



## Stichting NIOC en de NIOC kennisbank

Stichting NIOC ([www.nioc.nl](http://www.nioc.nl)) stelt zich conform zijn statuten tot doel: het realiseren van congressen over informatica onderwijs en voorts al hetgeen met een en ander rechtstreeks of zijdelings verband houdt of daartoe bevorderlijk kan zijn, alles in de ruimste zin des woords.

De stichting NIOC neemt de archivering van de resultaten van de congressen voor zijn rekening. De website [www.nioc.nl](http://www.nioc.nl) ontsluit onder "Eerdere congressen" de gearchiveerde websites van eerdere congressen. De vele afzonderlijke congresbijdragen zijn opgenomen in een kennisbank die via dezelfde website onder "NIOC kennisbank" ontsloten wordt.

Op dit moment bevat de NIOC kennisbank alle bijdragen, incl. die van het laatste congres (NIOC2025, gehouden op donderdag 27 maart 2025 jl. en georganiseerd door Hogeschool Windesheim). Bij elkaar zo'n 1500 bijdragen!

We roepen je op, na het lezen van het document dat door jou is gedownload, de auteur(s) feedback te geven. Dit kan door je te registreren als gebruiker van de NIOC kennisbank. Na registratie krijg je bericht hoe in te loggen op de NIOC kennisbank.

Het eerstvolgende NIOC vindt plaats op 18 maart 2027 in Arnhem en wordt georganiseerd door HAN University of Applied Sciences.

Reacties over de NIOC kennisbank en de inhoud daarvan kun je richten aan de beheerder:

R. Smedinga [kennisbank@nioc.nl](mailto:kennisbank@nioc.nl).

Vermeld bij reacties jouw naam en telefoonnummer voor nader contact.

# The Internet You Ain't Seen Nothing Yet.

Michiel Verheij, Consultant / Product Owner

[www.trimm.nl](http://www.trimm.nl)

[@michielverheij](https://twitter.com/michielverheij)

<https://www.linkedin.com/in/michielverheij>

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# Our clients



Easy Drain®



Lenco

ROSEN



UNIVERSITEIT TWENTE.



TEIJIN

Twence®



ALUCA®

Gemeente Enschede

BiZZdesign







**PAY  
ATTENTION  
WHILE  
WALKING**



**YOUR FACEBOOK  
STATUS UPDATE  
CAN WAIT.**



A digital Earth with a glowing orange and red digital interface at the bottom right, overlaid with the text "SOFTWARE IS EATING THE WORLD". The Earth is shown from space, with the Americas visible. The digital interface consists of a glowing orange and red border with floating numbers and symbols, suggesting a data-driven or software-driven world.

**SOFTWARE IS EATING THE WORLD**



Ingram Pinn

**PHOTO FINISH**

# 2015:

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the world's largest taxi company owns no vehicles

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The Facebook logo, featuring the word 'facebook' in white, lowercase letters on a dark blue rectangular background.

facebook®

the world's most popular media owner creates no content

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the most valuable retailer has no inventory

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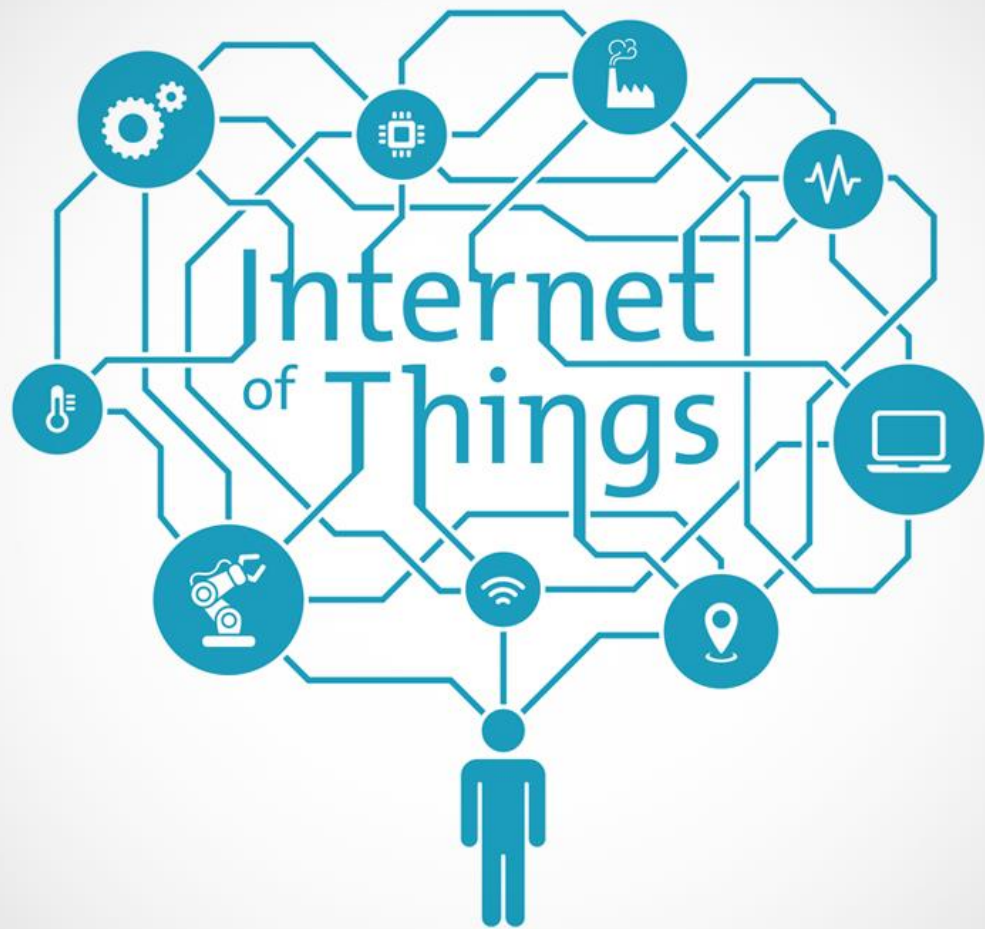


the world's largest accommodation provider owns no real estate.

“A revolution doesn’t happen  
when society adopts new tools,

It happens when society adopts  
new behaviors”

Clay Shirky



# Definition

- › The Internet of Things (IoT) is a computing concept that describes a future where everyday physical objects will be connected to the Internet and be able to identify themselves to other devices.
- › The IoT is significant because an object that can represent itself digitally becomes something greater than the object by itself. No longer does the object relate just to you, but is now connected to surrounding objects and database data. When many objects act in unison, they are known as having "ambient intelligence."

nest

FRIDAY

8A 12P 4P 8P 12A 4A



CHANGE

REMOVE

DONE

Nest builds  
a schedule  
you can adjust.

# Internet of Things: next phase of the .net

Rob Chandhok (Qualcomm):

We're going to a world where we connect trillions of sensors. They connect to each other and bring intelligence to us as human beings through the .net. Industry has to decide if standards are coming. To develop, use what is out there. That will speed-up your time2market.

# Industrial Internet of Things: 80% of total IoT

Industrial Internet of Things: Keys to Success

1. Balanced Strategy: Focus on Growth & Operational Efficiency

2. Anticipate the Shift from Product to Service

3. Rethink your Partner Ecosystem

4. Focus on your IIoT Workforce

Paul Daugherty (Accenture):

- #IIoT: Connected Equipment, Connected Vehicles, Life Safety, Connected Energy, Connected Health
- Mastering #IIoT: Operational Technology higher spend than Information Technology, IIoT will bring them together.- Pace & Speed is most important to create and deliver success

**1.0** | 1784 | based on mechanical production equipment driven by water and steam power



**2.0** | 1870 | based on mass production enabled by the division of labor and the use of electrical energy



**3.0** | 1969 | based on the use of electronics and IT to further automate production



**4.0** | tomorrow | based on the use of cyber-physical systems



### 1. Product



### 2. Smart product



+



### 3. Smart, connected product



+

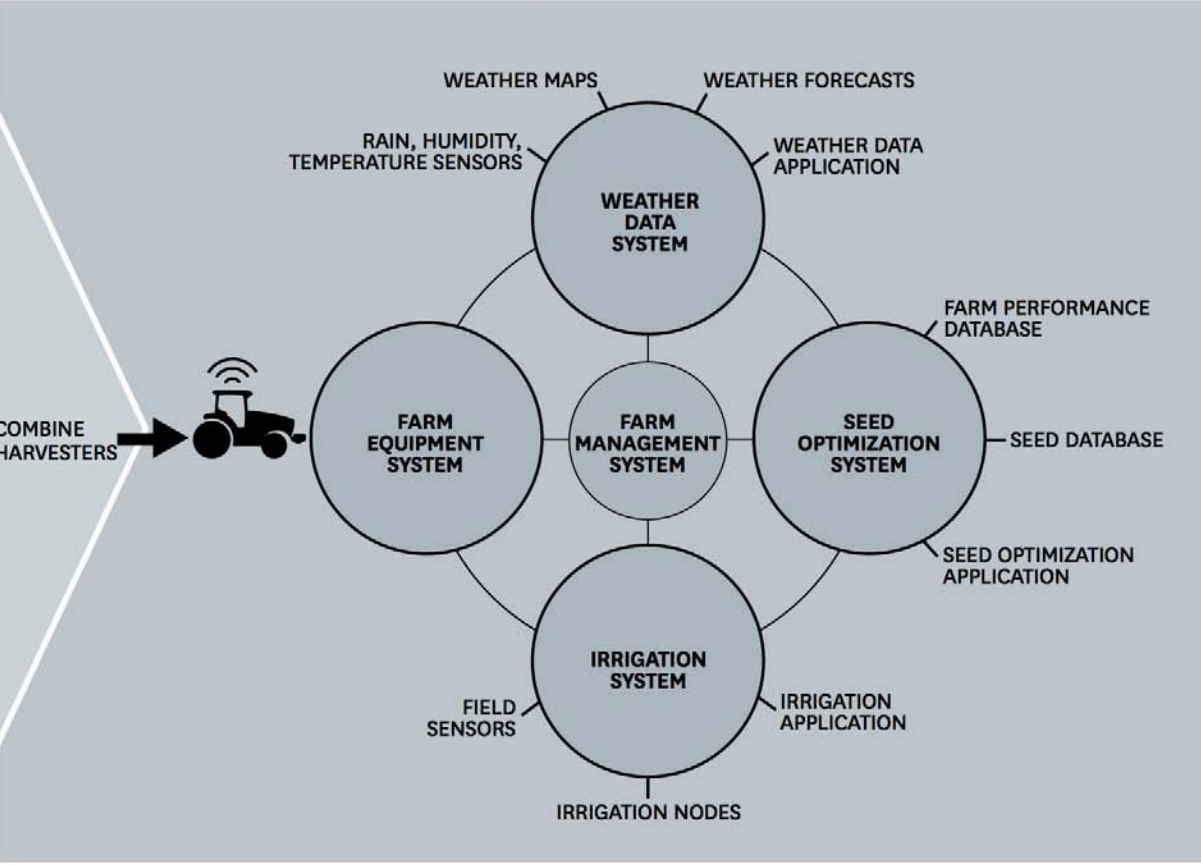
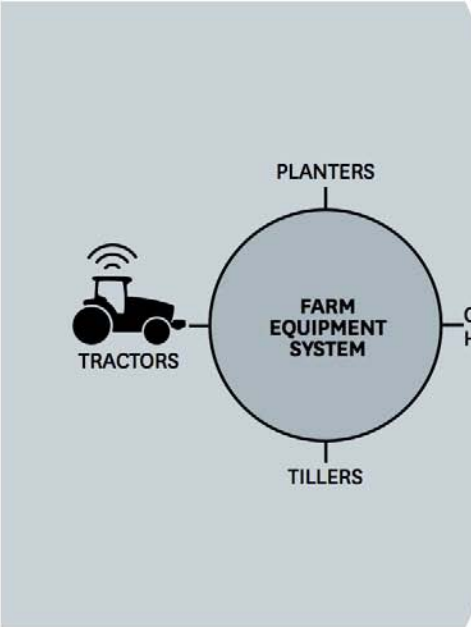


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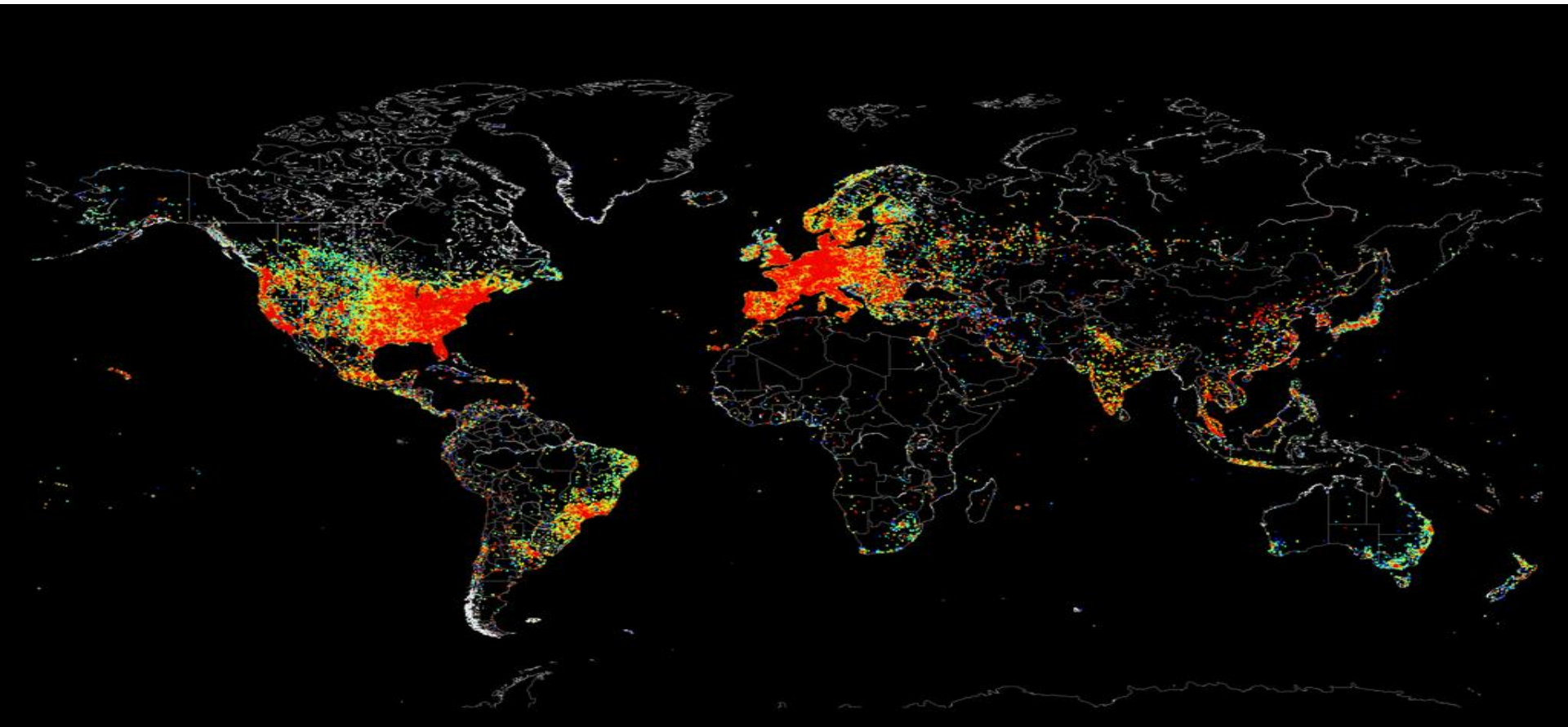


# 5. System of systems

## 4. Product system







Accenture estimates the Industrial Internet of Things could add US\$14.2 trillion to the global economy by 2030.



### Sensors

- \* Low energy
- \* Miniaturization
- \* Reduced costs
- \* GPS



### Wireless Connectivity

- \* High bandwidth
- \* Open standards
- \* Reduced costs
- \* Smartphone as interface and datahub



### Dataprocessing and analysis

- \* Increasing computing power, memory and datastorage
- \* Cloud service access
- \* Reduced costs



Things that  
**communicate**  
their own **data**

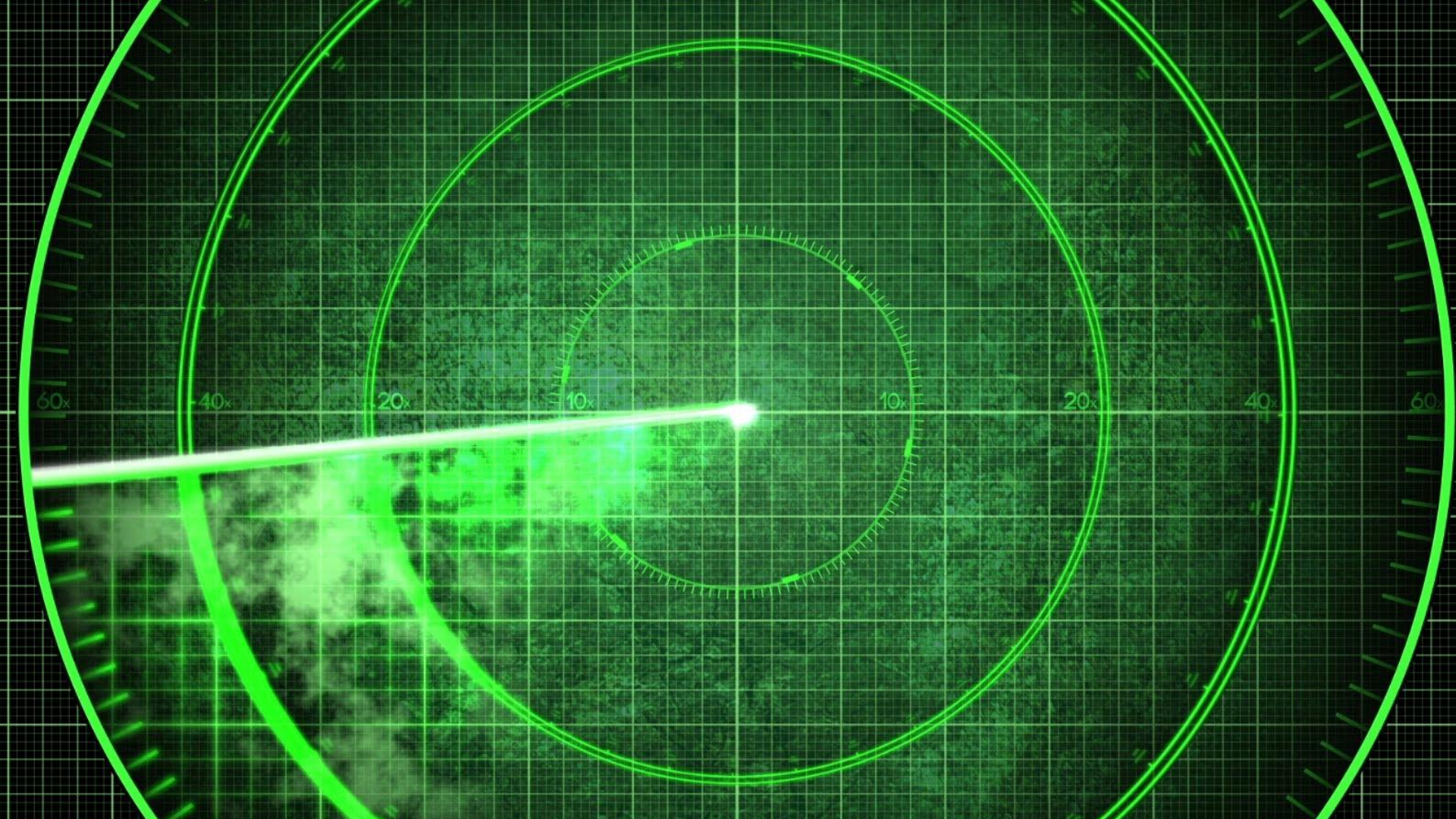


Things that also  
**communicate**  
**data** of their  
**surroundings**



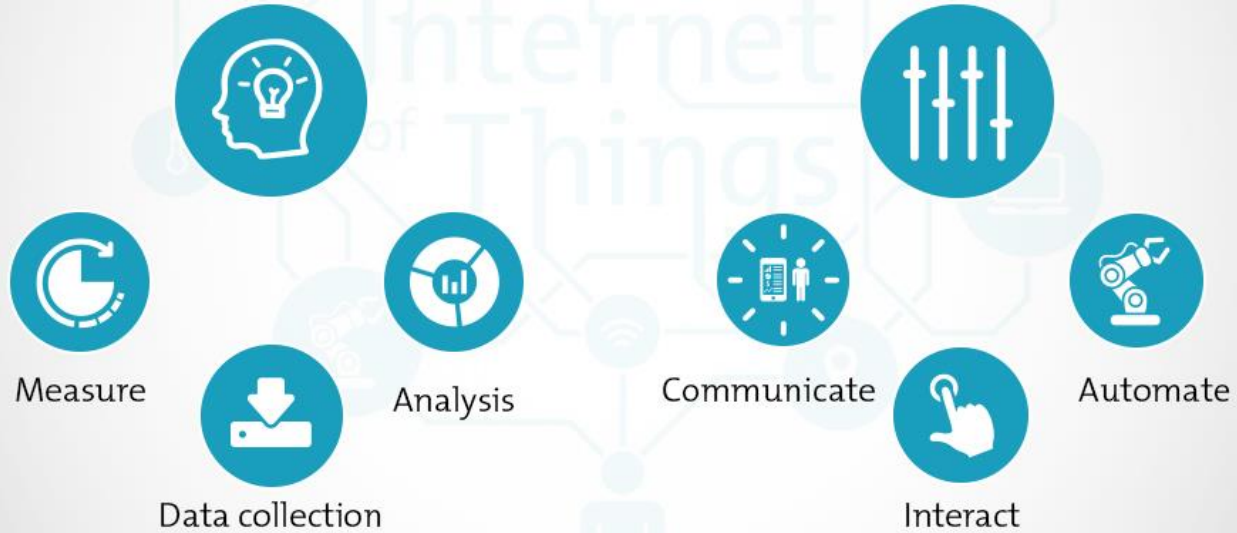
Things that  
(autonomously)  
**react** on their  
**surroundings** and  
**communicate** with  
other objects  
(and humans)





Insights

Influence





## Insights

- Cost reduction
- Process optimization
- Company processes
- (Remote) service
- Production processes
- Logistical processes
- Supply chain optimization
- Asset management
- Smart metering
- Legal proof

## Influence

- Strengthen customer relationship (upselling / lock-in)
- Increase of turnover / new business
- Updates & customization
- Discover customer and end user behavior
- Input for innovation
- New value & experience
- New business models through cooperation
- Combined business models
- Data as extra income source
- Competitors become customers

Product



Software/Application



Services

Our

Services

Data/Information



Indirect/Marketing



Business ecosystem



# BEST GLOBAL BRANDS 2010





































































































The Definitive Ranking of the World's Most Valuable Brands

Creating and managing brand value™

Interbrand

1 2009 Rank 1 79,452 Sm ▲ +2% COCA-COLA	2 2009 Rank 2 64,727 Sm ▲ +3% IBM	3 2009 Rank 3 48,895 Sm ▲ +7% MICROSOFT	4 2009 Rank 4 41,557 Sm ▲ +36% GOOGLE	5 2009 Rank 5 42,888 Sm ▼ -18% GE	6 2009 Rank 6 33,578 Sm ▲ +4% MCDONALD'S	7 2009 Rank 7 32,815 Sm ▲ +4% INTEL
8 2009 Rank 8 29,495 Sm ▼ -15% NOKIA	9 2009 Rank 10 28,711 Sm ▲ +1% DISNEY	10 2009 Rank 11 26,887 Sm ▲ +13% HP	11 2009 Rank 9 26,110 Sm ▼ -16% TOYOTA	12 2009 Rank 12 23,179 Sm ▲ -6% MERCEDES-BENZ	13 2009 Rank 13 23,209 Sm ▲ +2% GILLETTE	14 2009 Rank 14 23,219 Sm ▲ +5% CISCO
15 2009 Rank 15 22,322 Sm ▲ +3% BMW	16 2009 Rank 16 21,868 Sm ▲ +4% LOUIS VUITTON	17 2009 Rank 20 21,345 Sm ▲ +37% APPLE	18 2009 Rank 17 19,961 Sm ▲ +5% MARLBORO	19 2009 Rank 19 19,491 Sm ▲ +11% SAMSUNG	20 2009 Rank 18 18,506 Sm ▲ +4% HONDA	21 2009 Rank 21 16,136 Sm ▲ +5% H&M
22 2009 Rank 24 14,881 Sm ▲ +9% ORACLE	23 2009 Rank 23 14,061 Sm ▲ +3% PEPSI	24 2009 Rank 22 13,944 Sm ▼ -7% AMERICAN EXPRESS	25 2009 Rank 26 13,706 Sm ▲ +4% NIKE	26 2009 Rank 27 12,756 Sm ▲ +5% SAP	27 2009 Rank 25 12,753 Sm ▼ -4% NESCAFÉ	28 2009 Rank 28 12,487 Sm ▲ +4% IKEA
29 2009 Rank 37 12,314 Sm ▲ +29% J.P. MORGAN	30 2009 Rank 30 12,252 Sm ▲ +4% BUDWEISER	31 2009 Rank 31 11,826 Sm ▲ +2% UPS	32 2009 Rank 32 11,561 Sm ▲ +10% HSBC	33 2009 Rank 33 11,485 Sm ▲ +10% CANON	34 2009 Rank 25 11,356 Sm ▼ -5% SONY	35 2009 Rank 34 11,041 Sm ▲ +6% KELLOGG'S
36 2009 Rank 41 9,665 Sm ▲ +23% AMAZON.COM	37 2009 Rank 38 9,372 Sm ▲ +1% GOLDMAN SACHS	38 2009 Rank 35 8,990 Sm ▼ -2% NINTENDO	39 2009 Rank 40 8,976 Sm ▲ +6% THOMSON REUTERS	40 2009 Rank 36 8,887 Sm ▼ -13% CITI	41 2009 Rank 38 8,800 Sm ▼ -14% DELL	42 2009 Rank 42 8,696 Sm ▲ +7% PHILIPS
43 2009 Rank 43 8,453 Sm ▲ +15% EBAY	44 2009 Rank 41 8,346 Sm ▲ +2% GUCCI	45 2009 Rank 44 7,981 Sm ▲ +3% L'ORÉAL	46 2009 Rank 46 7,534 Sm ▲ +4% HEINZ	47 2009 Rank 45 7,441 Sm ▼ -3% ACCENTURE	48 2009 Rank 48 7,464 Sm ▲ +10% ZARA	49 2009 Rank 47 7,315 Sm ▲ +8% SIEMENS
50 2009 Rank 48 7,295 Sm ▲ +3% FORD	51 2009 Rank 52 6,932 Sm ▲ +6% COLGATE	52 2009 Rank 57 6,921 Sm ▲ +8% MORGAN STANLEY	53 2009 Rank 25 6,832 Sm ▲ +6% VOLKSWAGEN	54 2009 Rank 41 6,762 Sm ▲ +12% BLACKBERRY	55 2009 Rank 54 6,712 Sm ▲ +3% MTV	56 2009 Rank 55 6,694 Sm ▲ +3% AXA
57 2009 Rank 54 6,548 Sm ▲ +4% NESTLÉ	58 2009 Rank 68 6,083 Sm ▲ +7% DANONE	59 2009 Rank 56 6,109 Sm ▼ -5% XEROX	60 2009 Rank 61 5,844 Sm ▲ +2% KFC	61 2009 Rank 62 5,777 Sm ▲ NEW Sprite	62 2009 Rank 62 5,495 Sm ▲ +2% ADIDAS	63 2009 Rank 65 5,461 Sm ▲ +9% AUDI
64 2009 Rank 67 5,072 Sm ▲ +3% AVON	65 2009 Rank 65 5,833 Sm ▲ +9% HYUNDAI	66 2009 Rank 64 4,958 Sm ▼ -3% YAHOO!	67 2009 Rank 62 4,904 Sm ▲ +28% Allianz	68 2009 Rank 70 4,782 Sm ▲ +4% HERMÈS	69 2009 Rank 70 4,782 Sm ▲ +4% HERMÈS	70 2009 Rank 65 4,704 Sm ▼ -6% CATERPILLAR
71 2009 Rank 71 4,536 Sm ▲ +3% KLEENEX	72 2009 Rank 74 4,404 Sm ▲ +4% PORSCHE	73 2009 Rank 75 4,331 Sm ▲ +7% PANASONIC	74 2009 Rank 80 4,218 Sm ▲ NEW BARCLAYS	75 2009 Rank 80 4,155 Sm ▲ +8% J & J	76 2009 Rank 76 4,127 Sm ▲ +3% TIFFANY & CO.	77 2009 Rank 77 4,052 Sm ▲ +2% CARTIER
78 2009 Rank 82 4,018 Sm ▲ NEW CREDIT SUISSE	79 2009 Rank 82 4,018 Sm ▲ NEW CREDIT SUISSE	80 2009 Rank 82 4,003 Sm ▲ +24% SHELL	81 2009 Rank 81 3,998 Sm ▲ +26% VISA	82 2009 Rank 84 3,958 Sm ▲ +26% VISA	83 2009 Rank 79 3,973 Sm ▲ +2% PIZZA HUT	84 2009 Rank 79 3,961 Sm ▲ +1% GAP
85 2009 Rank 85 3,947 Sm ▲ NEW CORONA	86 2009 Rank 72 3,812 Sm ▼ -13% UBS	87 2009 Rank 86 3,784 Sm ▲ +5% NIVEA	88 2009 Rank 89 3,626 Sm ▲ +15% ADOBE	89 2009 Rank 84 3,624 Sm ▼ -2% SMIRNOFF	90 2009 Rank 88 3,562 Sm ▲ NEW 3M	91 2009 Rank 88 3,562 Sm ▲ +1% FERRARI
92 2009 Rank 92 3,557 Sm ▲ NEW JOHNNIE WALKER	93 2009 Rank 93 3,516 Sm ▲ NEW HEINEKEN	94 2009 Rank 94 3,496 Sm ▲ NEW ZÜRICH	95 2009 Rank 93 3,443 Sm ▲ +8% ARMANI	96 2009 Rank 91 3,401 Sm ▲ +5% LANCÔME	97 2009 Rank 90 3,379 Sm ▲ +2% STARBUCKS	98 2009 Rank 71 3,281 Sm ▼ -24% HARLEY-DAVIDSON
99 2009 Rank 100 3,241 Sm ▲ +5% CAMPBELL'S	100 2009 Rank 96 3,118 Sm ▲ +8% BURBERRY					

# Best Global Brands 2014

01  Apple +2% 118,863 \$m	02  Google +9% 107,430 \$m	03  Coca-Cola +3% 91,583 \$m	04  IBM -8% 72,244 \$m	05  Microsoft +3% 91,514 \$m	06  GE -9% 45,480 \$m	07  Samsung +19% 43,462 \$m	08  Toyota +20% 42,280 \$m	09  McDonald's +1% 42,254 \$m	10  Mercedes-Benz +6% 34,338 \$m
11  BMW +1% 34,214 \$m	12  Intel -6% 34,183 \$m	13  Disney +14% 32,223 \$m	14  Cisco +6% 30,936 \$m	15  Amazon +28% 29,476 \$m	16  Oracle -4% 25,380 \$m	17  HP -8% 23,758 \$m	18  Gillette -9% 23,845 \$m	19  Louis Vuitton -9% 22,552 \$m	20  Honda +17% 21,073 \$m
21  H&M +16% 21,083 \$m	22  Nike +16% 19,675 \$m	23  American Express +1% 19,550 \$m	24  Pepsi +7% 19,119 \$m	25  SAP +4% 17,240 \$m	26  IKEA +6% 15,865 \$m	27  UPS +6% 14,470 \$m	28  eBay +9% 14,258 \$m	29  Facebook +89% 14,242 \$m	30  Pampers +8% 14,070 \$m
31  Volkswagen +23% 13,716 \$m	32  Kellogg's +4% 13,442 \$m	33  HSBC +6% 13,442 \$m	34  Budweiser +9% 13,004 \$m	35  J.P. Morgan +9% 12,456 \$m	36  Zara +12% 12,026 \$m	37  Canon +6% 11,762 \$m	38  Nescafe +7% 11,606 \$m	39  Ford +19% 10,876 \$m	40  Hyundai +19% 10,401 \$m
41  Gucci +2% 10,385 \$m	42  Philips +5% 10,264 \$m	43  L'Oréal +3% 10,182 \$m	44  Accenture +4% 9,882 \$m	45  Audi +27% 9,631 \$m	46  Hermès +16% 8,977 \$m	47  Goldman Sachs +3% 8,758 \$m	48  Citi +10% 8,737 \$m	49  Siemens +2% 8,672 \$m	50  Colgate +5% 8,215 \$m
51  Danone +3% 8,205 \$m	52  Sony -3% 8,133 \$m	53  AXA +14% 8,120 \$m	54  Nestlé +6% 8,000 \$m	55  Allianz +16% 7,702 \$m	56  Nissan +23% 7,523 \$m	57  Thomson Reuters -6% 7,472 \$m	58  Cartier +6% 7,440 \$m	59  adidas -2% 7,378 \$m	60  Porsche +19% 7,371 \$m
61  Caterpillar -4% 6,812 \$m	62  Xerox -2% 6,641 \$m	63  Morgan Stanley +1% 6,594 \$m	64  Panasonic +8% 6,303 \$m	65  Shell +14% 6,258 \$m	66  3M +14% 6,177 \$m	67  Discovery +7% 6,143 \$m	68  KFC -2% 6,050 \$m	69  Visa +19% 5,998 \$m	70  Prada +7% 5,977 \$m
71  Tiffany & Co. +9% 5,936 \$m	72  Sprite -3% 5,846 \$m	73  Burberry +3% 5,594 \$m	74  Kia +19% 5,398 \$m	75  Santander +16% 5,382 \$m	76  Starbucks +22% 5,382 \$m	77  Adobe +6% 5,333 \$m	78  Johnson & Johnson +9% 5,314 \$m	79  John Deere +5% 5,234 \$m	80  MTV +2% 5,103 \$m
81  DHL New 5,084 \$m	82  Chevrolet +10% 5,036 \$m	83  Ralph Lauren +9% 4,979 \$m	84  Duracell New 4,935 \$m	85  Jack Daniel's +5% 4,854 \$m	86  Johnnie Walker +2% 4,842 \$m	87  Harley-Davidson +13% 4,772 \$m	88  MasterCard +15% 4,756 \$m	89  Kleenex New 4,643 \$m	90  Smirnoff +8% 4,600 \$m
91  Land Rover New 4,473 \$m	92  FedEx New 4,414 \$m	93  Corona +3% 4,387 \$m	94  Huawei New 4,315 \$m	95  Heineken -9% 4,221 \$m	96  Pizza Hut -2% 4,195 \$m	97  Hugo Boss New 4,143 \$m	98  Nokia -44% 4,088 \$m	99  GAP +9% 4,022 \$m	100  Nintendo -38% 4,103 \$m

Interbrand Creating and managing brand value™



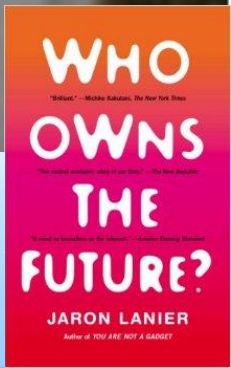
"If it's free, you're being sold. Steeds meer aspecten van ons leven worden vastgelegd. Het bewustzijn onder mensen dat hun persoonlijke data geld waard is, neemt toe. Partijen als Datacoup, LeafLad, Gigwalk, Data is Me (Dime) en Luth Research zijn op allerlei manieren aan oplossingen waarvoor de verstrekkers van de data geld ontvangen."

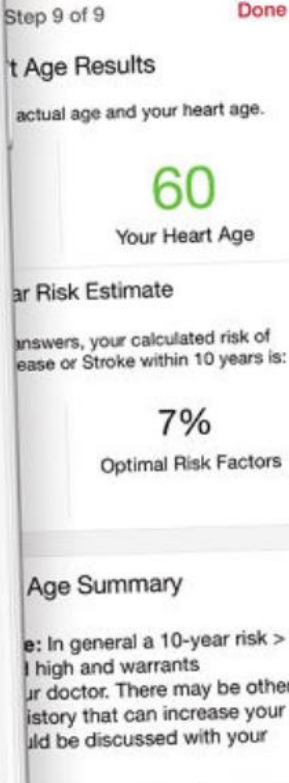
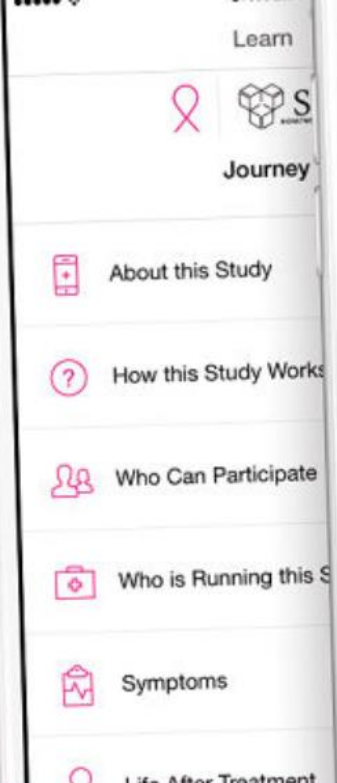
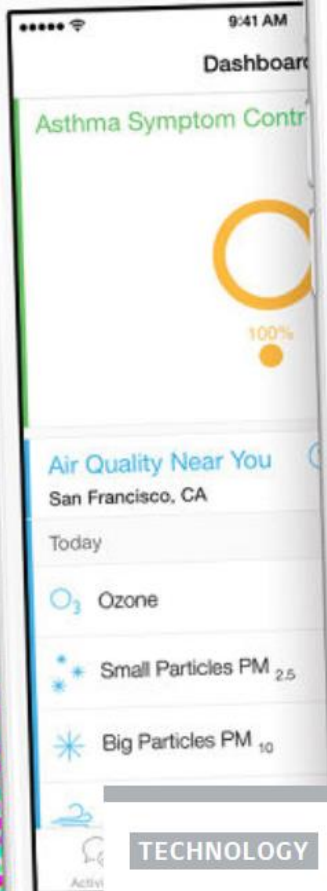


Tegenlicht

# Uw persoonlijke data zijn goud waard

VPRO





TECHNOLOGY

508 SHARES   ...

# HOW APPLE IS BUILDING AN ECOSYSTEM FOR YOUR BODY

AS IT EMBARKS ON A MISSION TO STRAP ITS PRODUCTS TO YOUR BODY, CEO TIM COOK SAYS HEALTH COULD BE THE COMPANY'S "BIGGEST" FRONTIER.

TRENDING

HAPPENING NOW

- 1 What Your Boss Is Really Saying To You: Decoded
- 2 How To Brand, Market, And Sell





# Wearables

need to pass the turn around test

The perfect wearable device  
doesn't have to be charged  
and people would wear it  
even if it did nothing...

Introducing  
**SHINE**  
the world's most accurate activity monitor.

Sonny Vu (Misfit Wearables)





# Wearable Technology



## Featured Categories

Buying Guides

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Activity Trackers



Running Watches



Wearable Cameras



Smart Glasses



Smart Watches



Smart Tracking



Kids & Pets



Smart Sport Accessories



Healthcare Devices



Gesture Control & Entertainment

**Myo**  
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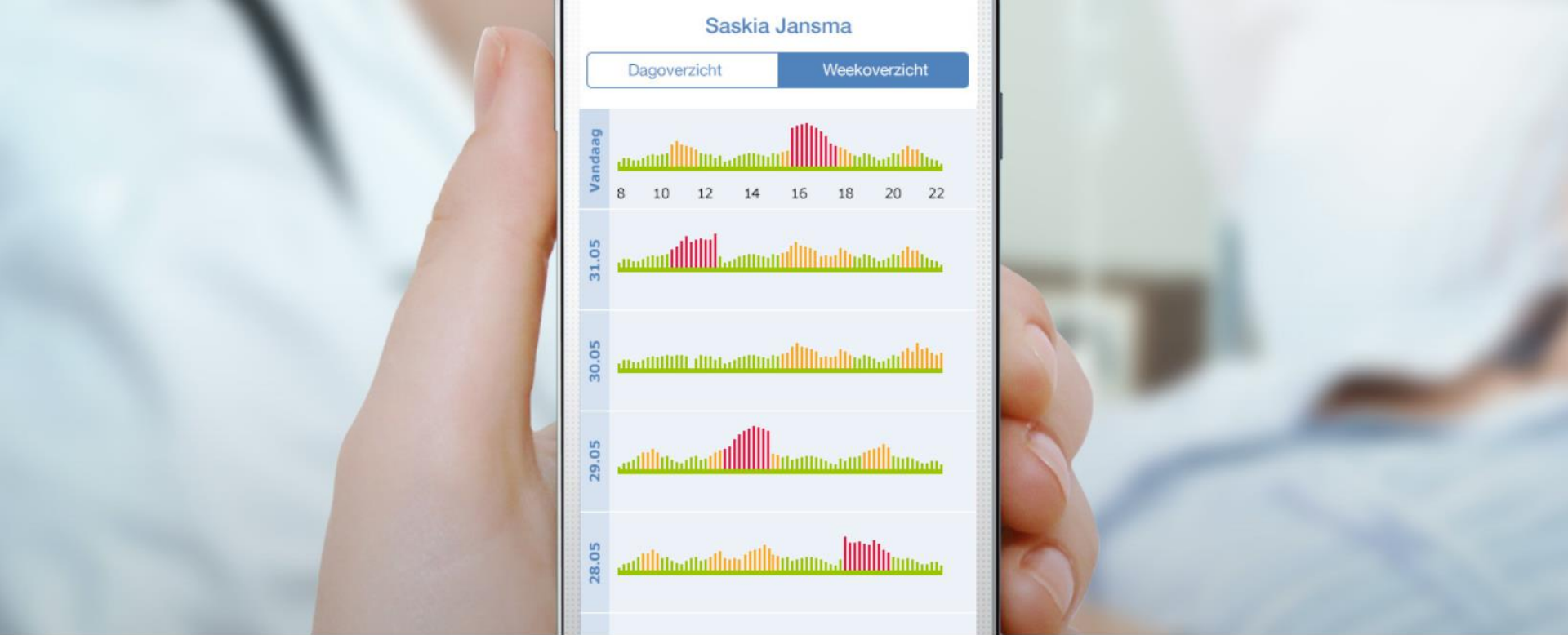
**fitbit**  
› [Learn more](#)

Featured Brand | Fitbit

**tile**  
› [Learn more](#)

▶

Tile for iOS and Android  
For finding anything and everything



## MoodRadar DAVID

De Twentse Zorgcentra (DTZC) is met ruim 1.900 cliënten de grootste aanbieder van zorg voor mensen met een verstandelijke beperking in Twente. Binnen DTZC is er, samen met de Universiteit Twente een project opgestart met als titel 'MoodRadar DAVID'. Het project heeft als doel agressie bij cliënten te detecteren om zodoende mogelijke incidenten te voorkomen.

### MOODRADAR DAVID

'Move4Mobile gaf mij de ondersteuning waarnaar ik op zoek was'





### Bedroom

Smart books interact with the house's 3D and virtual reality system, bringing to life what you read.

### Bathroom

Doctors will be able to give you virtual medical checks  
Toilets will analyse waste for medical problems such as colon cancer.



### Roof

Power collected through solar panels and stored in backup resources to power house and car.



### Bedroom

Clothes made with smart fabrics regulate your temperature and monitor your health  
E-commerce will become F-commerce - online consumers will be able to enjoy a tailored shopping experience based on Facebook 'Likes'.

### Kitchen

Smart surfaces identify what's on them and have the ability to react accordingly - keeping coffee cups warm and iced-tea cold.  
Refrigerators will advise on recipes based on whats in stock and creates personal diets.



PLUSNET ROAD

### Living Room

All appliances connected through invisible networking system  
Entertainment system creates life like sounds, images and experiences to completely envelop you in near 4D experience.



### Garage

Camera at entrance has facial recognition software which is linked to criminal database  
Car which is able to drive itself.

### Office

See-through electronics, screens, touch panels and tactile displays deliver 3D holographic experiences  
Contact lenses allow you to access infinite information resources instantly before your eyes.





**The Click is Going Away**





discard 1 cm

peel

cut into bouquets

## BROCCOLI

305 g

I F M A M J J A S O N D

DAILY SOURCE OF



Vitamin C



Folate



Fiber











htc

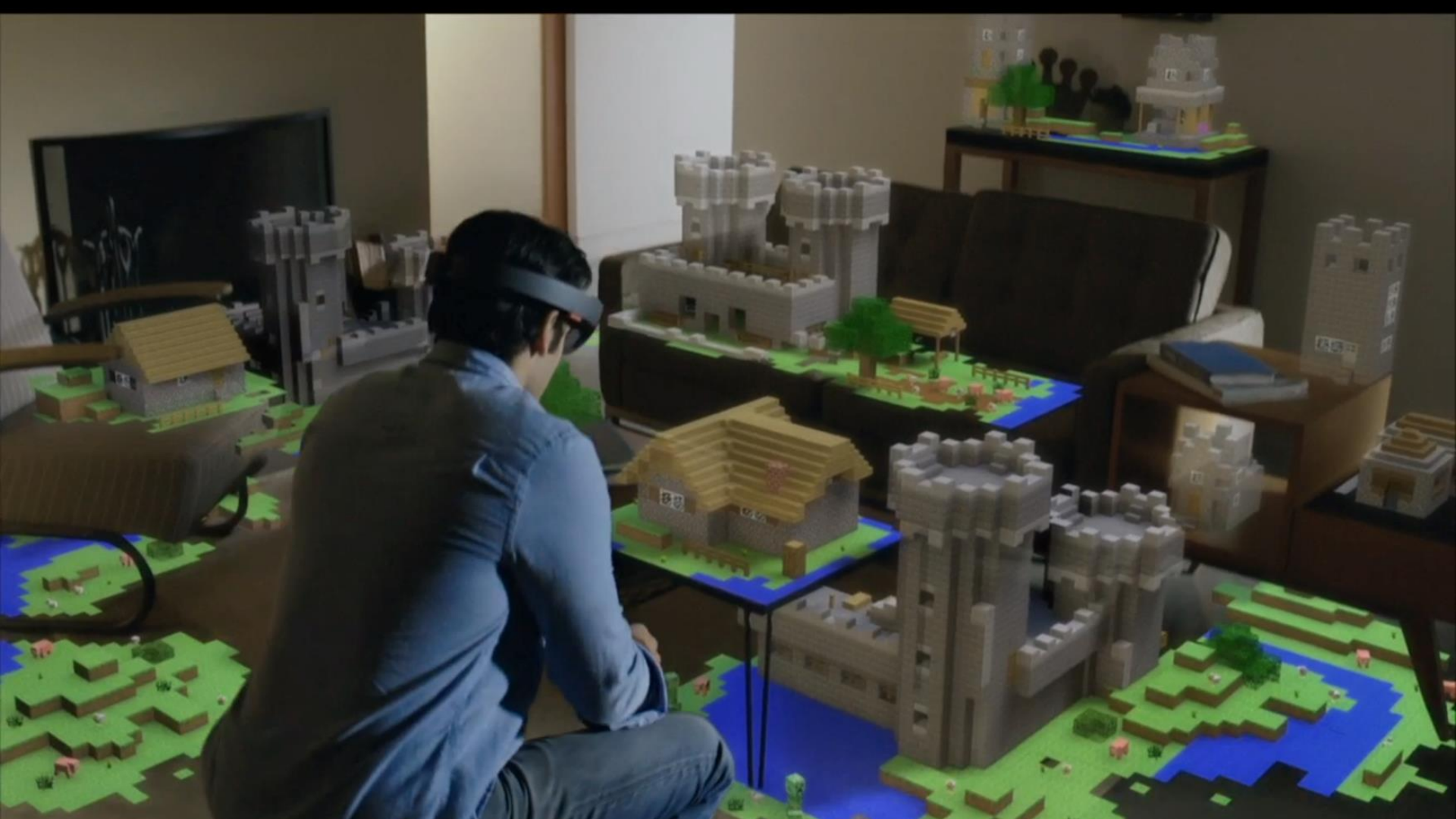
# Funda introduceert virtueel bezichtigen met Oculus Rift



**Makelaars kunnen huizenzoekers voortaan huizen virtueel laten bezichtigen op funda. Daarvoor heeft het online vastgoedplatform een interactieve toepassing ontwikkeld rondom de VR bril Oculus Rift.**

Met deze bril kan de makelaar potentiële kopers rondleiden door een huis zonder dat ze daar daadwerkelijk aanwezig zijn. funda

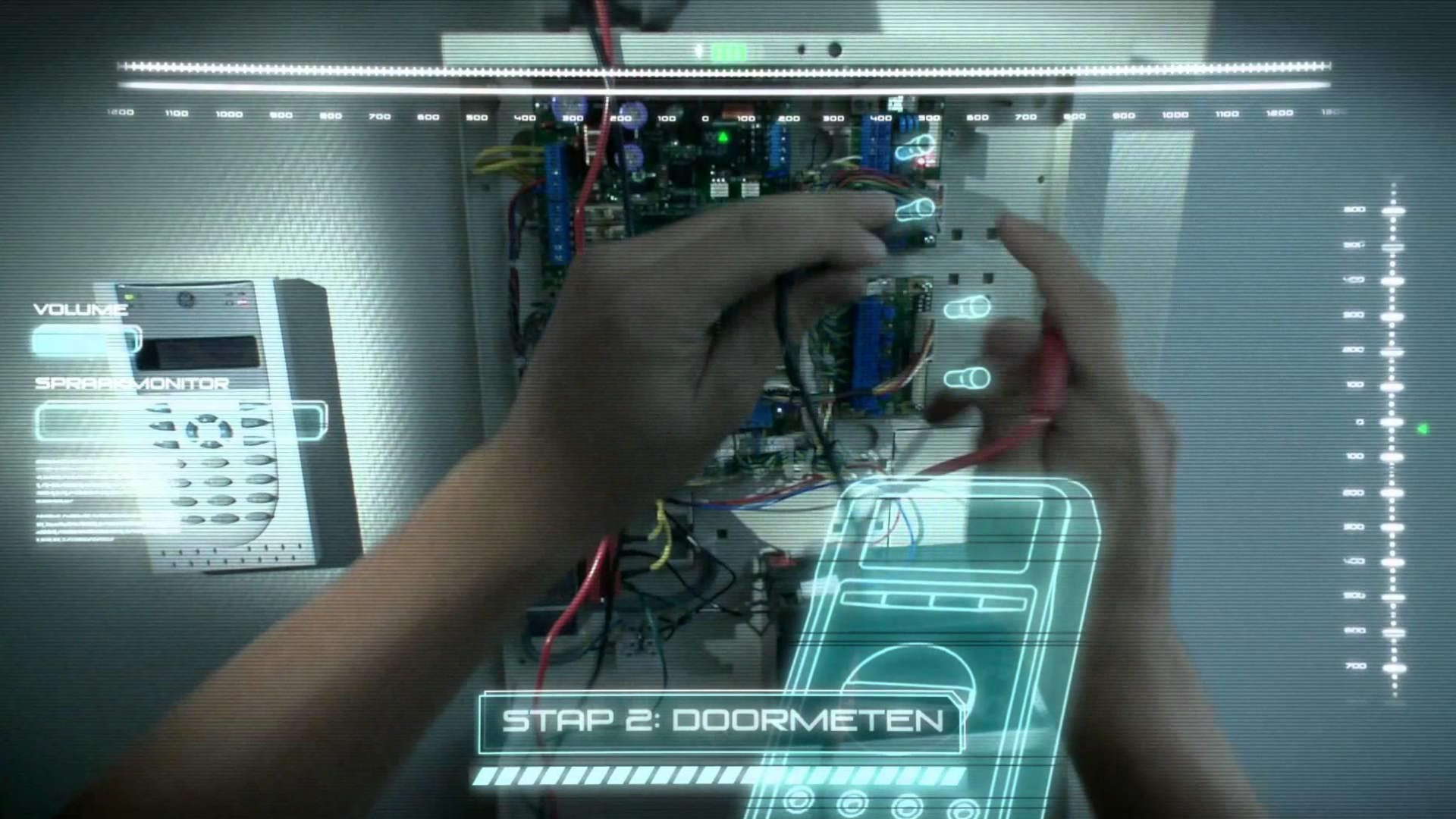
verwacht dat virtueel bezichtigen voor meer contact tussen makelaar en huizenzoeker gaat zorgen.

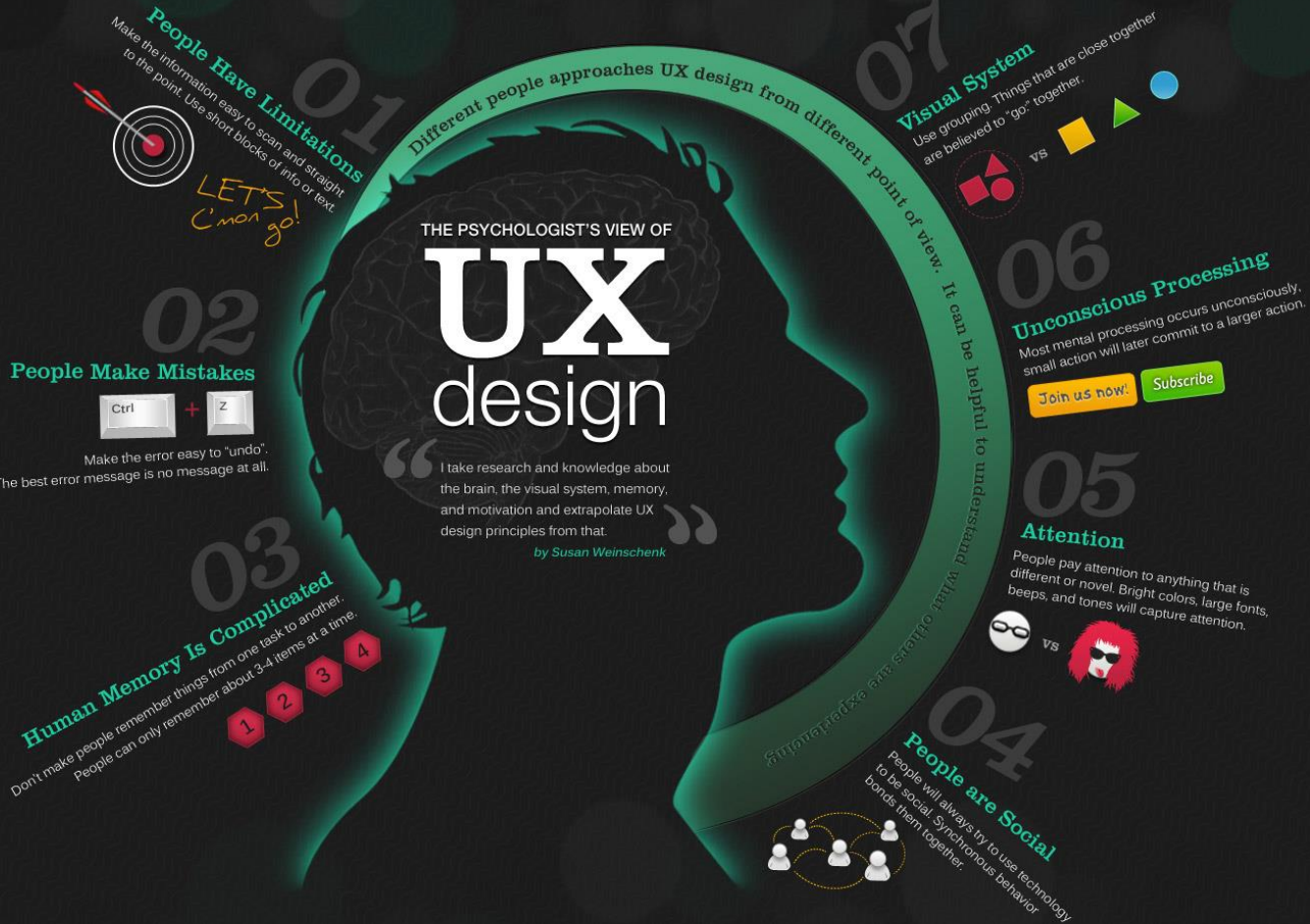


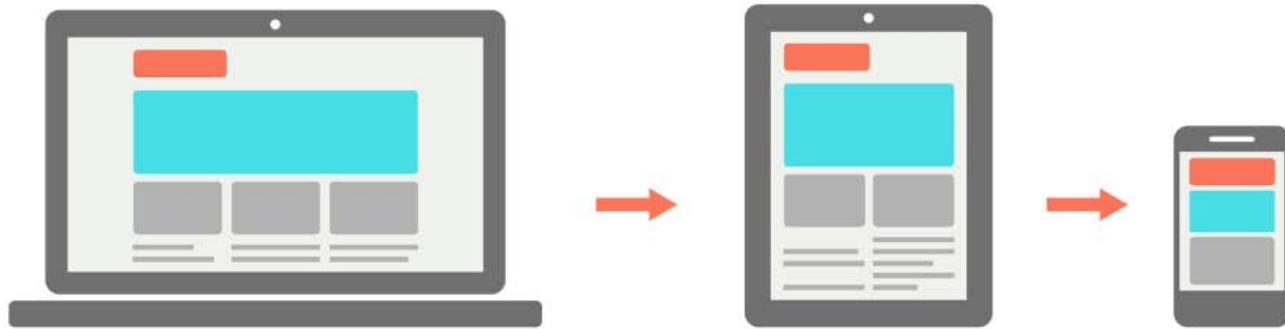
VOLUME

SPRAAKMONITOR

STAP 2: DOORMETEN



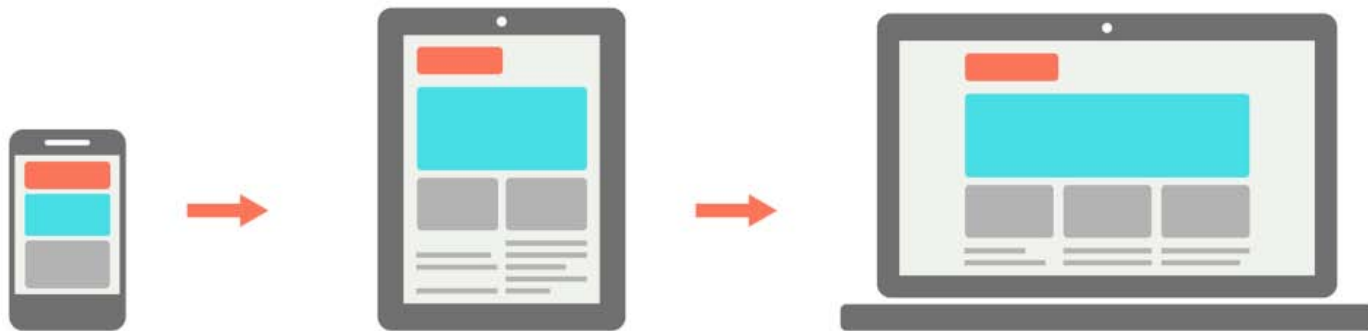




Responsive Web Design

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Mobile First Web Design



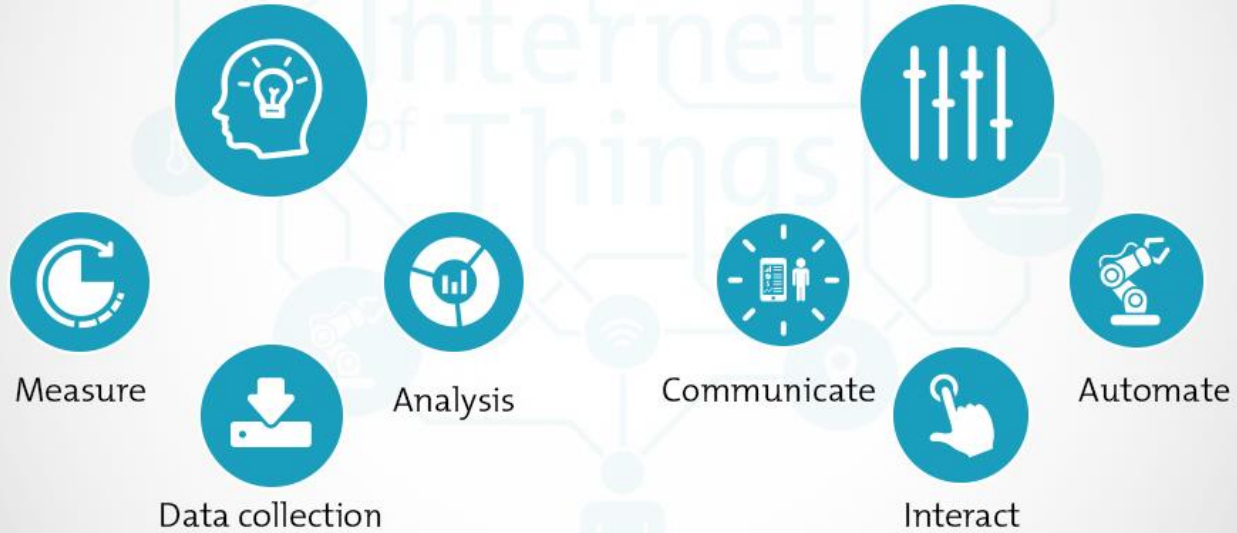



BEHAVIORAL TARGETING



Insights

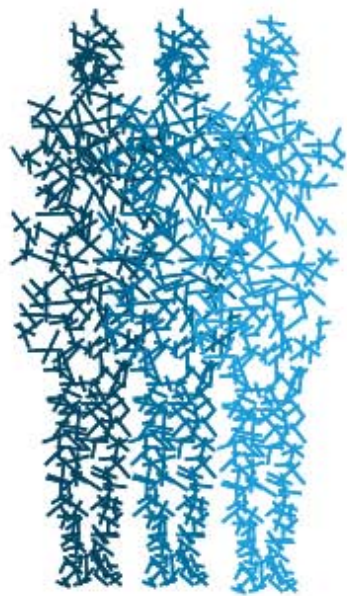
Influence



A woman is shown in profile, looking towards a large digital display. The display is filled with a grid of small, glowing blue dots, creating a textured, digital appearance. The overall lighting is a deep blue, and the woman's face is partially illuminated by the light from the screen. The text "Digital" is Going Away is overlaid in the top right corner in a white, sans-serif font.

**“Digital” is Going Away**





**INTERNET**  
*of* **PEOPLE**

# The Internet You Ain't Seen Nothing Yet.

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