

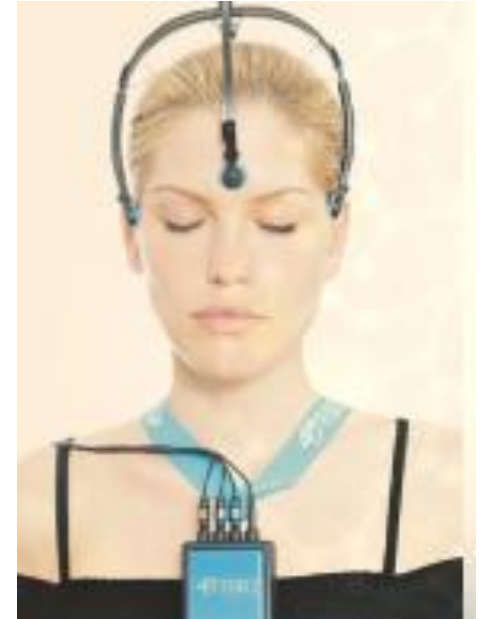
Hyperconnected Society

Implications and opportunities for business

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About IDTechEx

IDTechEx provides **insight, intelligence** and **networking services on Emerging Technologies**, helping clients with their critical strategic business decisions.

Areas of coverage:

- Internet of Things & People
- Wearable Technology
- Printed Electronics
- Emerging Materials & Devices
- Energy Harvesting
- Energy Storage
- Hybrid & Pure Electric Vehicles
- 3D Printing

Global and timely analysis through:

- **Subscriptions**
 - IDTechEx Market Intelligence Portal
 - Weekly market, technology and company assessments
- **Research Reports**
 - Over 70 detailed current studies
- **Custom Consulting Projects**
 - Over 300 conducted
- **Global Events**
 - Held in 3 continents
- **Free Web Journals**
 - e.g. www.PrintedElectronicsWorld.com
 - www.ElectricVehiclesResearch.com

With bases in the **US, UK, Germany** and **Japan**, IDTechEx has served clients in **80 countries since 1999**.

Some business opportunities in the journey to 2030

Levelling of the Third World and the Advanced World.

Bright people will succeed anywhere and small or virtual companies will often have the advantage

The Internet will never be the best way of doing everything

Almost all materials and electrical and electronic

components will change radically in nature and form

Hype, irrational enthusiasm and business bubbles will continue

It will be impossible for you or your government to protect your privacy

Viruses in your computer will seem nothing compared to hijacking your hardware and your body

Plagues will return

Business opportunities on the way to 2030

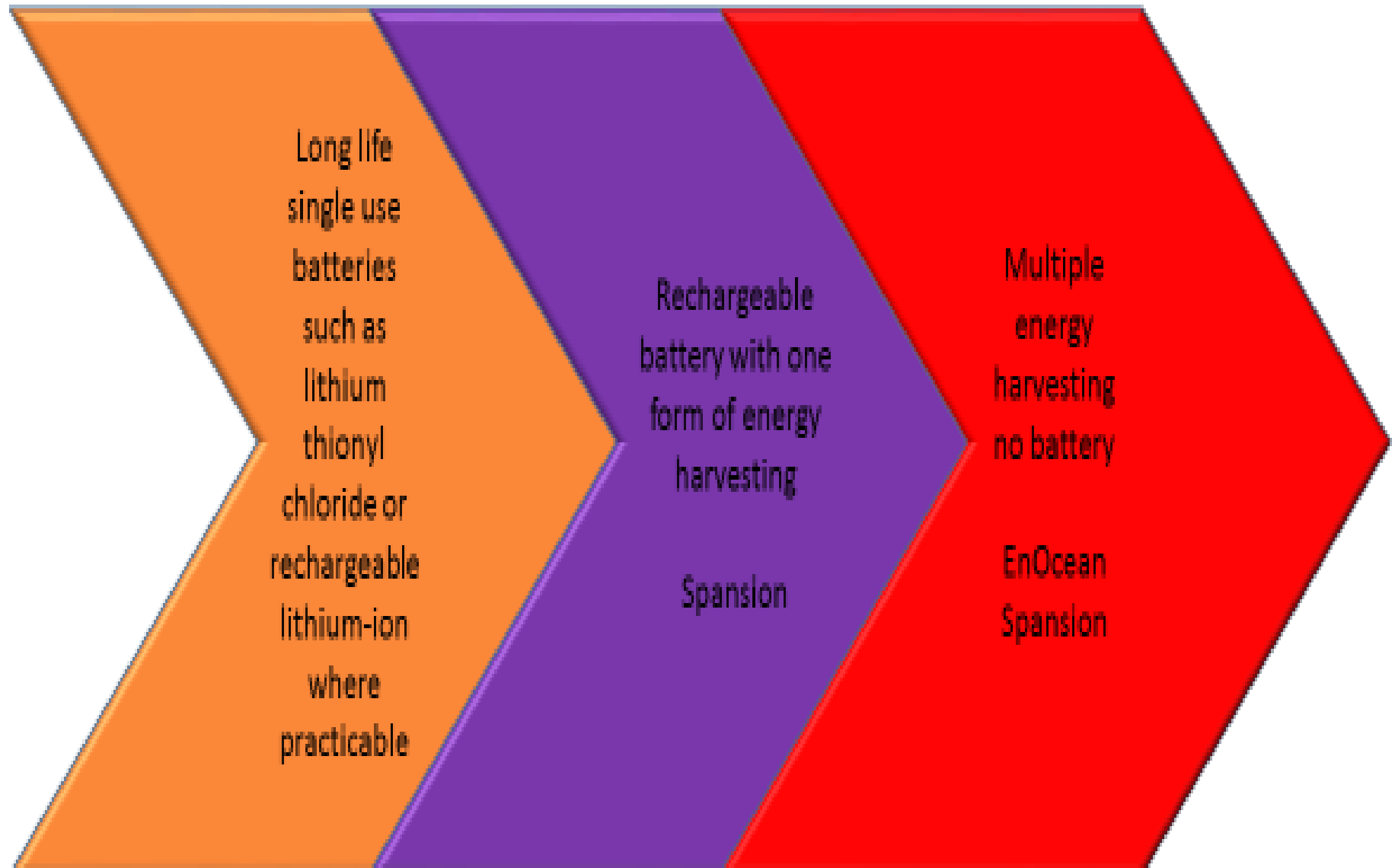
“What one man can dream of, another can do....”

“Make electricity where it is needed” Edison

“Hardware is the new software”

“Doctor heal thyself”

Energy harvesting will be a key enabling technology for EVs to IoT but it receives little attention as yet



*“Then the eyes of the blind
will be opened And the
ears of the deaf will be
unstopped. Then the lame
will leap like a deer, And
the tongue of the mute will
shout for joy. For waters
will break forth in the
wilderness”
Book of Isaiah*

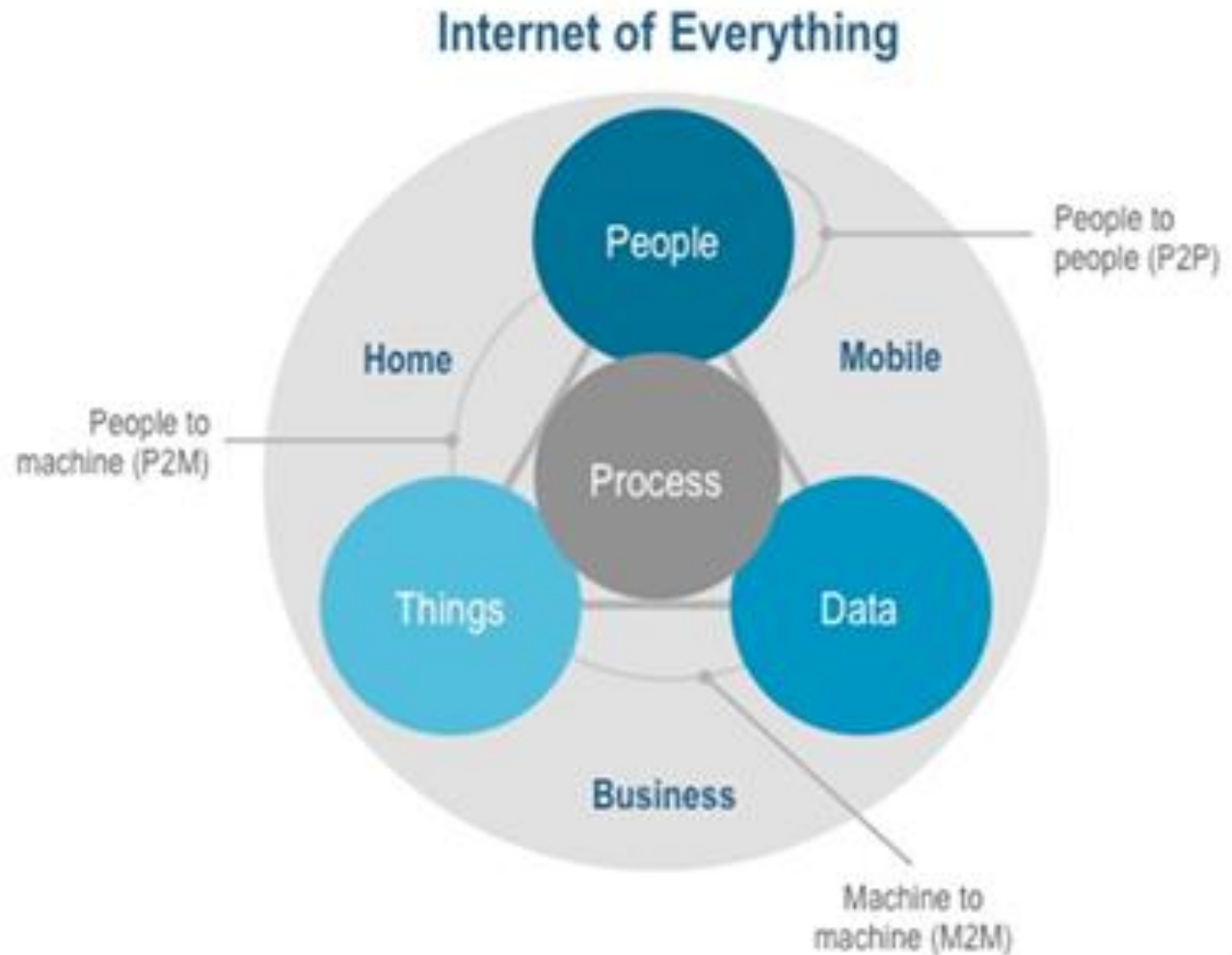


Example: electrically powered exoskeletons for power tools and for making the lame walk –

Argo Medical, Cyberdyne, Ekso Bionics and prosthetics

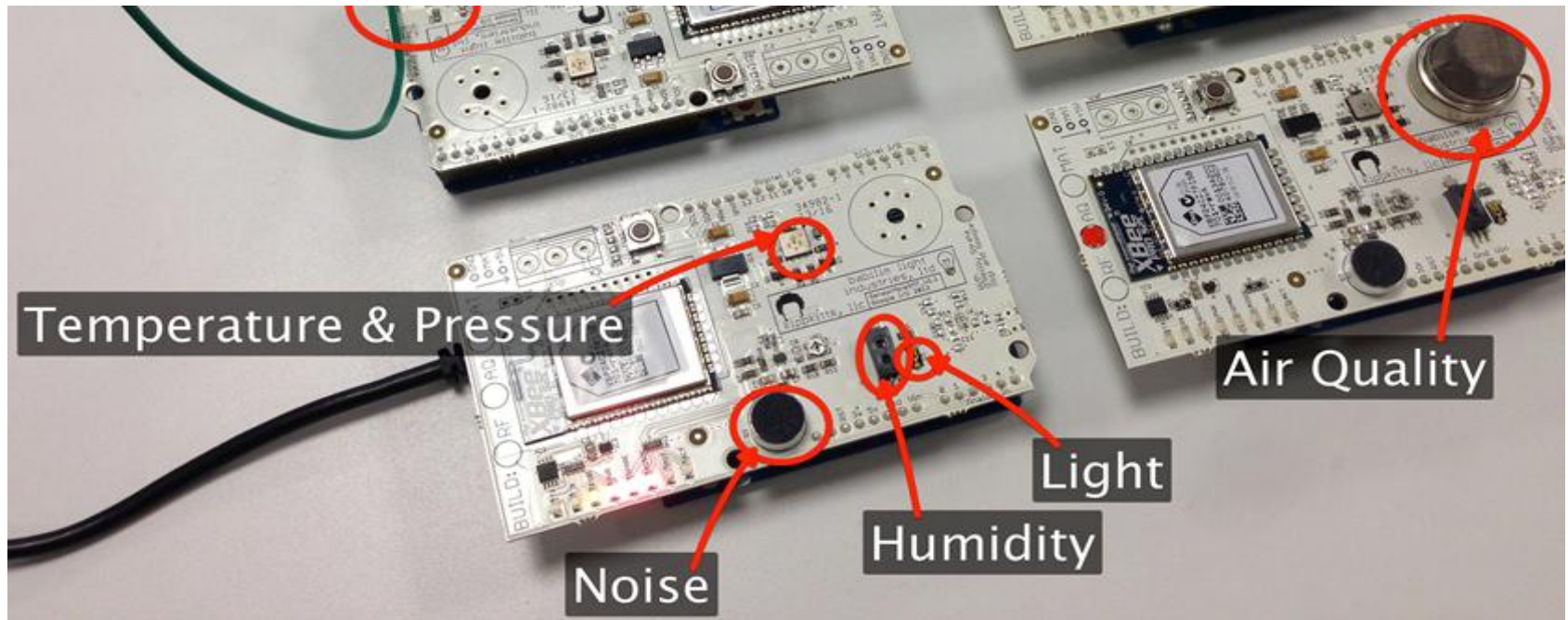


Internet of People – big now – adds wearable etc
Internet of Things – tiny now – big 2025 onwards

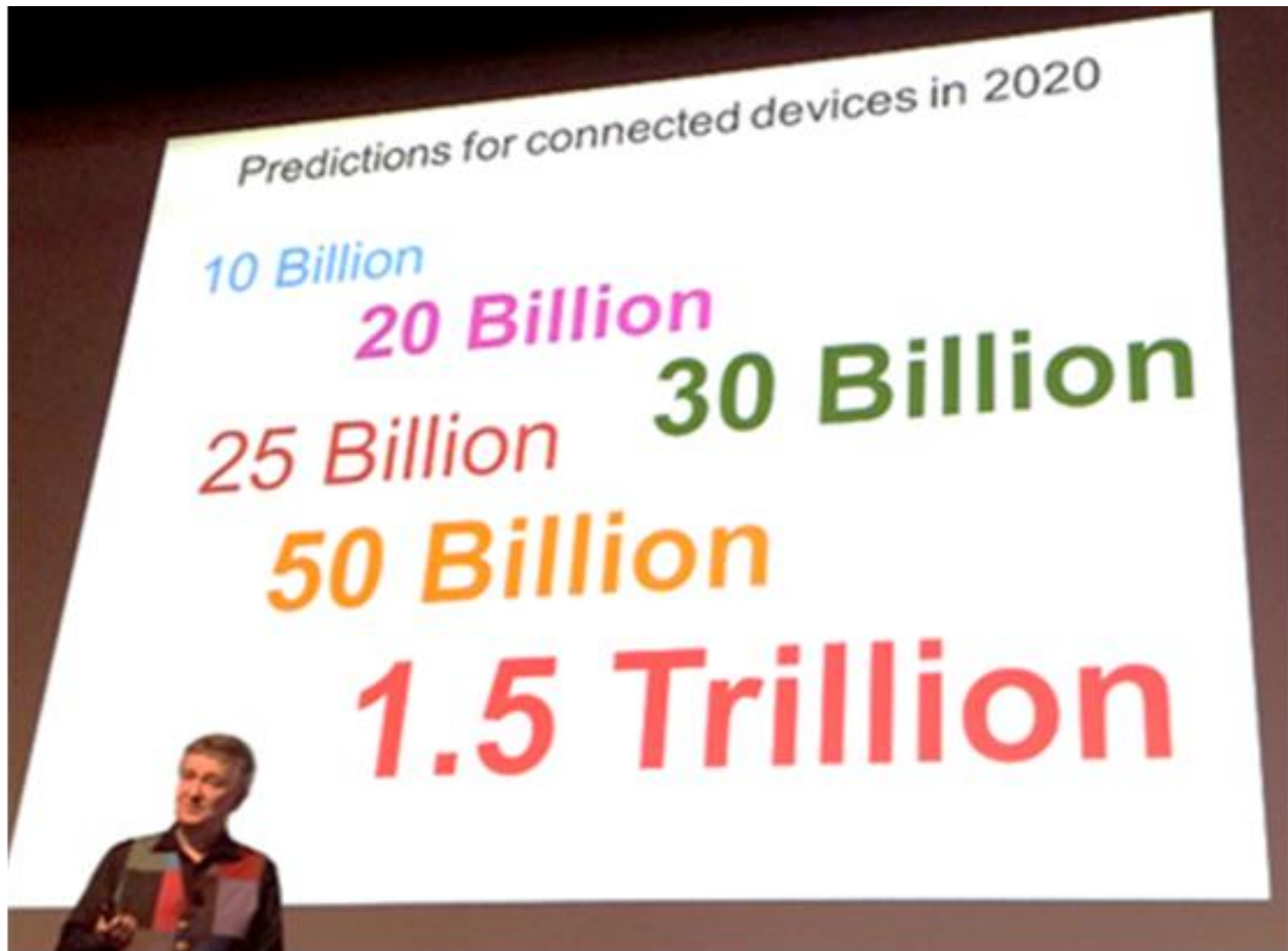


Internet of Things

Internet-enabled microcontrollers sense, learn, adapt, communicate, co-operate without human intervention at the time



Hype



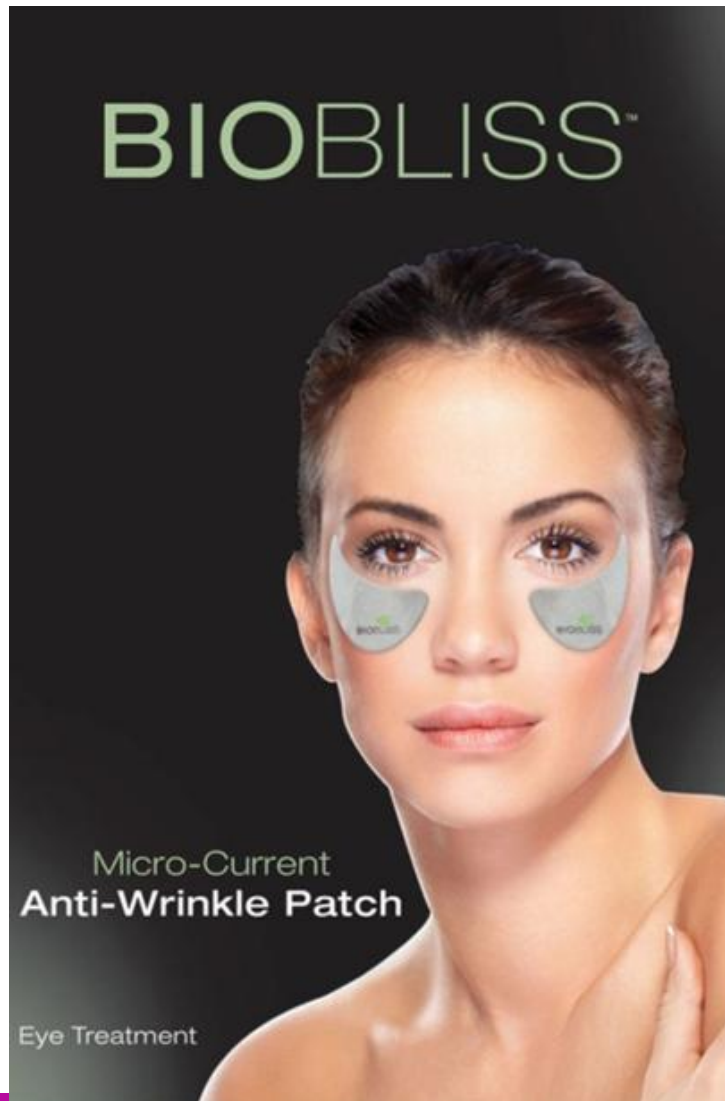
Silly season: Apple just bought Beat for \$3 billion+ and Facebook bought Oculus headware for \$2 billion



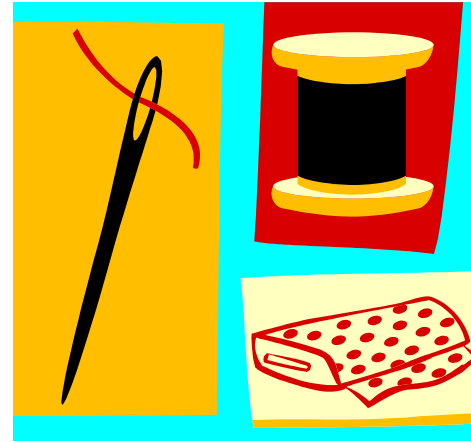
However, wearable electronics is an important new trend

Let us look at that

Two very different types of wearable electronics



Apparel and textiles



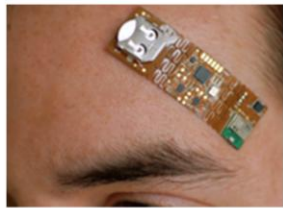
Devices



Weavable, washable, stretchable, wide area, tightly rollable, foldable, printed, transparent or at least invisible, integral energy harvesting.....

Intel

Rigid or bendable, largely conventional electronics with batteries and usually no energy harvesting



Apparel & Textiles

Disruptive – distributed functions, radically new technology, electrics & electronics intimately combined. Healthcare, sport, fashion, safety, military

Devices

Evolutionary – typically mobile phone peripheral or variant with new human interfaces or diagnostic devices. Mainly conventional electronics

Allied subjects – implants, carried items



Adidas
Nike



Google
Apple
Samsung



Mobile Technology is Global

More people have access to cell phones than
drinking water, electricity or a toothbrush



**MOBILE DEVICES HAVE OVERTAKEN
WORLDWIDE POPULATION***

The frivolous helps healthcare

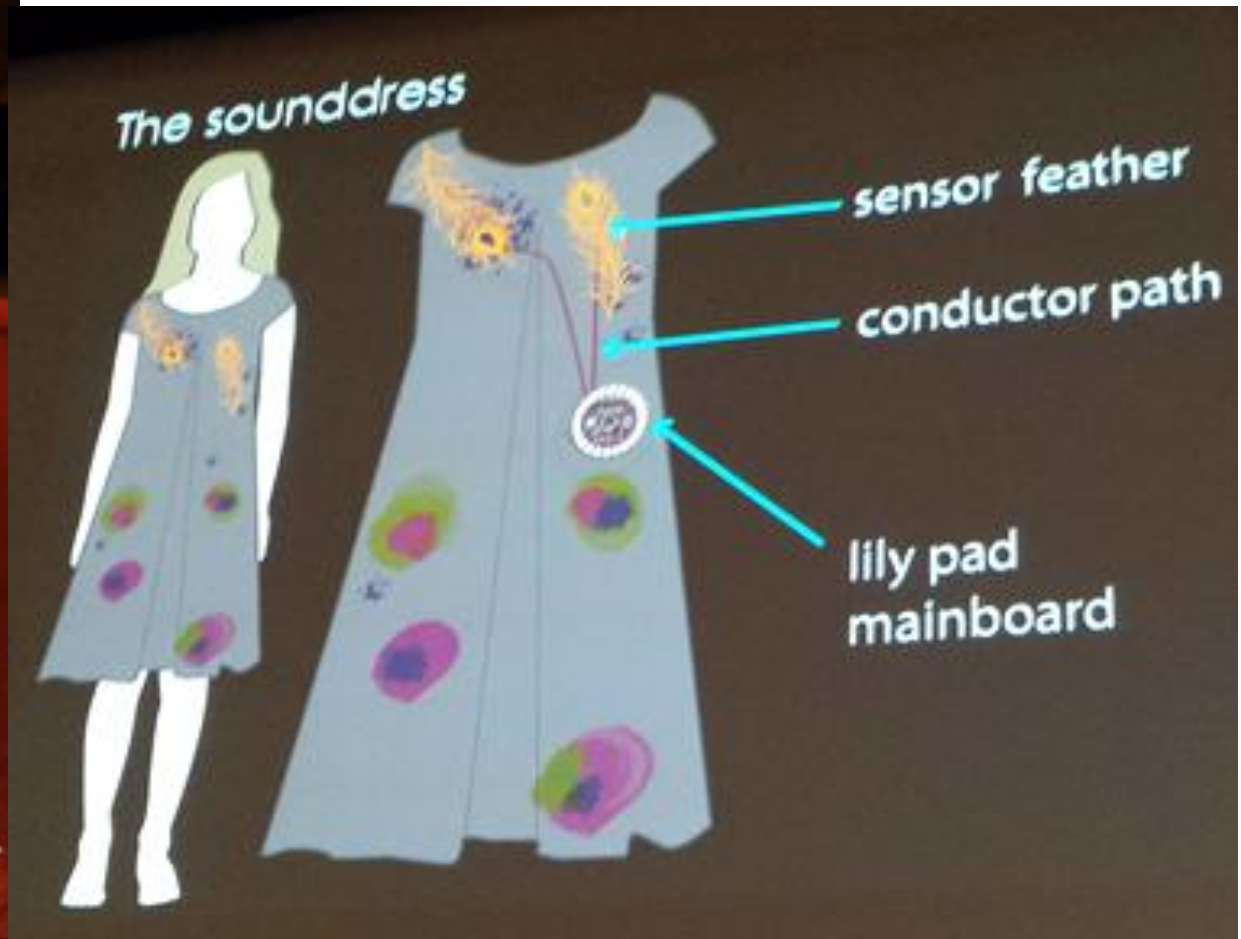
- Amusement including gaming
- Interactive mental state brain training
- Personal neurofeedback training
- A meditation tool
- Simple communication with Alzheimer's patients in Japan



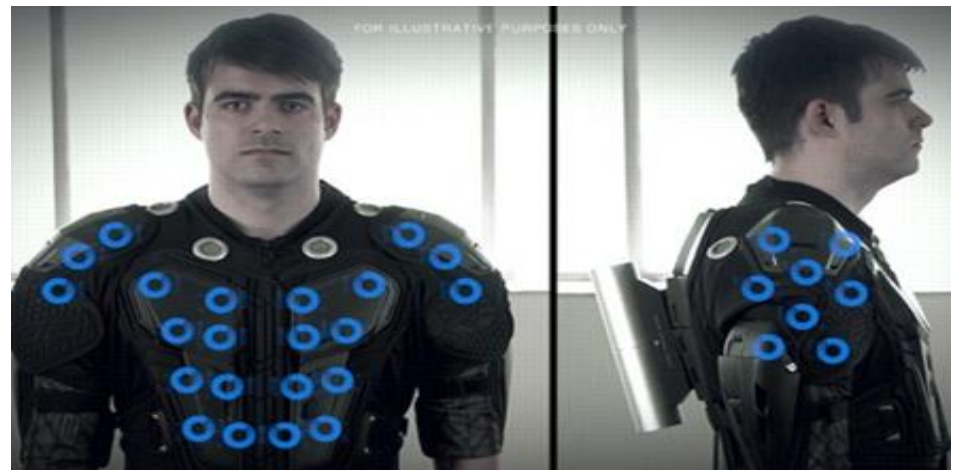
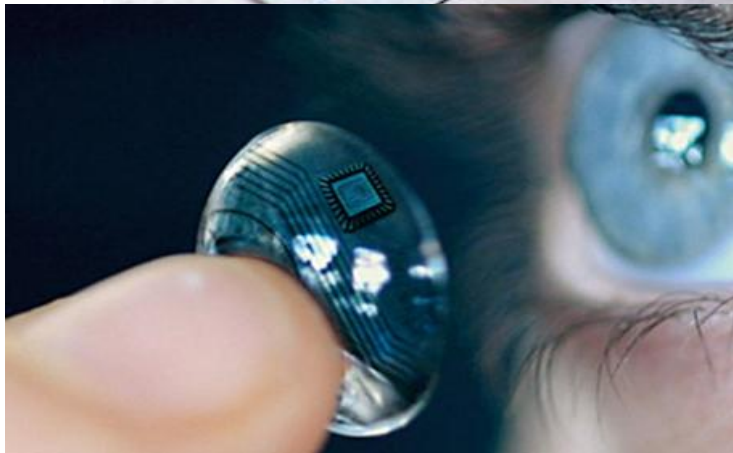
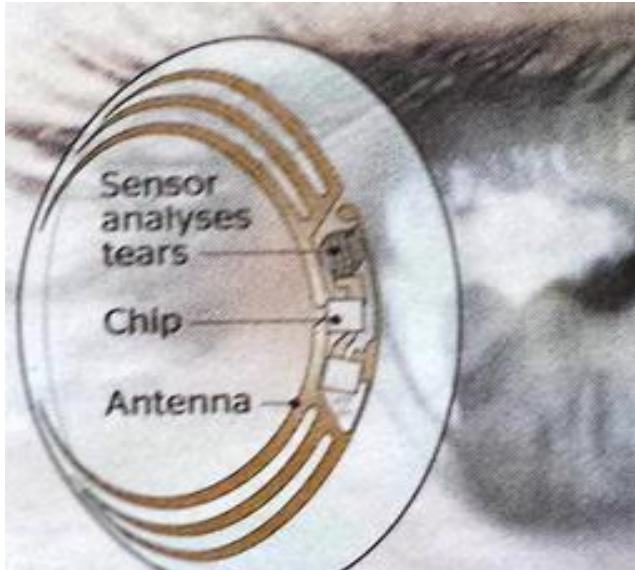
High tech warfare available to anyone



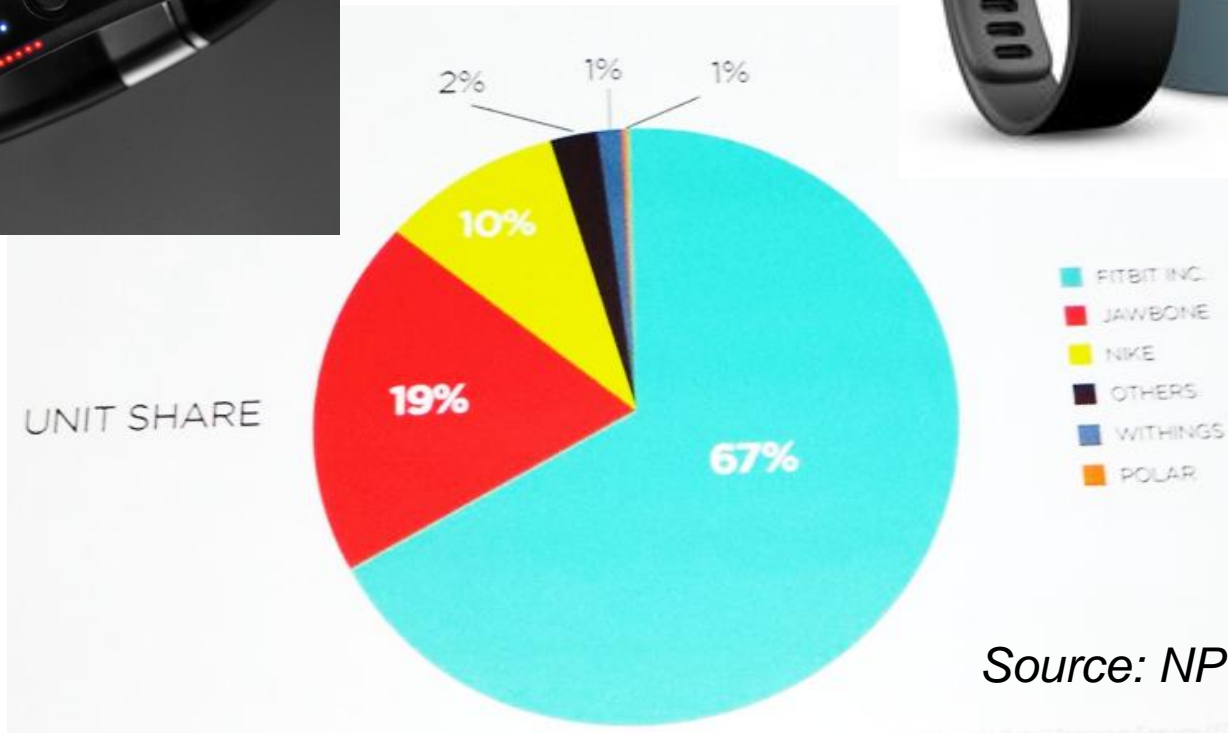
Electronic fashion - from gross to Guccchi, dumb to Dior



Other wearable exotica: blood glucose in real time or enhanced virtual reality from contact lens, artificial pancreas skin patch, gaming suit for realistic sensations



Novelty peaks: Market share in leaders in body trackers (fitness monitoring) Then Nike left.....



Are basic electronic wristwatches an indication of the addressable market for smart wristwatches?

Source	Number billion	Unit price ex-factory \$	Total market value \$ billion
China including Hong Kong	1	3	3
Switzerland	0.25	20	5
Other	0.25	3	0.75
TOTAL rounded	1.5	5.8	8.75

Plenty of reasons to make wearables

Two examples:

- 20% of Americans and 40% of Australasians get skin cancer. Sensor Sensor has UVA+B wristbands detection available in 2014 at many sensitivity levels reflecting the need to get some sunshine for its many benefits but not too much.
- 45% reduction of mortality of chronic disease patients when they use telehealth (UK Department of Health).

Plenty of reasons

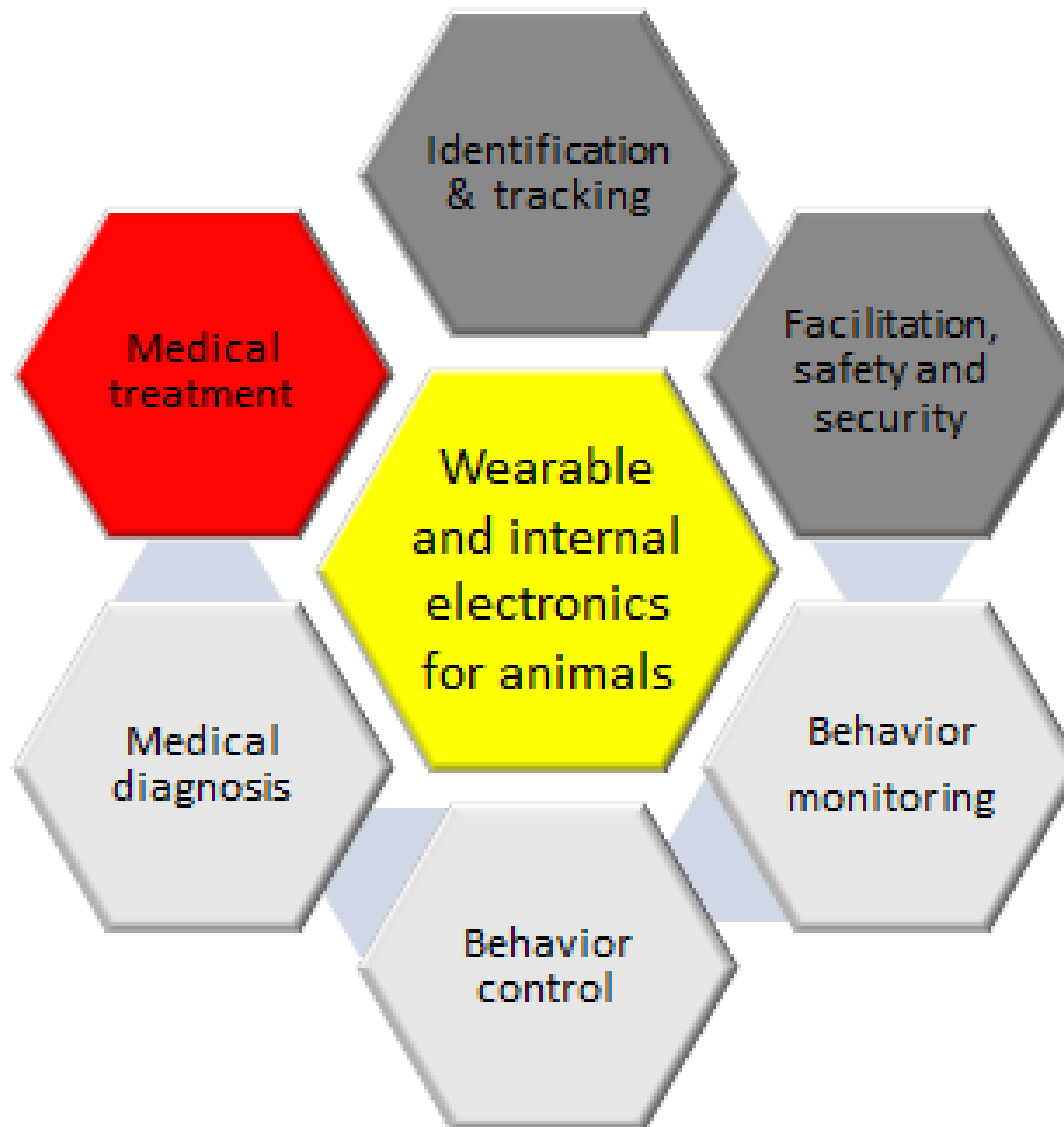
Issue	Example of improved solutions coming to market
Diabetes epidemic worldwide	Non-intrusive wearable monitoring of blood glucose. Worn artificial pancreas.
Obesity epidemic in USA and UK	Strongly linked to diabetes. Wearable fitness and exercise monitors.
Demographic timebomb – the greying of the population, most immediately in Russia, Japan, Italy.	Wearable electronics for self-diagnosis and treatment, providing mobility throughout life and automated diagnosis and treatment
Making the blind see, the deaf hear and the dumb speak. Helping dementia patients communicate.	Smart contact lenses, patches, brainwave sensors on the head.
Helping the paralysed and disabled to walk and move.	Electrically driven exoskeletons and prosthetics

Qualcomm view of wearable technology

- Qualcomm claims that it will transform healthcare, given that a visit to the physician only gives 55% chance of a correct diagnosis.
- Telemedicine is radically improving diagnosis and patient mobility, even reducing visits to Emergencies by 20%.
- Qualcomm says that the fact that insurers now demand evidence that treatment has been taken properly and that it is beneficial will drive wearable electronics.
- Qualcomm offers a prize for a wristband that non-intrusively detects 15 medical conditions and it has a \$100 million wearable electronics startup investment fund, having invested \$40 million in FitBit (leader in fitness monitoring wristbands) recently, so the industry is very much on the move.

Plenty of benefits of wearable electronics

Benefit	Example
Green	Solar apparel and handbags to charge mobile phones and work functions
You do not have to find it to use it	Smart apparel and skin patches
Non-invasive and providing continuous medical and fitness information	Wristband diabetes blood glucose monitoring
Hands free	Google Glass eyewear
Web connected: locatable in emergency	Smart wristwatches
New forms of high fashion	Dresses and underwear that sense, illuminate, change pattern, reveal mood
By-passing human operation to improve integrity and service using the Internet of Things IOT meaning ubiquitous Machine to Machine M2M sensing connected to the web.	Connected wearable diagnostics and treatment such as iontophoretic drug delivery through skin patches. Wearable telemedicine.



- “Using most smart watches is like assembling an ocean liner through a keyhole”
- “Wearable electronics can be an ironic term: it often wears us or wears us out.” *Dr Isabel Pederson University of Toronto Canada.*
- “Features, apps and services are limited so far” *Neil Cox of Intel*
- “There is no real user proposition for fitness applications,” *Anmol Sood of Hida*
- “People offering single functions will have a hard time and smart watches must have fitness and health functions and be wirelessly connected to have any chance.” *Josh Flood ABI Research*
- “The problem is in making massively functional little things easy to use”.

For more read the new reports.....

Internet of Things (IoT): Business Opportunities 2015-2025

Wearable Technology 2014-2024: Technologies, Markets, Forecasts

E-Textiles: Electronic Textiles 2014-2024



Reports on Internet of People, on Wearable Technology for Animals 2015-2025, Electric vehicles – land, water and air etc

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