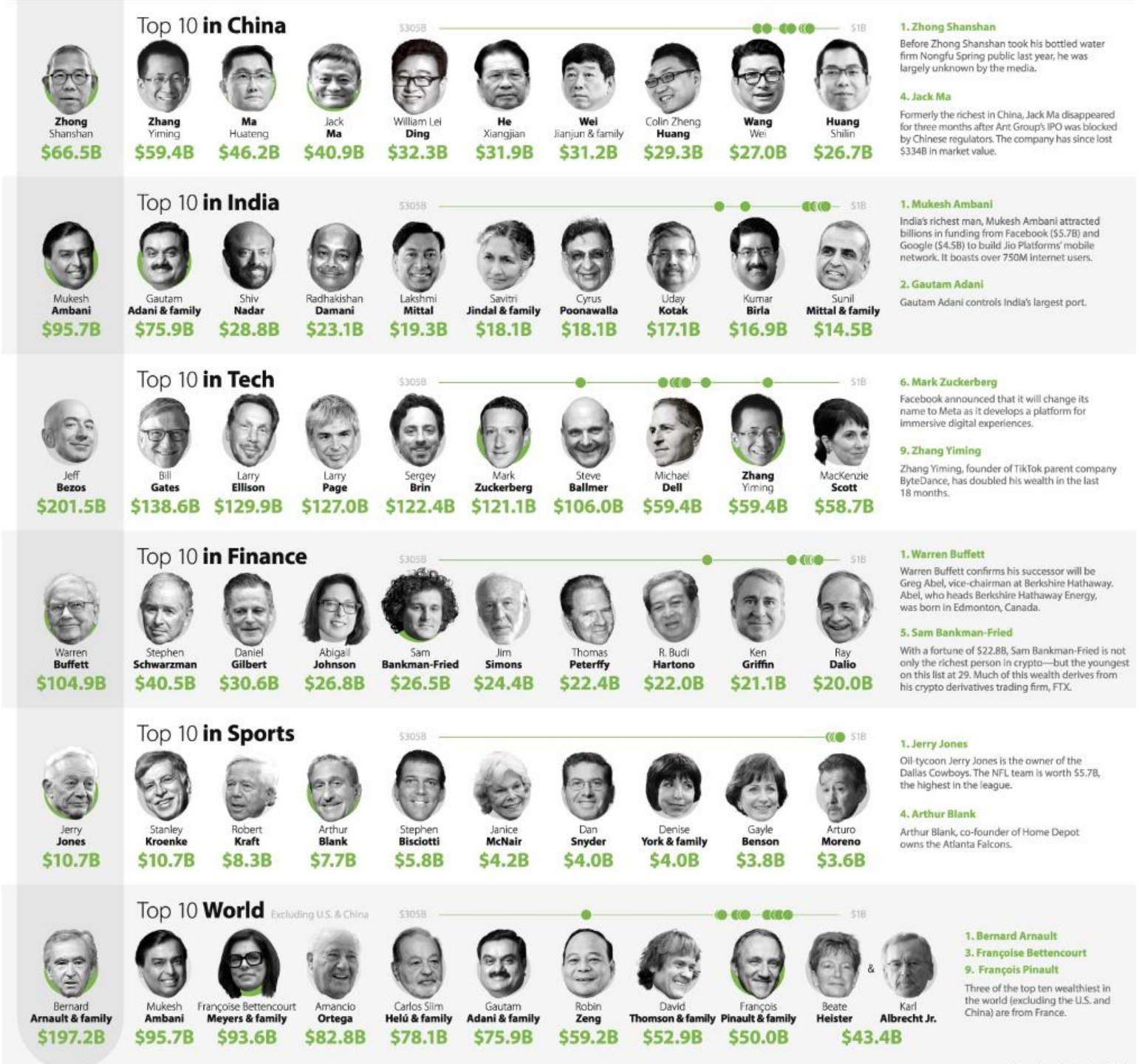
Three of the top ten wealthiest in the world (excluding the U.S. and China) are from France.

Top 10 **Growth** 2020-2021



Net worths as of November 8, 2021

Top 10 Billionaires in India

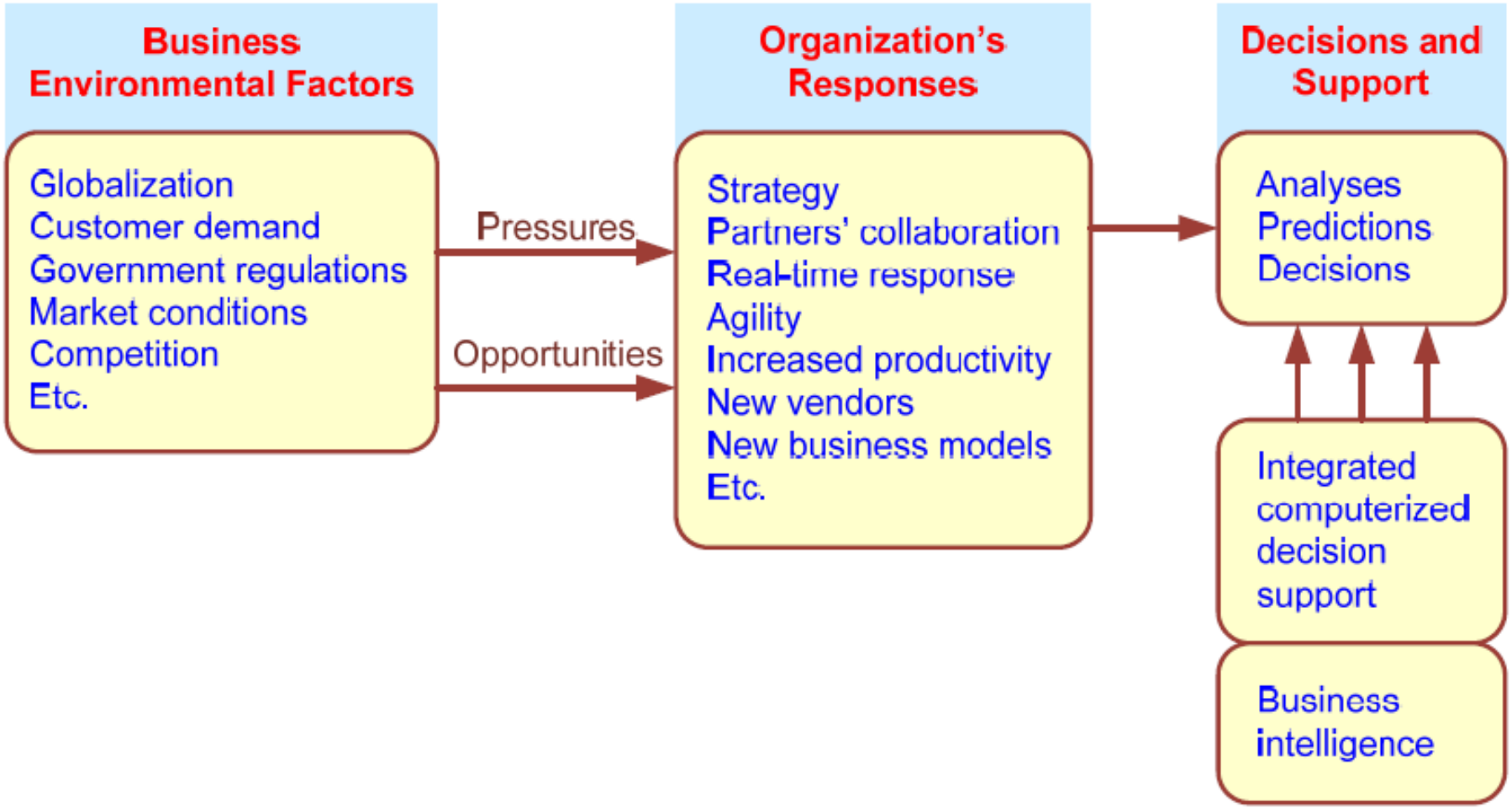


Changing Business Environment & Computerized Decision Support

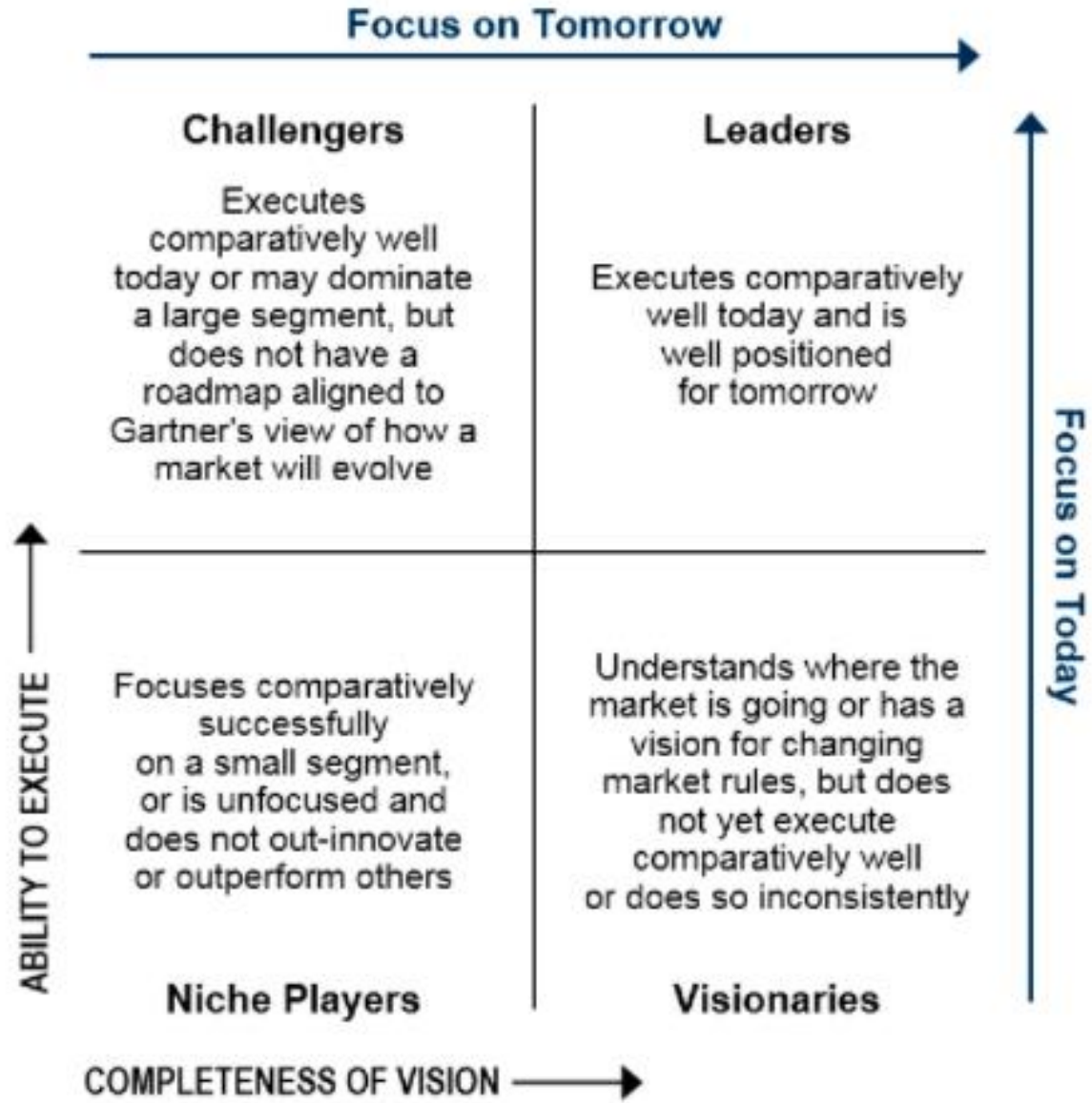
- Companies are moving aggressively to computerized support of their operations ⇨ Business Intelligence
- Business Pressures–Responses–Support Model
  - Business pressures result of today's competitive business climate
  - Responses to counter the pressures
  - Support to better facilitate the process

Anticipative

Business Pressures–Responses–Support Model



The Magic Quadrant



Source: Gartner
ID: 441610

Source: Gartner (February 2021)

Thank
You…