DeltaHedron®
Shaping the future

NATIONAL ASSOCIATION OF MANAGING AGENTS
SHAPING OUR PROFESSION

Assessing the strategic business impact, opportunities and risks presented by emerging technologies

A NEW DAWN
The way forward

NAMA 2019 National Conference

Calie Pistorius

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Site map

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We know two things….

All companies rely on technology….

- **Use, make, logistics and supply chain**
- **… as well as their customers, suppliers, partners and competitors**

All technologies change and evolve

- **Some incrementally and slow….**
- **Some faster and radically - disruptive**
- **Substitution of one for another**

Dynamics of technological change

- **Strategic business impact - all companies**
- **Strategic innovation risk**
  - **Opportunities and Threats**
  - **Emerging technologies**

Risk…

Probability/ impact

- **‘bad things happening’**
- **Missing a good opportunity**

‘One company’s opportunity is another’s threat’

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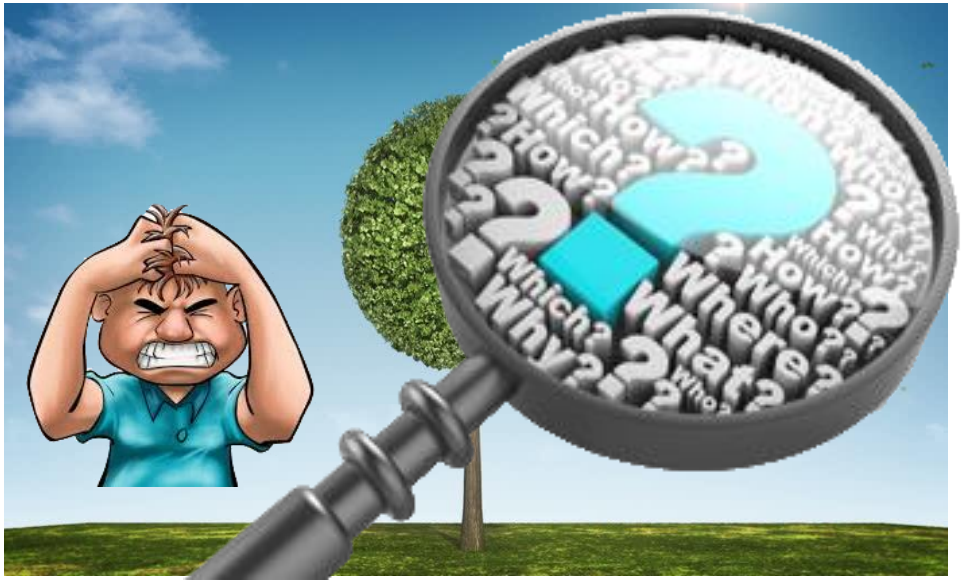
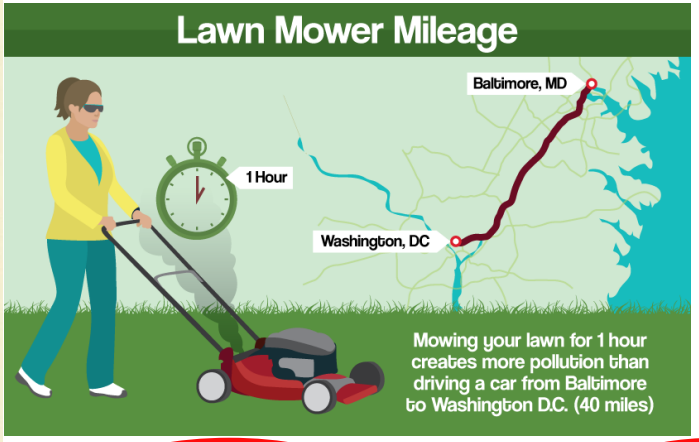
Emerging technologies……

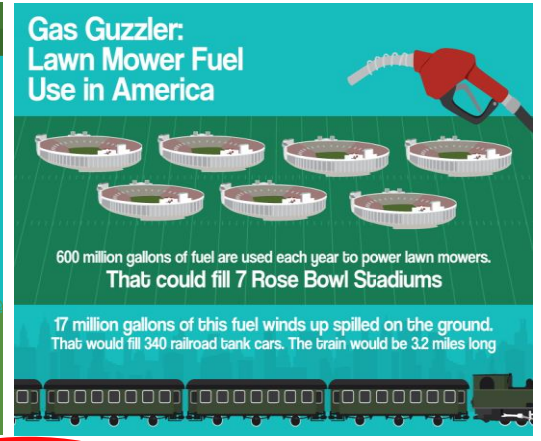
[….. “Where did that come from ?”]

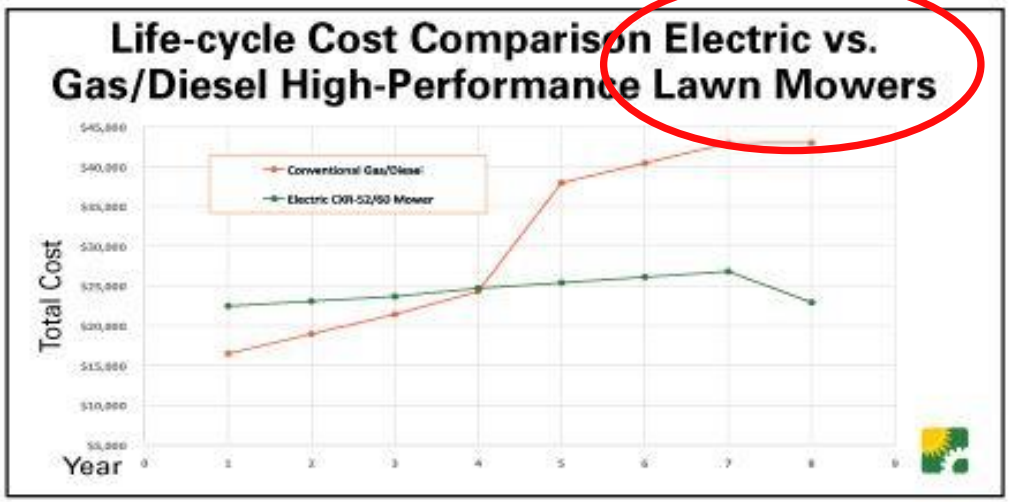


Emerging technologies……
[….. “Where did that come from ?”]

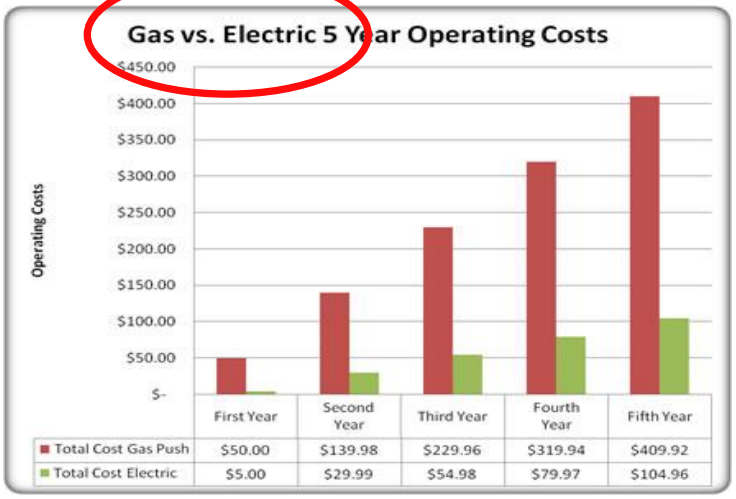
www.fix.com







https://www.ecoequipmentsupply.com/why-electric/



https://www.powerequipmentdirect.com

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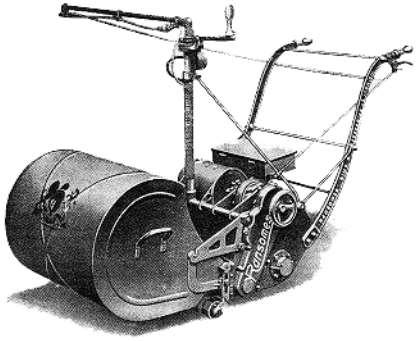
Emerging technologies……

[….. “Where did that come from ?”]



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Meanwhile…..innovations in magnets and electric motors

Scientists discover new type of magnet

07.02.2019

A team of scientists has discovered the first robust example of a new type of magnet--one that holds promise for enhancing the performance of data storage technologies.

This "singlet-based" magnet differs from conventional magnets, in which small magnetic constituents align with one another to create a strong magnetic field.

RESEARCH

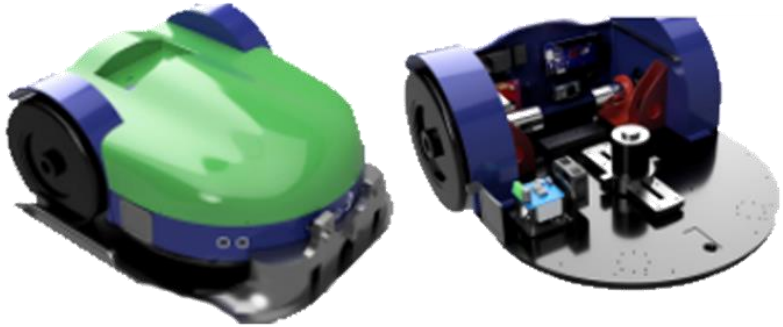
METAL 3D PRINTER USES COLD SPRAY TO MAKE BETTER MOTORS

- JANUARY 26TH 2018 - 7:25PM 0 0

A new metal 3D printer developed by scientists at the National Research Council of Canada (NRC) has created high-performance magnets using cold spray additive manufacturing.
The 3D printed magnets, manufactured by [redacted] at the NRC laboratory in Boucherville, Quebec, will be used to enhance the design of electric motors.

Mechanical Engineer Makes 95% 3D Printed Autonomous Robotic Lawn Mower

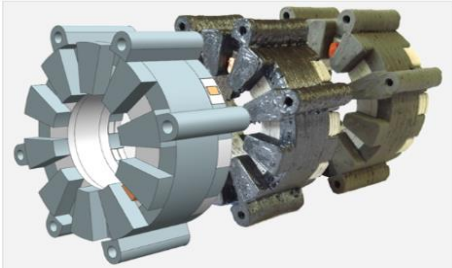
by Sarah Saunders | Feb 20, 2019 | 3D Printing, Robotics |



Researchers Create First Fully 3D Printed Electric Motor

by Clare Scott | May 2, 2018 | 3D Design, 3D Printing, Science & Technology |

The 3D printing process that the researchers developed for the motor involves the extrusion of viscous pastes which consist of particles of iron, copper or ceramics as well as specially-adapted bonding agents. The 3D printed part is then sintered, which burns away the binder and fuses the metallic or ceramic materials together.



[Image: Johannes Rudolph]

"The special strength of the 3D multi-material process lies in the possibility of

Innovate !
Stop pushing….

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Innovate !
Stop pushing….

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Meanwhile…
in another galaxy far away

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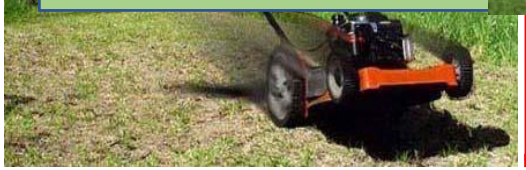
Are you solving the ‘real’ problem ?



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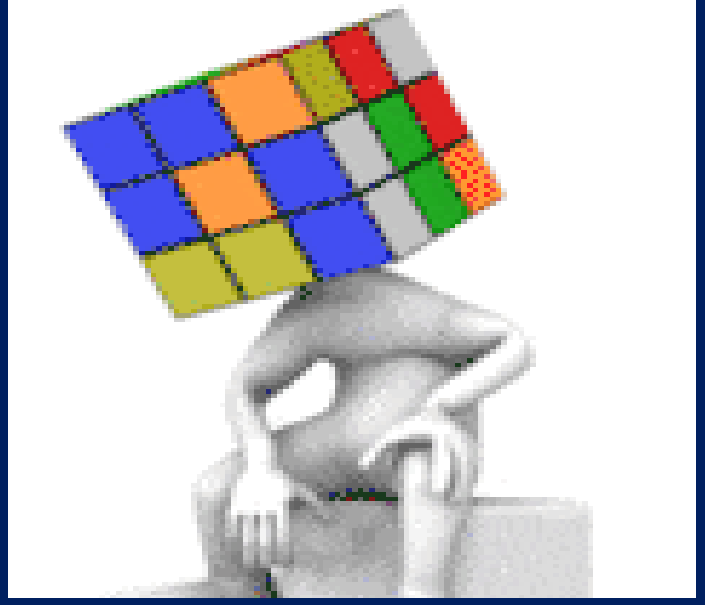
But wait… there is more

Dynamic

Continuous



Interaction

Technologies/Other

Strategic impact

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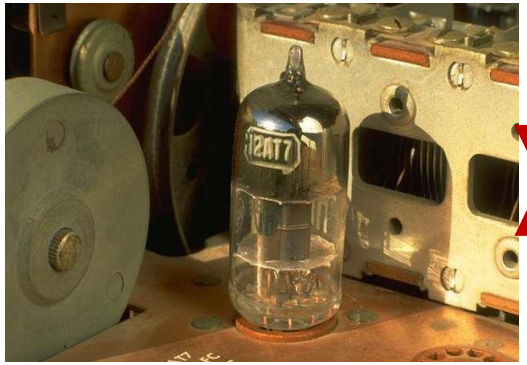
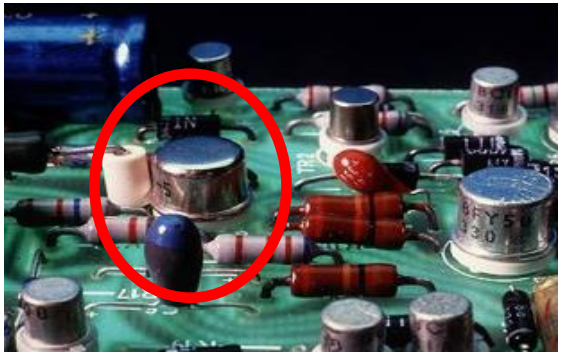
Shifts in industry leadership

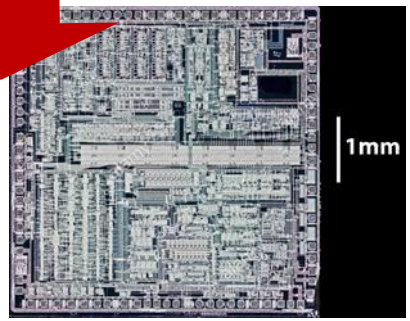
Consider now as an example the impact that various waves of technological innovation had on the structure of the active electronics industry…



Valves (tubes)



Transistors



Integrated circuits (IC)

Strategic impact [Risk]

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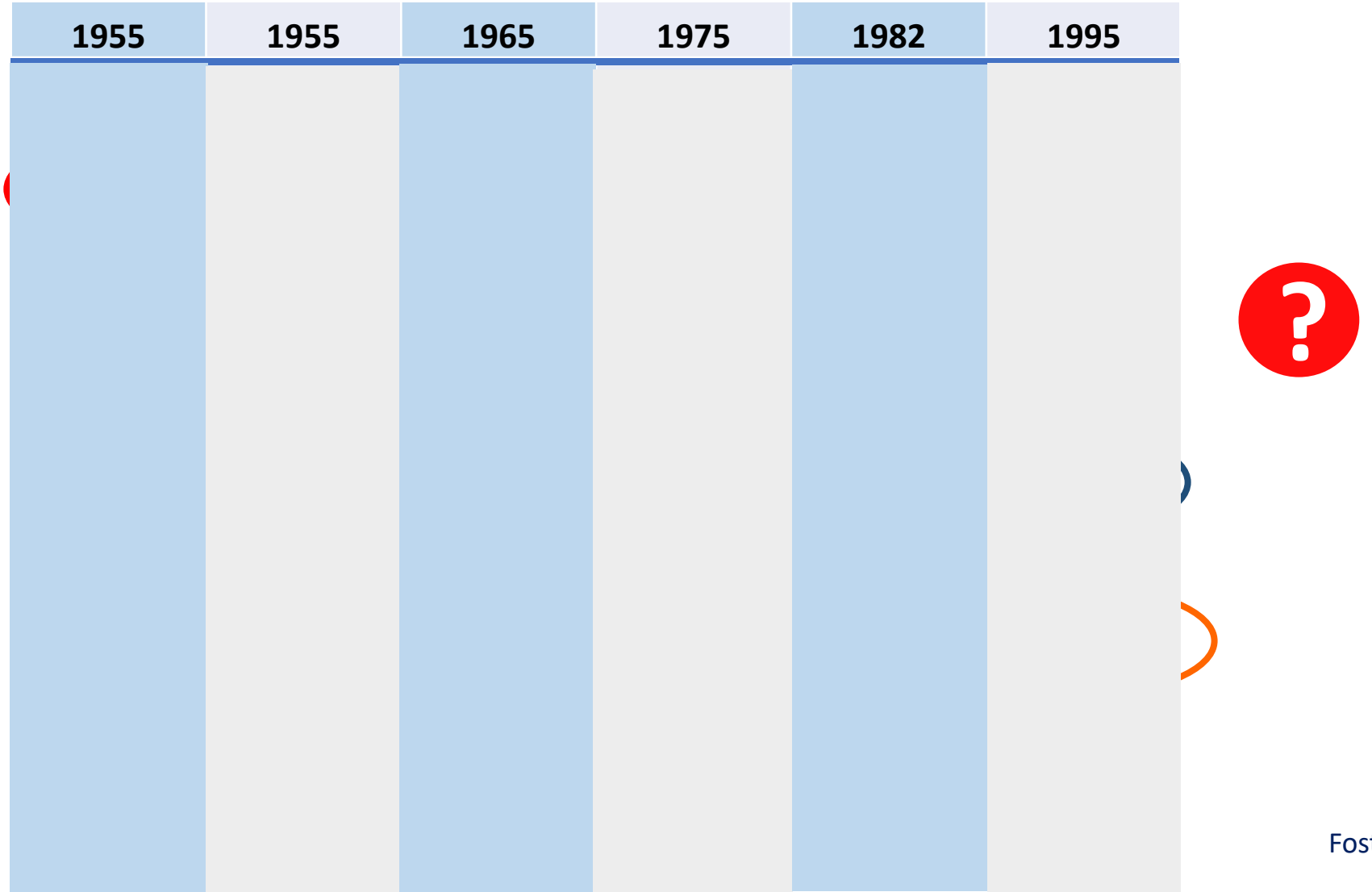
Shifts in industry leadership: Active electronics



Foster

Biological electronics

The quest for the protein chip

INNOVATION

Why Technologists Should Think Like Biologists

Harvard Business Review

by Samuel Arbesman

JULY 20, 2016

New way to double the efficiency of organic electronics

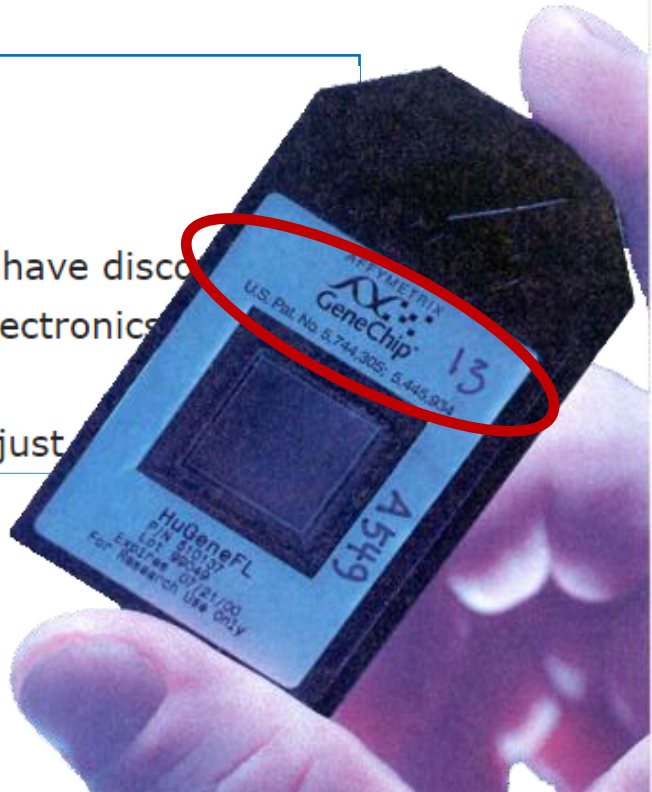
January 15, 2019

Researchers from Chalmers University of Technology, Sweden, have disco
simple new tweak that could double the efficiency of organic electronics

OLED-displays, plastic-based solar cells and bioelectronics are just

Animal, Plant Biology Improves Electronic and Energy Conversion Devices

Fri, 01/25/2019 - 11:00am by Chris Adam, Purdue University



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Biological electronics

WORLD ECONOMIC FORUM

Top 10 Emerging Technologies 2019

DNA Data Storage

Life's information-storage system is being adapted to handle massive amounts of information

DNA can accurately stow massive amounts of data at a density **far exceeding that of electronic devices**. All **the world's current storage needs for a year** could be well met by a **cube of DNA measuring about one meter on a side**

Microsoft: This is world's first automated DNA data storage, retrieval system

Microsoft researchers reveal an apparatus for automating the storage and retrieval of data stored in DNA.

March 22, 2019 -- 14:12 GMT (14:12 GMT) | Topic: Innovation

Microsoft believes synthetic DNA could be the next big leap in long-term data storage, with just one gram of DNA capable of storing 215 petabytes of data for up to 2,000 years. If it pans out, the technology could significantly reduce the space required to store the world's growing data.

Using the proof-of-concept DNA storage device, the researchers demonstrated its write and read capabilities by encoding the word 'hello' in snippets of DNA and converting it back to data.

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Biological computers

How MIT's new biological 'compu works, and what it could do in the future

By Graham Templeton on Ju

1.4K shares

For years now, scientists have been working to make cell goal; cells store information in something roughly approx due to the strict, rules-based expression of programming can carry out operations with astonishing speed. Each ce complexity to theoretically be quite a powerful computing also small enough to pack by the millions into tiny physic ability to program cell behavior as reliably as we do comp what biological computing could accomplish.

Brain Computer Interface (BCI) Market | Smart Technologies Are Changing medical device Industry

Press Release • Mar 25, 2019 11:50 IST

Share

DANIEL OBERHAUS SCIENCE 03.21.19 06:10 PM

FINALLY! A DNA COMPUTER THAT CAN ACTUALLY BE REPROGRAMMED

They showed it's possible to use a simple trigger to coax
nting numerous
l exploratory,
sed in the future
ssfully delivered

Elon Musk reveals brain-hacking plans

465 17 July 2019

NeuraLink, a company set up by Elon Musk to explore ways to connect the human brain to a computer interface, has applied to US regulators to start trialling its device on humans.

Strategic impact [Risk]

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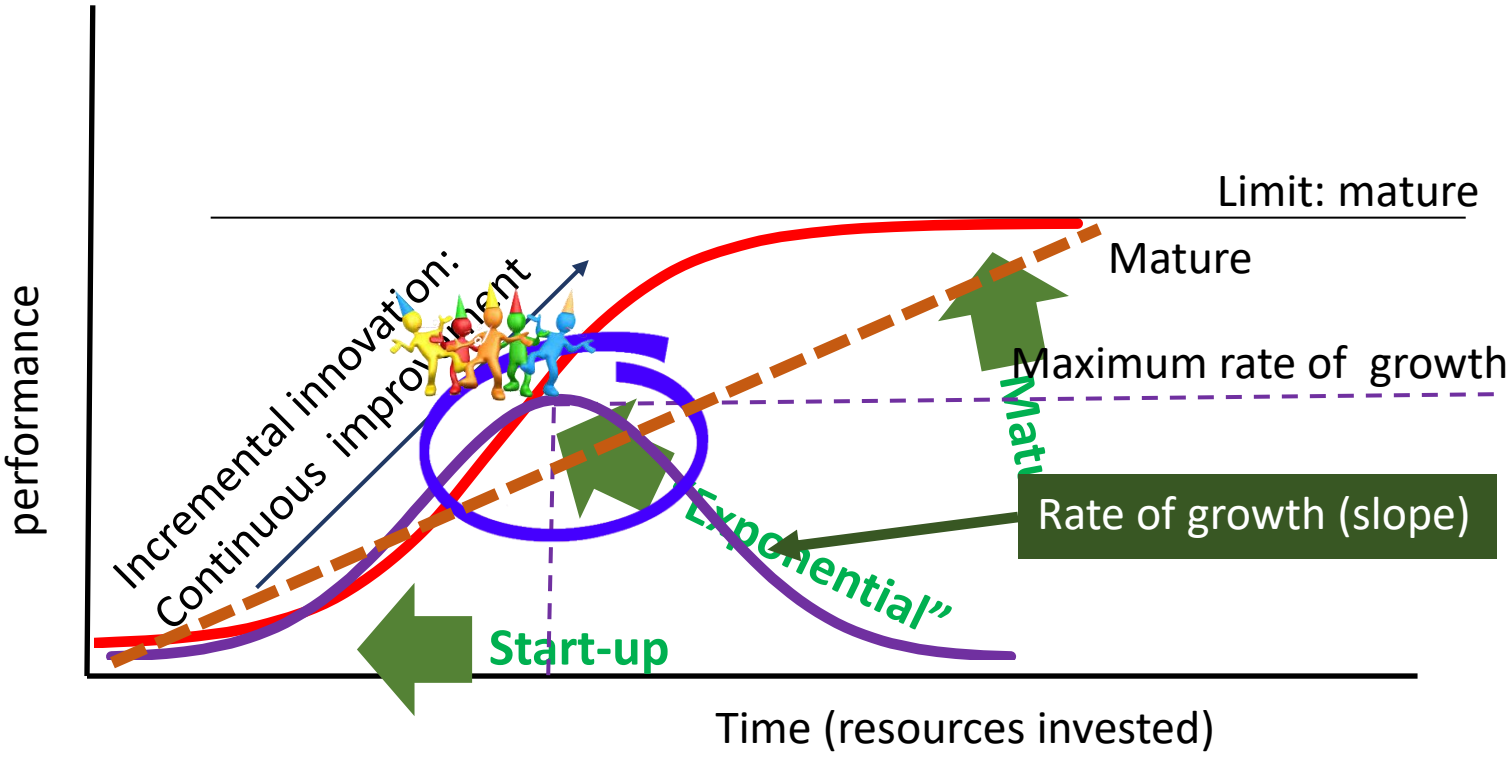
The growth of systems
…to maturity ('the dynamics')



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Incremental innovations: Bicycles

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Continuous improvement…? (Resistance to change)

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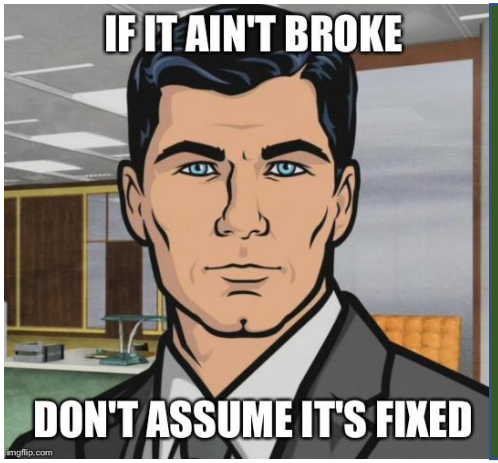
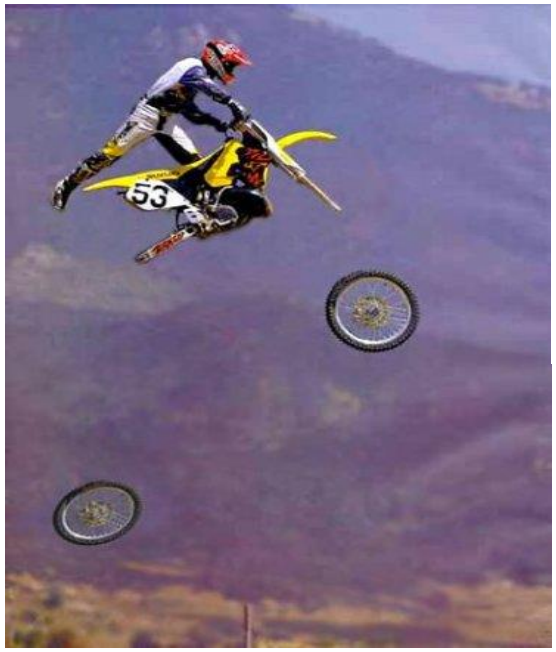
Continuous improvement…

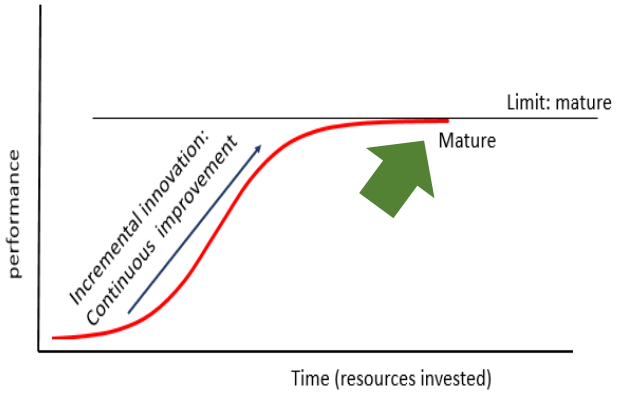


" they say if it isn't broke, don't fix it. But if it could be better, then it's just as good as broken (…not even to speak of obsolete)"

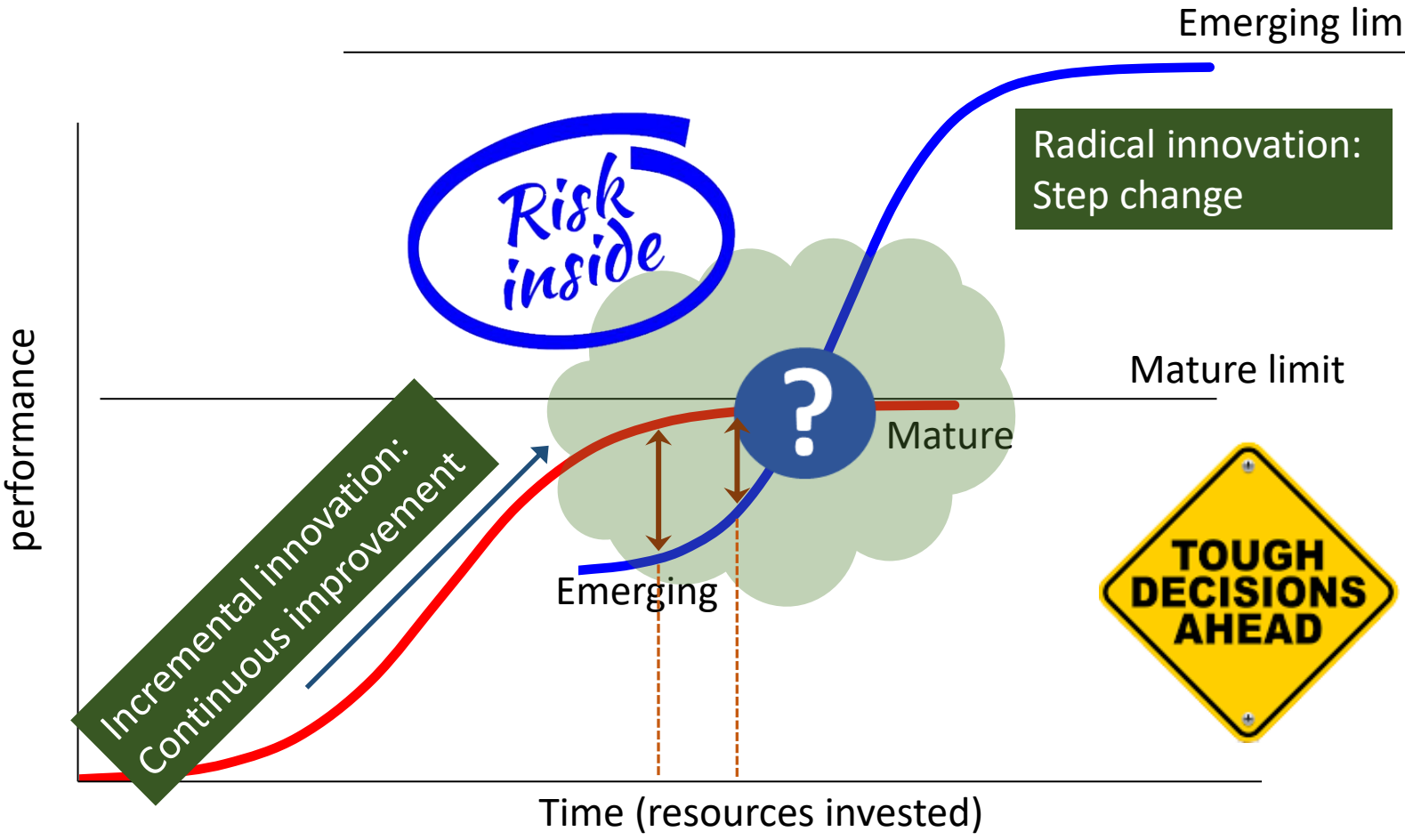
Fire brigade … ('if it ain't broke don't fix it' approach

Pushing beyond the limits…

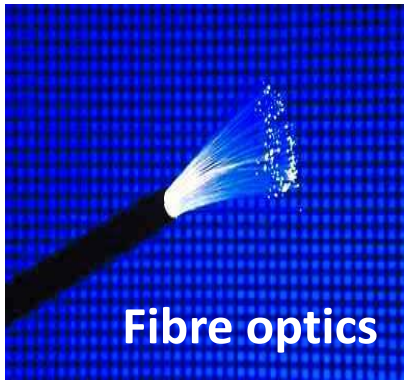




Innovation…
When step-change is required



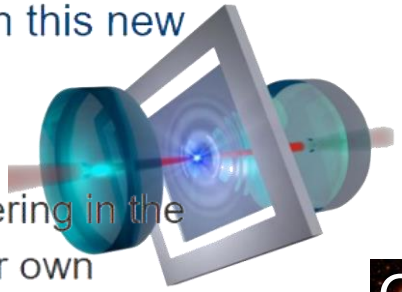
Radical innovation
Telecommunication



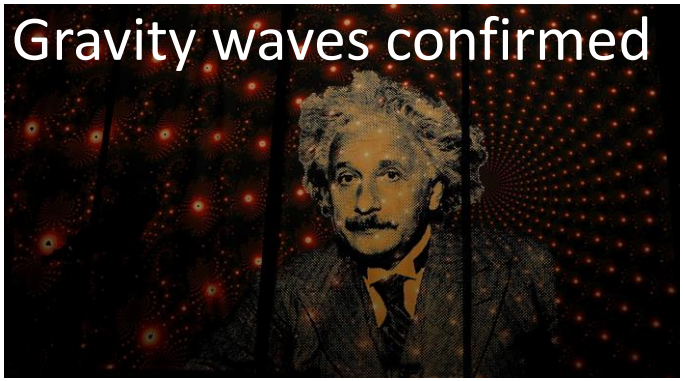
Wireless

It's a one-way street for sound waves in this new technology

Date: April 3, 2019



Imagine being able to hear people whispering in the next room, while the raucous party in your own room is inaudible to the whisperers. Yale researchers have found a way to do just that -- make sound flow in one direction -- within a fundamental technology found in everything from cell phones to gravitational wave detectors.



Disruption….
even as we speak

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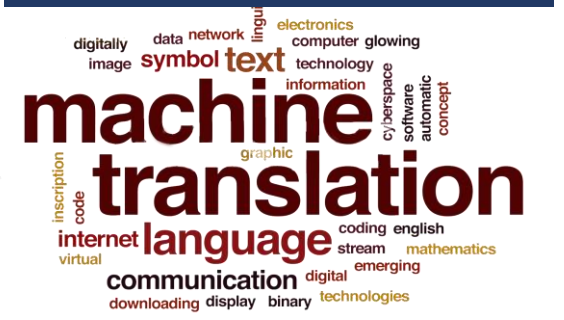
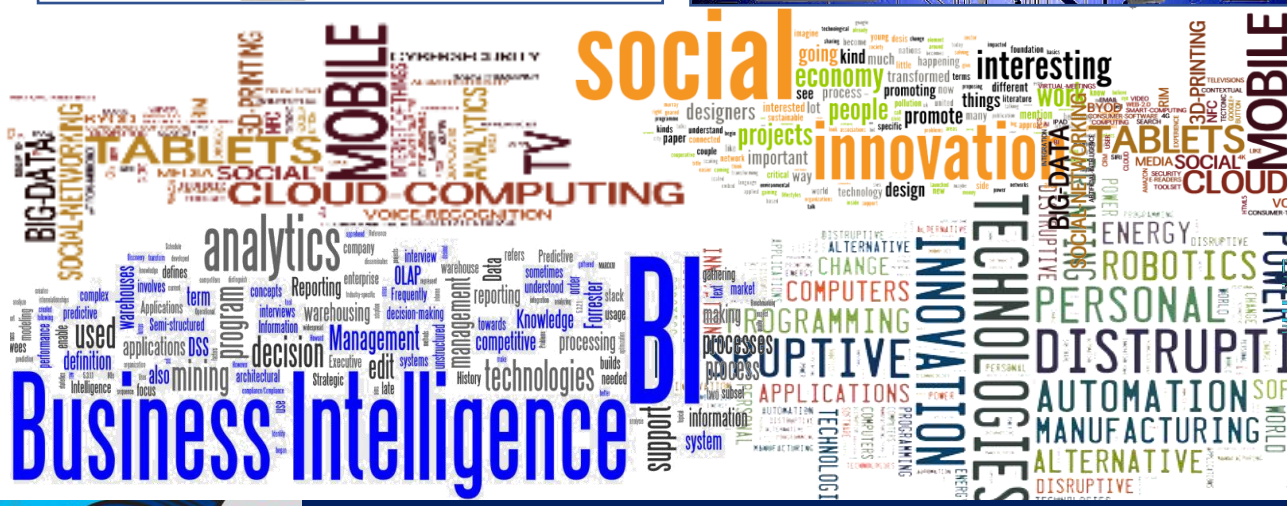
Remember these ?

Recognise these ?

How about these ?





So what ?

Why is this important ?

…. because they are (probably) disrupting your business even as you read this – Innovation risk !

Emerging technologies

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Digital transformation

- Generate
- Collect
- Transmit/Receive

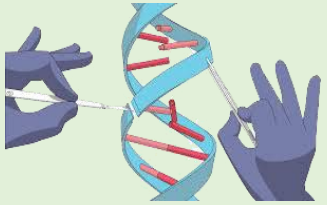
Sensors
IoT

  - Communication
- Store/organise/retrieve
- Analyse/interpret
- Intelligence
  - Decision support
- Action
  - Control
  - Feedback

"If its digital, its data"

Non-digital

- Biotechnology
- Materials
- Astrophysics



BIOTECH

Emerging technologies

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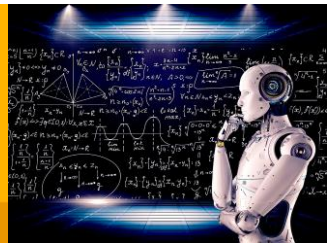
Smart

- Smart ‘everything’

Sense **See, hear, feel** **Weather** **Awareness** **Environment** **Time** **Location** **Orientation** **Movement** **Collaborate**	**Reasoning** **Make decisions** **Draw conclusions** **Develop 'common sense'** **[Ethics and bias-free]** **Dealing with the unforseen** **Navigate** **Take evasive action in in real time** **Pro-activity** **Anticipate and predict**	**Monitor** **Measure** **Observe** **Recognise** **Detect** **Hazards** **Self maintenance** **Self cleaning** **Self healing** **Compute** **Remember**	**Learn** **Adapt behaviour** **Decision-criteria** **Communicate** **Interact with humans machines, animals and environment** **Natural language processing (NLP)** **Take action** **Autonomous** **Control**







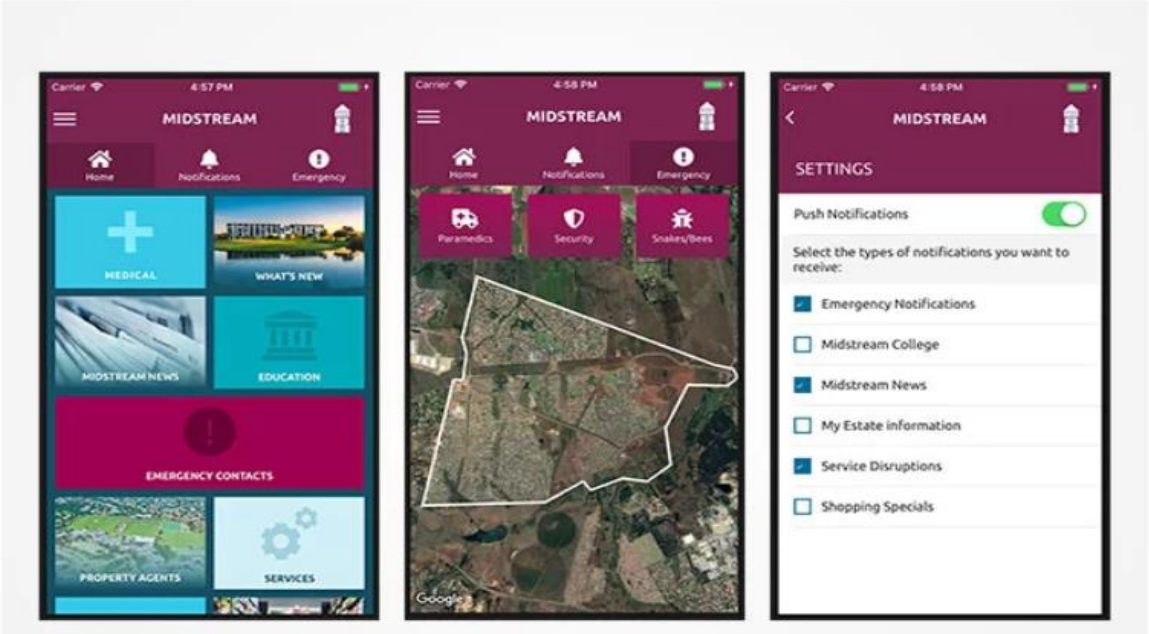
Emerging technologies

Digital transformation

- Mobile (wifi)
  - “Mobile-first”
  - Apps

Top South African security estate launches innovative new app

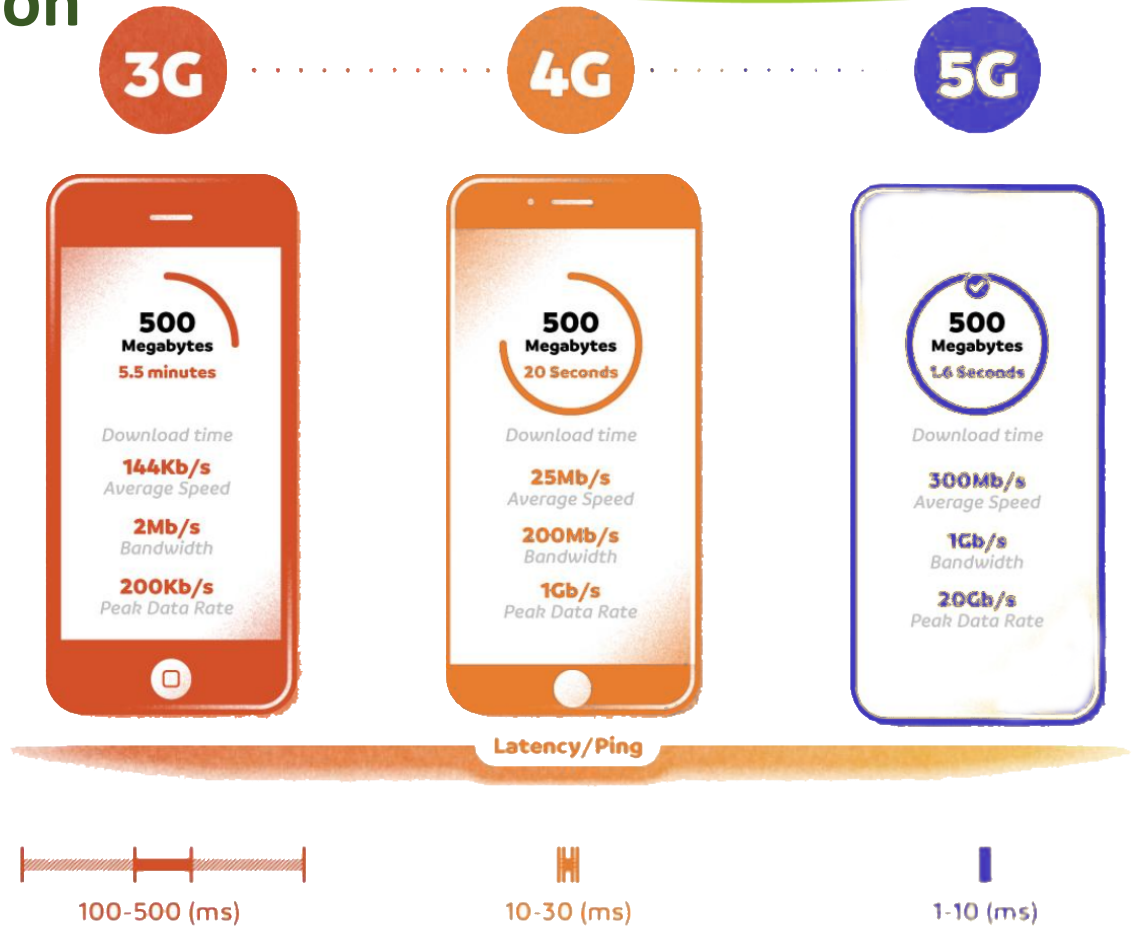
26 August 2019



Emerging technologies

Digital transformation

- **Mobile (wifi)**



Insurers Brace for Emerging 5G Risks

August 2019

Emerging technologies

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Digital transformation

- **Cloud**
- **SaaS**
  - ‘Software-as-a-service’
  - ….XaaS
  - Business model
    - Subscription model

Emerging technologies

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How Big Data Has Impacted The Real Estate Industry

Big data has impacted the real estate industry in major ways. Here's what to know about the major transformations it has caused.

March 2019

- Better prediction and analysis
  - Monitoring risks and trends
- More accurate a and faster property evaluations and appraisals
  - Used by finance institutions
- Helping buyers and sellers adjust their behaviour to align with the market
- Help consumers with prospecting
- A ‘decline of real estate agents’ ?
  - NAR: 51% of home buyers found their homes online in 2017
  - A new role ?

Emerging technologies

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Digital transformation

- **Analytics**
  - Descriptive
    - "What happened…"
  - Predictive
    - "What will happen…"
  - Prescriptive
    - "What to do about it"

How India's Biggest Property Tech Startup Square Yards Is Using Analytics To Unify The Real Estate Market

February 2019

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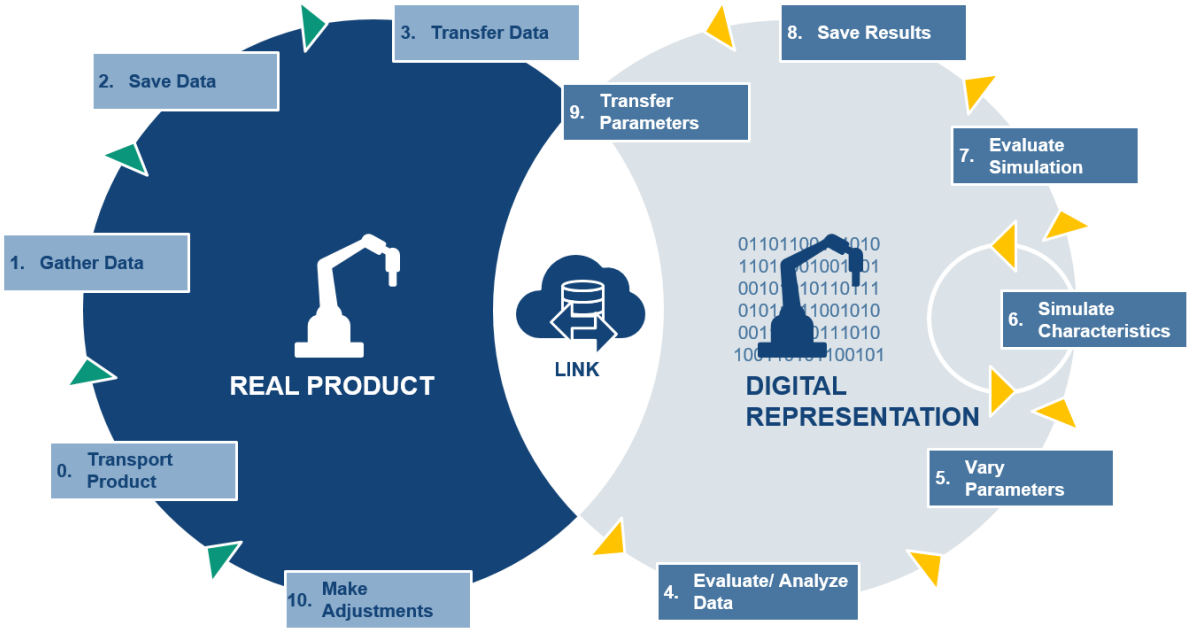
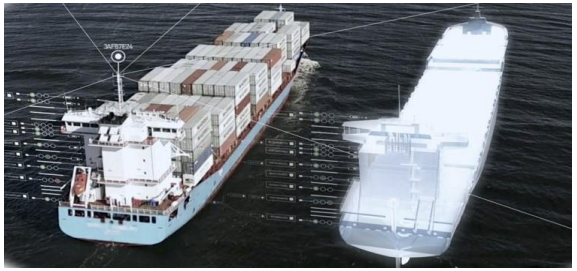
Emerging technologies

- **Digital twins**
  - Simulations





Emerging technologies

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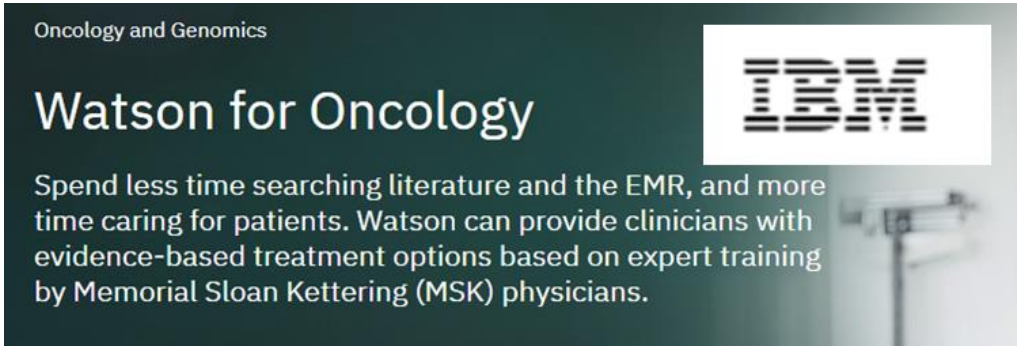
Digital transformation

- Artificial intelligence
  - Machine learning
  - Deep learning



Indian Real Estate Firms Fast Adopting AI Technology: Report

July 2019

ARTIFICIAL INTELLIGENCE (AI) NEWS

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LeaseHawk unveils artificial intelligence leasing assistant

June 2019

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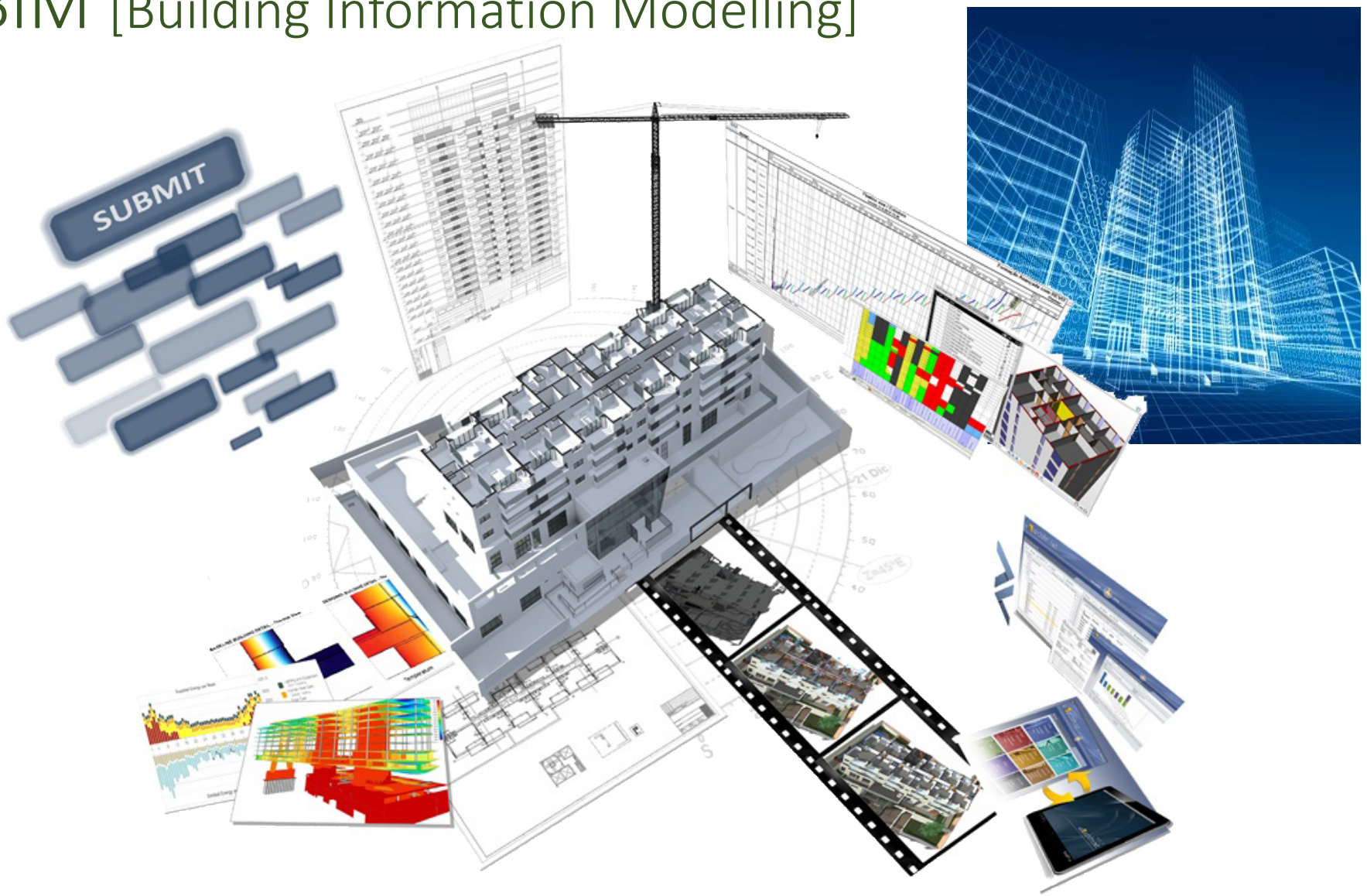
Emerging technologies

BIM [Building Information Modelling]



Emerging technologies

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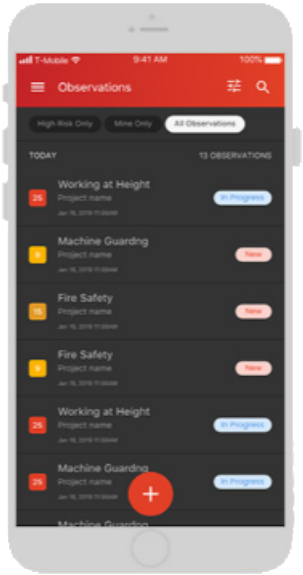
Digital transformation

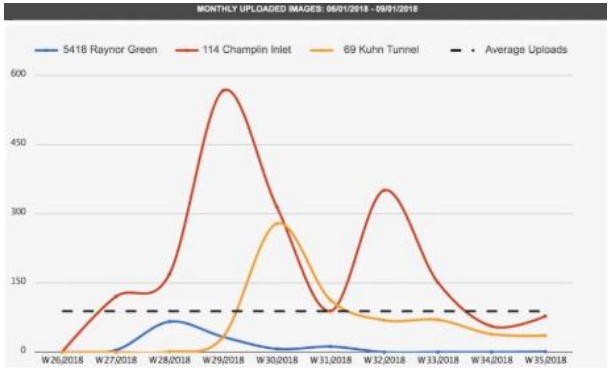
- **Artificial intelligence**

Interpretation and predication of safety incidents

SMARTVID.IO



PROJECT	HARD HAT	HI VIS	GLOVES	GLASSES	AVERAGE
5418 Raynor Green	98%	93%	79%	100%	93%
114 Champlin Inlet	97%	61%	71%	19%	62%
69 Kuhn Tunnel	97%	98%	95%	99%	97%
AVERAGE BY TAG	97%	91%	91%	97%	84%



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HoloLens 2 powers next generation of BIM tools

February 2019

Improving Facility Management Through BIM Data

Access to building information modeling data provides facilities teams valuable insight, but integrating this data into facility systems is a challenge.

November 30, 2018

Emerging technologies

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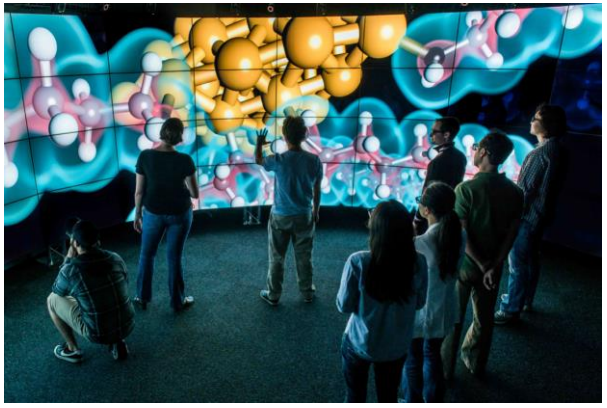
Digital transformation

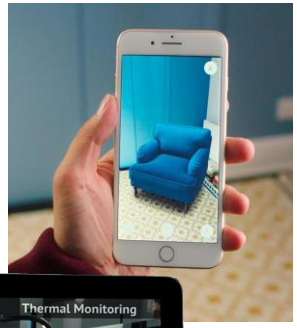
- **Virtual Reality (VR)**
  - Immersed in a virtual world
- **Augmented Reality (AR)**
  - Overlays virtual objects on the real world
  - [Heads up displays]
- **Mixed Reality (MR)**

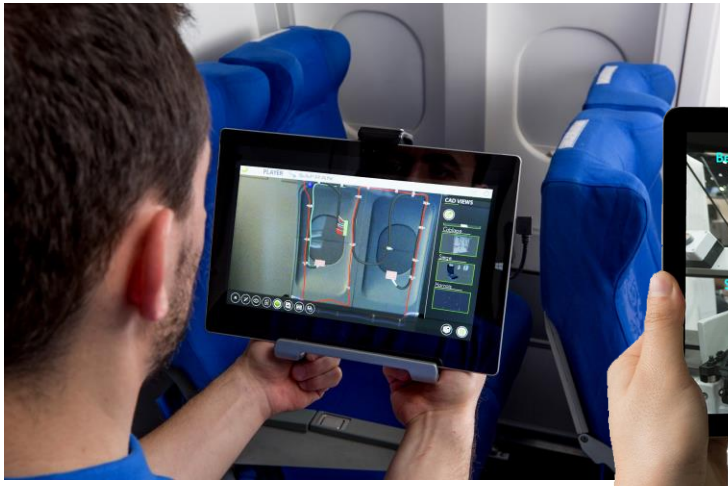


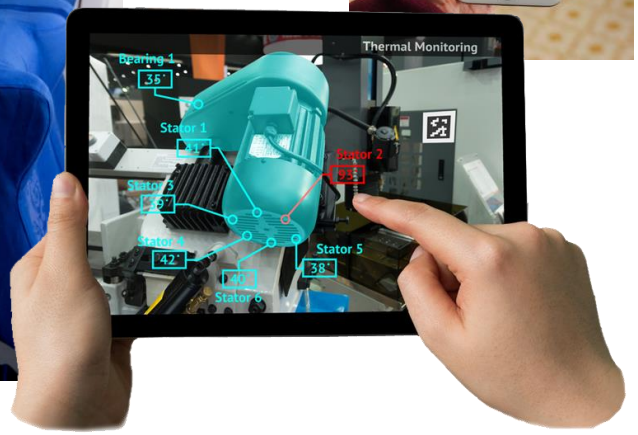
Emerging technologies

Digital transformation

- **Virtual Reality (VR)**
  - Immersed in a virtual world
- **Augmented Reality (AR)**
  - Overlays virtual objects on the real world
  - [Heads up displays]
- **Mixed reality (MR)**







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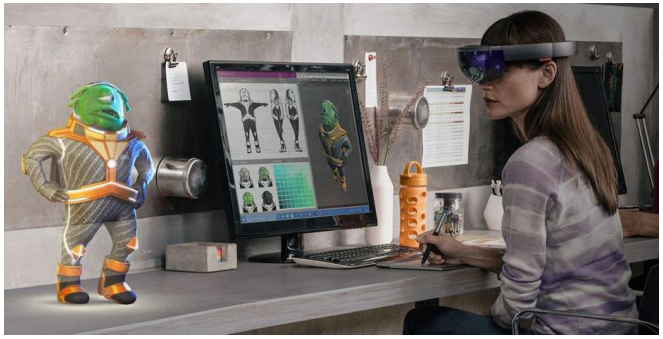
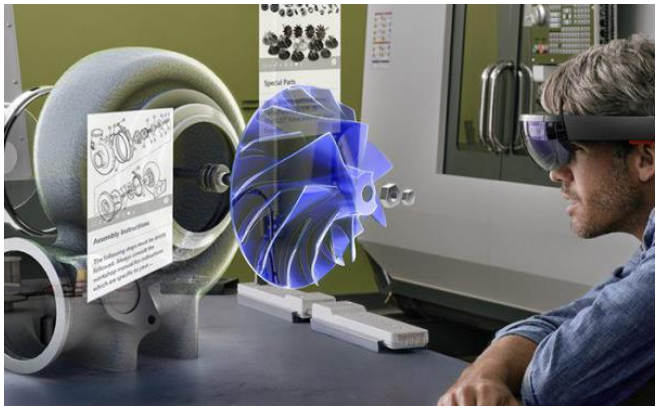
Emerging technologies

Digital transformation

- **Virtual Reality (VR)**
  - Immersed in a virtual world
- **Augmented Reality (AR)**
  - Overlays virtual objects on the real world
- **Mixed Reality (MR)**
  - AR plus ability to interact
  - Holograms
  - Extended Reality (XR)





VR/AR

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Emerging technologies

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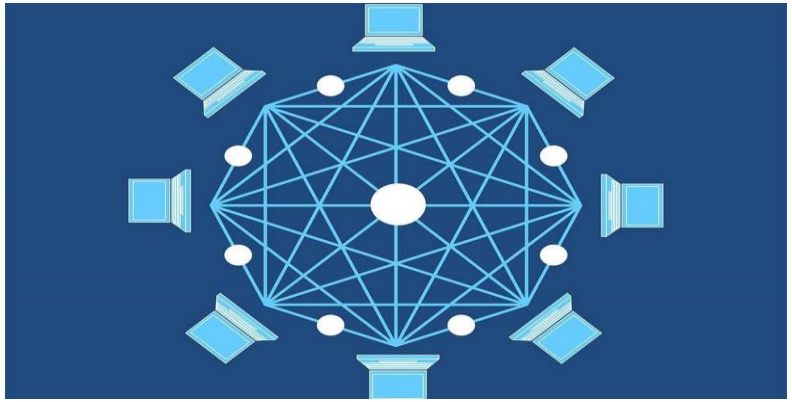
Digital transformation

Blockchain

- Digital 'trust and authentication'
- Distributed ledger system

- **Cryptocurrencies**
  - Bitcoin
  - Euthereum
  - …. and 1000s more

- Smart contracts
- Document verification
- Property title
- Logistics
- "Transaction….."
- Tokenisation
  - Splitting assets
  - represented on the blockchain



Emerging technologies

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Digital transformation

Blockchain

05 JUN 2019

BLOCKCHAIN

Patents for blockchain-related technology is outpacing all other fields of computing

Blockchain Real Estate Startups Shaking Up Property Investment

Europe Completes Its First Ever Blockchain Real Estate Sale for €6.5 Million

Internet of Things (IoT)

- Internet of Industrial Things (IIoT)
  - IoXT
- Sensors

- Asset management
  - Identify, verify, alert
  - Track
    - Position
    - Speed, acceleration
    - Orientation
    - Status (full/empty)
  - Communicate
  - Control

Emerging technologies

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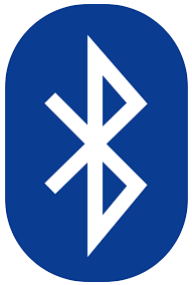
Geospatial

- Where
- When
- How fast, accelerate
- Orientation
- Proximity
  - Alerts, interventions
- Predict and Analyse
  - Record
  - Analytics, Big Data, AI
- Combine with other sensors



Geospatial Intelligence Center and Esri Team Up to Introduce New Tool that Enhances Remote Property Assessments for Insurers

10 July 2019

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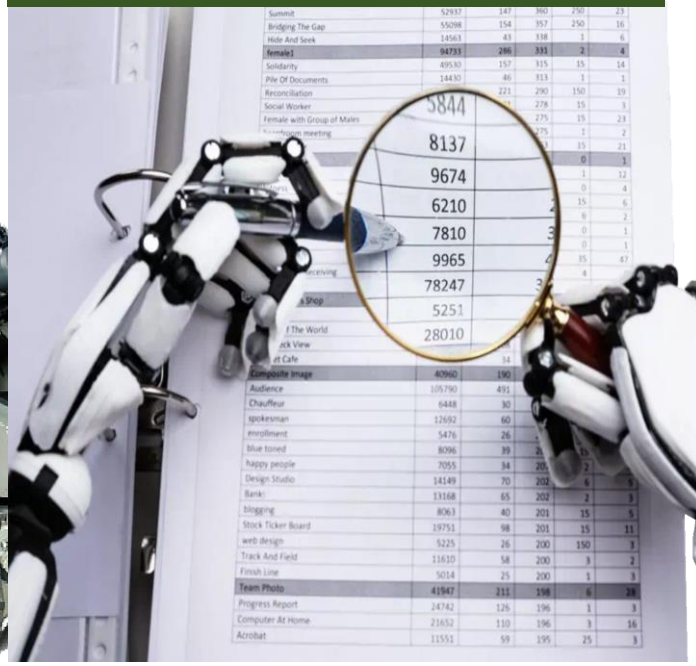
Robotics

Robotic process automation (RPA)



Emerging technologies

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Drones

Emerging technologies

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Drones

Drones Patrol South African Residential Estates

Aerial assessment: The insurance adjuster is a drone

Drone inspections are fast becoming the new norm for insurance companies, and that's creating new industry alliances.

Emerging technologies

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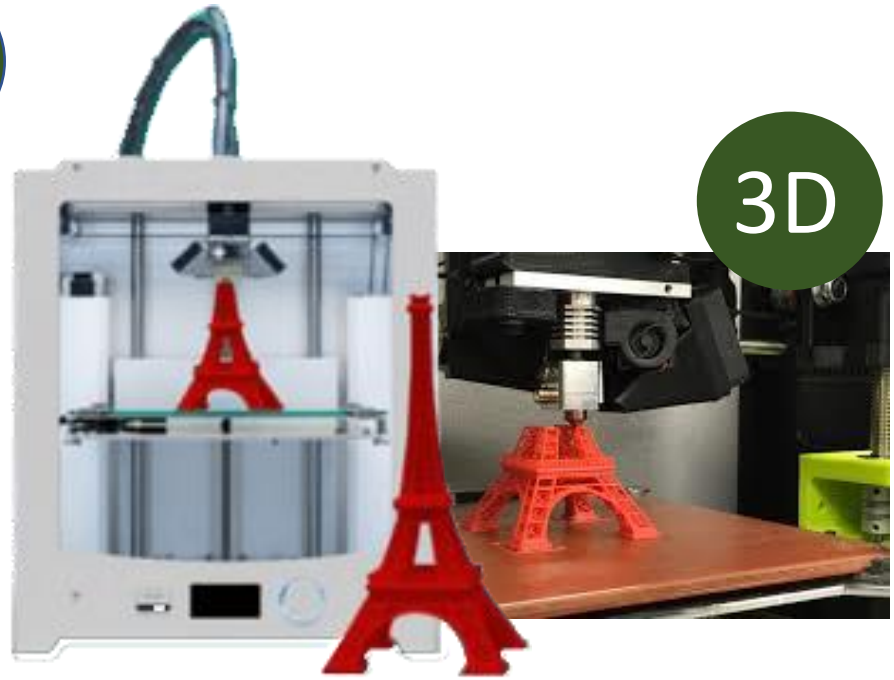
3D Printing
(Additive manufacturing)



Materials (include…)		
Plastic	Biomaterials	Wood
Metals and alloys	Ceramics	Electronics
Nano materials	Concrete	Liquids

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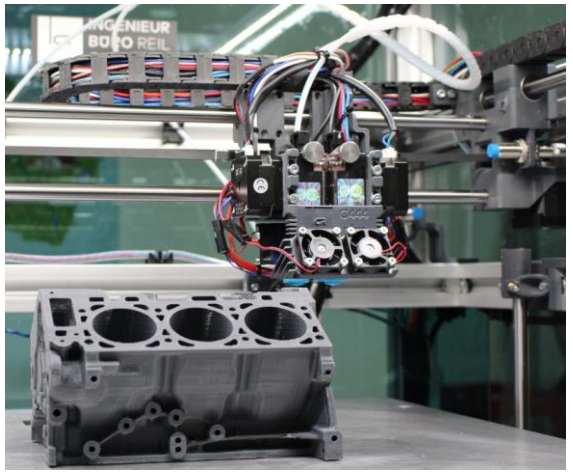
Emerging technologies

3D Printing
(Additive manufacturing)



Emerging technologies

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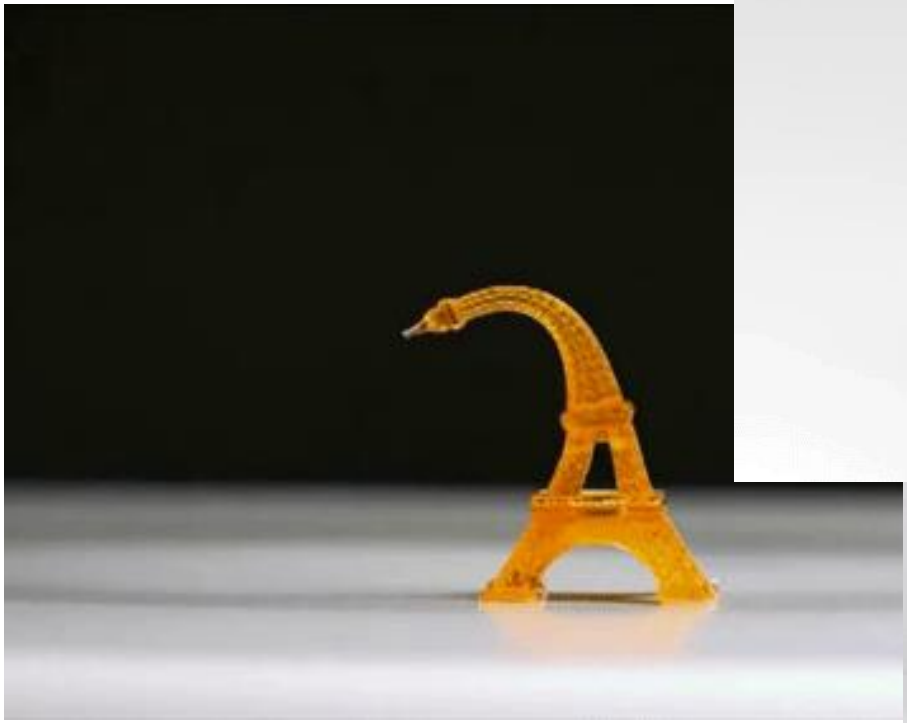
Construction: 3D printing with concrete

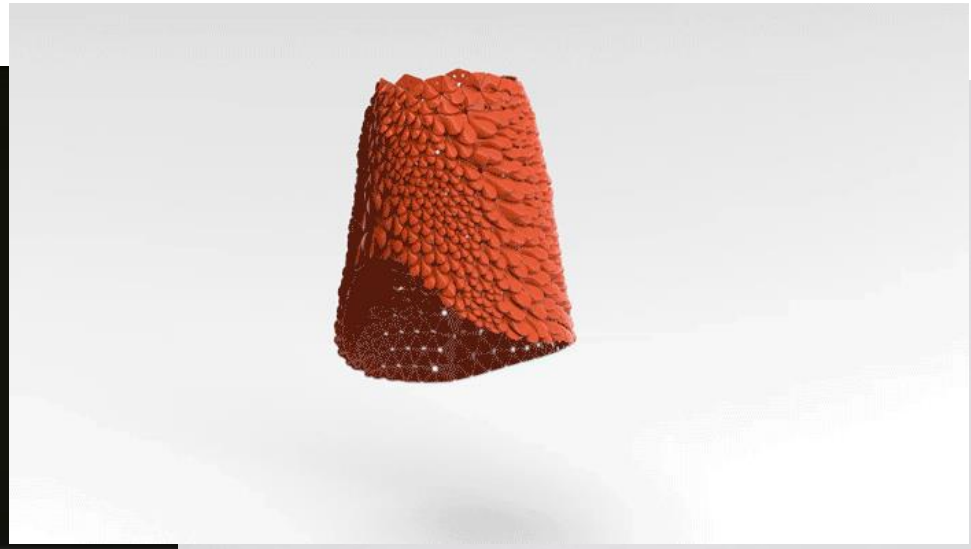
4D printing

Changes shape after having been 3D printed

- Programmable shape
- Triggered by: heat, light, water, etc

4D





Emerging technologies

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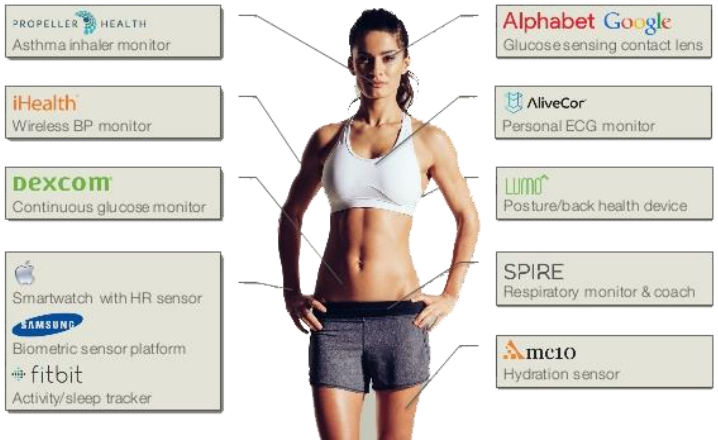
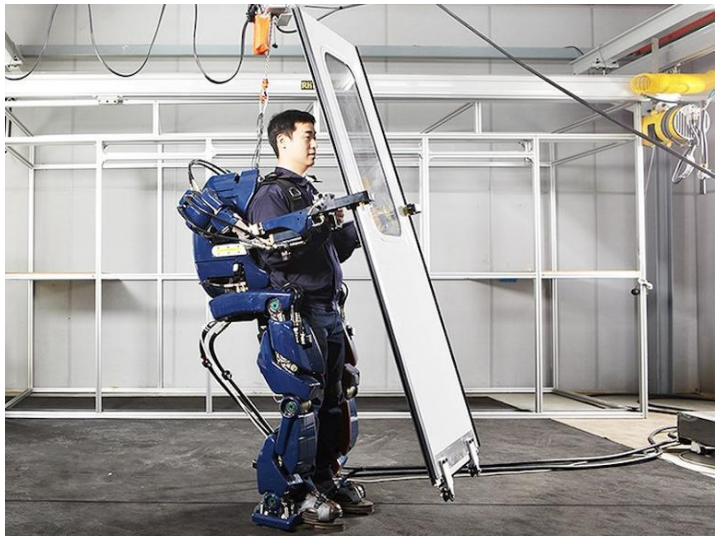
- **Wearables**

Temperature controlled clothing (heating/cooling)
Smart helmets/caps
Smart footwear
Exoskeletons
Data collection and transmission
    Measuring safety gains
    AR/VR glasses
    Sensors (including biosensors)





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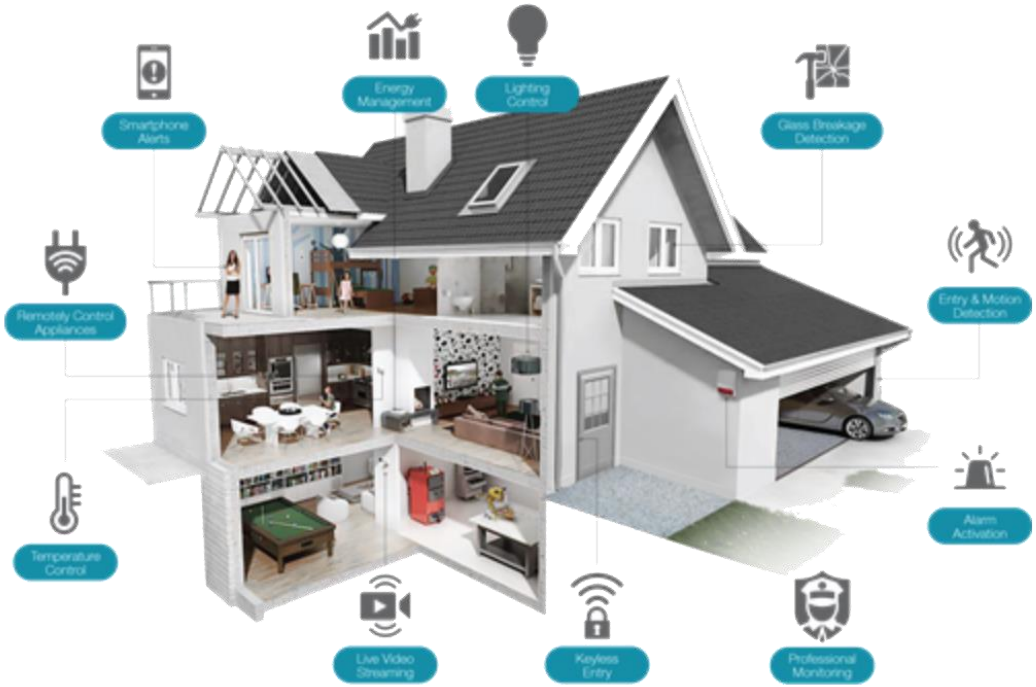
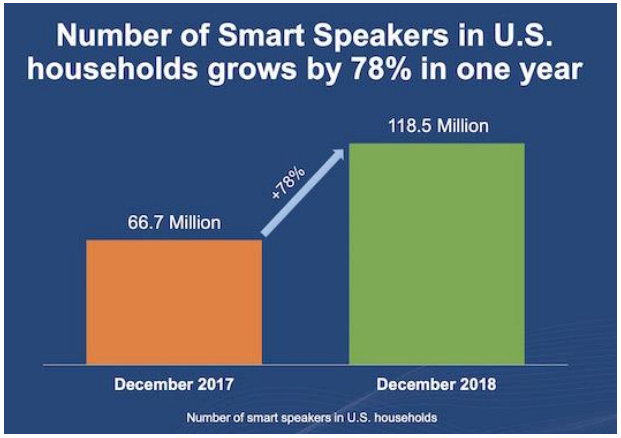
Smart home/ buildings





Smart cities

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Smart Facility Management Is The Future

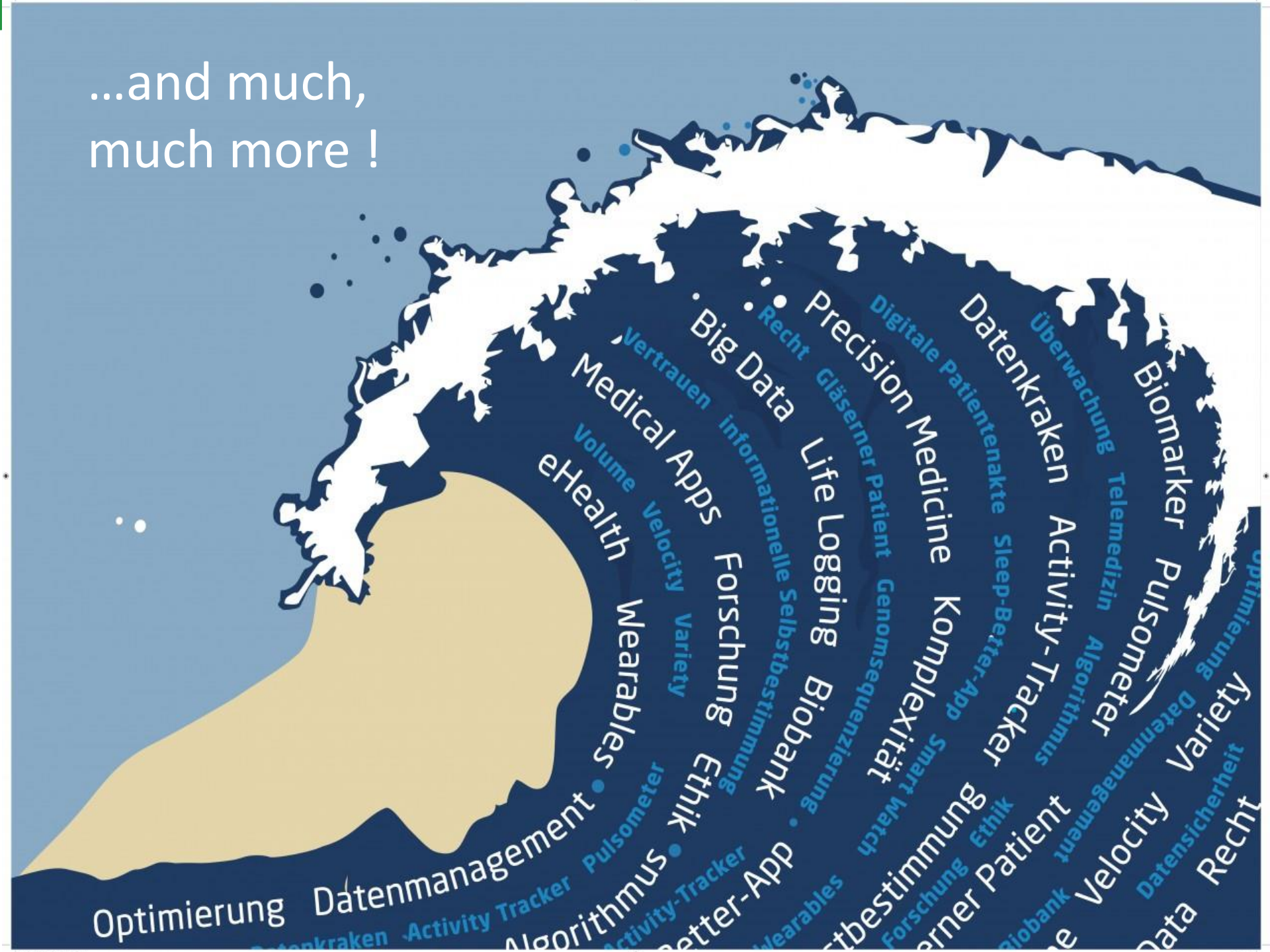
May 2019

The workforce of the future

Millennials, grew up in a “real-time, anytime, anywhere, always-on” environment

Survey (Dell/Intel) : 57% expect to be working in a ‘smart office’ in 5 years time

- Automation will be core to workplace expectations
- Adding a ‘premium to a building
  - Real-time responsiveness and predictive management of buildings
- Internet of things (IoT) and AI enabled smart building offer a competitive edge
- Empowering the workforce within


…and much,
much more !
Optimierung
Datenmanagement
Algorithmus
Ethik
Forschung
Big Data
Precision Medicine
Datenkraken
Activity-Tracker
Biomarker
Pulsometer
Activity Tracker
Pulsometer
Wearables
Medical Apps
eHealth
Life Logging
Biobank
Komplexität
Variety
Velocity
Recht
Datensicherheit
Vertrauen
Informationelle Selbstbestimmung
Volume
Velocity
Variety
Recht
Gläserner Patient
Genomsequenzierung
Digitale Patientenakte
Sleep-Better-App
Smart Watch
Überwachung
Telemedizin
Algorithmus
Datenmanagement
Optimierung

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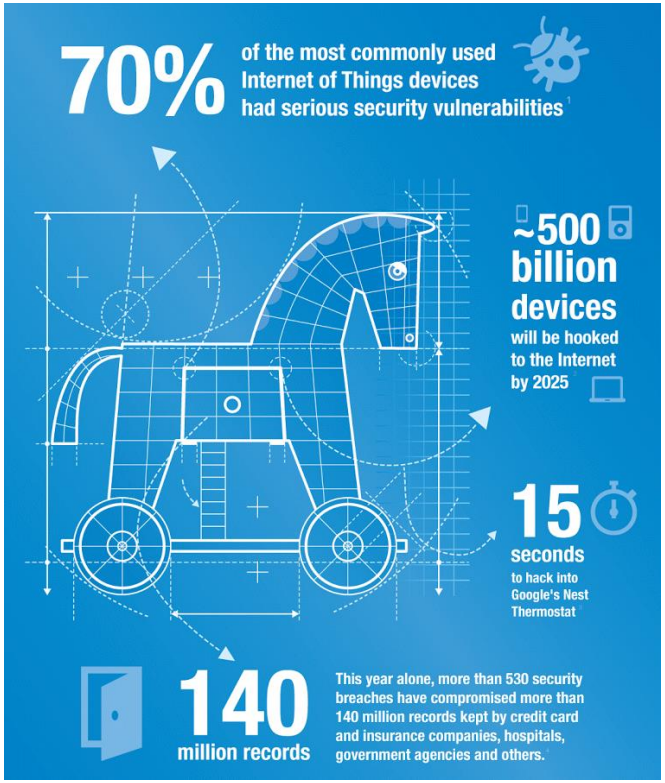
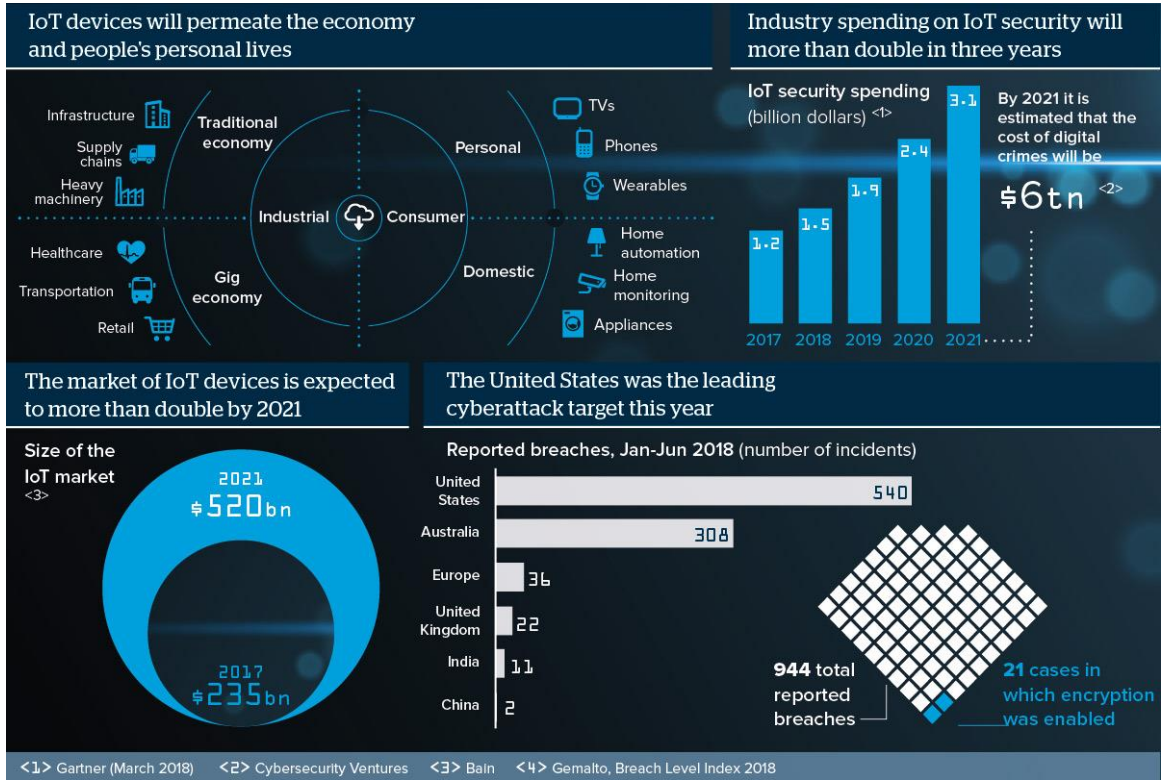
Emerging technologies

- **Cyber security**
  - …..also for IoT !





Strategic insights
Risk? What risk ?

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- **Strategic business impact of emerging technologies**
  - All companies rely on technology
  - Technologies change (slow, fast, incremental, radical, interact)
    - Dynamics of technological change present strategic business risks
- **Strategic business risks can and should be managed**
  - Including the strategic risks presented by emerging technologies
  - Recognise the importance
    - Opportunities/threats

Technological advances ('emerging technologies') can *significantly* enhance the scope of managing agents

(…. But there are also risks)

Strategic insights
Risk? What risk ?

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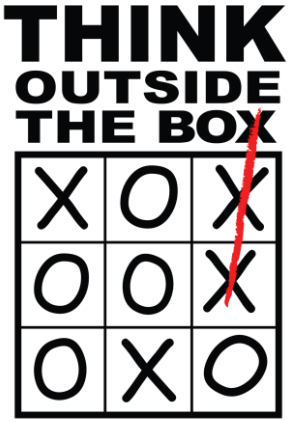
- **What is required:**
  - **A culture of innovation, that recognises and is eager to gain the benefits of new technologies**
    - **Adoption rather 'resistance to change'**
  - **Understand the swiftly evolving landscape of emerging technologies**
    - **Monitor and analyse**
      - **Search for the signals …they often come from unexpected places**
      - **Scan broad**
  - **Develop 'Actionable intelligence' and take action**
    - **Decision support**



Strategic insights
Risk? What risk ?

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- **Keep in mind that emerging technologies:**
  - **Evolve swiftly and are in different stages of development**
  - **In their early stages, they are inefficient and expensive**
    …. but they grow up and displace mature technologies (which then become obsolete)
    - **Don't judge them too harshly or give up too soon**
  - **The 'best' solution typically uses a number of ('innovative combination') of emerging technologies**
    - **They continuously interact with one another**
  - **Digital is important – but so is non-digital**
- **Recognise the importance of the human element**
  - **Adoption ('convincing')**
  - **Training – current generation and next generation**

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