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Open Mobile Alliance
For a Connected World

Big Data in Context

Public Information

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Ajit Jaokar

FUTURETEXT

World Economic Forum - future of the Internet UK based - Hands on Publisher (futuretext) - Author (Mobile Web 2.0, Social Media Marketing, Open Mobile) - Chair: Oxford University's Next Gen Mobile Applications panel - PhD student UCL/UK - Consulting – Operators, Governments EU, Startups

Recent and forthcoming talks include Mobile world congress (2007,2008,2009, 2011), CEBIT, Stanford University - MIT Sloan - Web 2.0 expo - Ajaxworld Supernova - CNN money - BBC - Oxford University European parliament

Smart cities: Advisory board – World Smart Capital(Amsterdam), Connected Liverpool

Global top 20 wireless blogger
According to fierce wireless
www.opengardensblog.futuretext.com
Phd research on resilience of sensor networks in
Advisory board World Smart Capital startup - @feynlabs

University of Oxford Continuing Education
Delivering learning online

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What we do ..

- Identify underlying trends in behaviour in a Mobile first world
- Based on methods currently applied to Policy trends
- Based on data points (social media, Apps, Data)
- Apply ‘forces’ analysis – like Porter’s forces
- To identify Open inflexion points for network effects
- This matters because currently viewpoints are biased – the goal is to predict trends by removing bias – including our own

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Internet – Retail – M2M – IOT – Consumer Data – Privacy – Commerce

Underpinned by (Big?) Data

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East vs.. West

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Internet + Internet of things = Wisdom of the earth - Wen Jiabo

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Parallel worlds ..

Michio Kaku's Parallel worlds ..

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As the term Internet of Things implies (IOT) – IOT is about Smart objects
For an object (say a chair) to be 'smart' it must have three things

- An Identity (to be uniquely identifiable – via iPv6)
- A communication mechanism(i.e. a radio) and
- A set of sensors / actuators

+ Physical context data(Starbucks) + Social context data(who else)

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•M2M implies a ‘machine + radio’ at least at one end with a cellular modem. (M2M is mainly a telco term)

• **IOT** has a wider goal of making intelligent devices using radio technologies(but not necessarily cellular).

• **M2M is a subset of IOT(Internet of things).**

• For example healthcare has the following wireless technologies - Bluetooth, MICS, 802.11, IEE 802.15.4, 802.11e, Zigbee, Whitehart, Wibree, ISA100.11a, 6LoWPAN , 6lowpan, 3G/GPRS/GSM. Cellular is one of them ..

• Also, many Telcos do not like the M2M business models because they are not relatively scalable

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IOT is related to the 50 billion number
Towards 50 billion connected mobile devices? What's the breakdown of the numbers?

To put in context:

- The first commercial citywide cellular network was launched in Japan by NTT in 1979

  The milestone of **1 billion** mobile phone connections was reached in 2002

  The **2 billion** mobile phone connections milestone was reached in 2005

  The **3 billion** mobile phone connections milestone was reached in 2007

  The **4 billion** mobile phone connections milestone was reached in February 2009.
- The usual suspects: Cars; Energy meters (such as electricity meters); Units used in HVAC (Heat, Ventilating, and Air Conditioning); Mobile point-of-sales terminals; Vending machines; Security alarms; Data storage devices (including electronic book readers); Devices used in navigation; Devices used in healthcare.

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However, there are different types of connectivity .. (source David Wood)

Level 1 is the rich and varied connectivity of a regular mobile phone, driven by a human user.

Level 2 machine to machine (ex smart metering)

Level 3: *Devices whose individual wireless connectivity is more complicated than an individual RFID tag (Level 4), but Is simpler (and less expensive) than cellular modems (Level 2).* ***(islands or hubs)***

Level 4 A very large number of devices that contain RFID type connectivity (i.e. no cellular modem) and will *not* involve any cellular network.

Level 5 connectivity and meta data i.e. true interoperable Internet of things.

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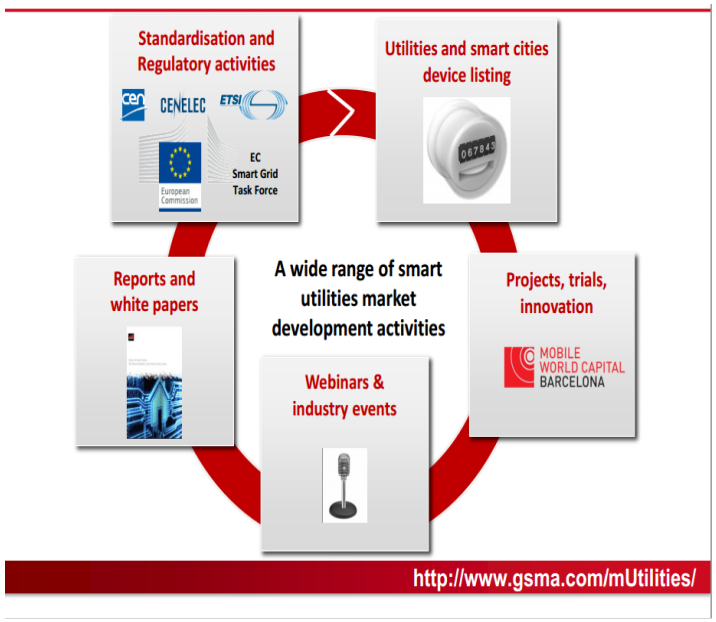
There are two classes of applications that will drive the uptake

a) Top down – mainly corporate/vendor led – ex Smart metering, vending machines etc and

b) Citizen led – more grassroots, citizen led approaches



Top down =

Public sector, Tourism & hospitality, Mobility and transport, Utilities, Logistics, Healthcare, Financial services, Retail

All need standards

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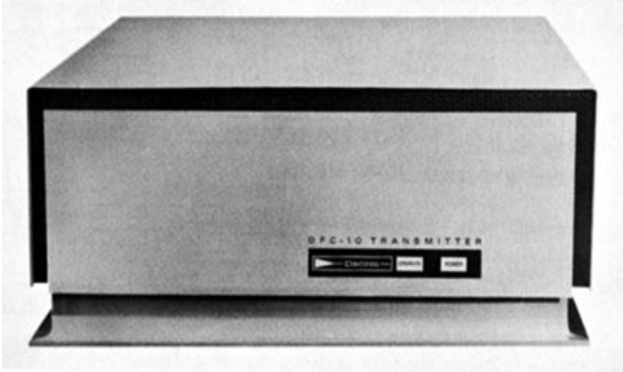

To achieve the network effect(fax machines) .. Where is the 'glue'? Ie the connectivity for IOT

1) **Big Data**
2) **Smart cities**
3) **Bridging the Virtual and physical spaces (retail)**
4) **Apps and appstores (apps and mortar economy)**
5) **Open source hardware**

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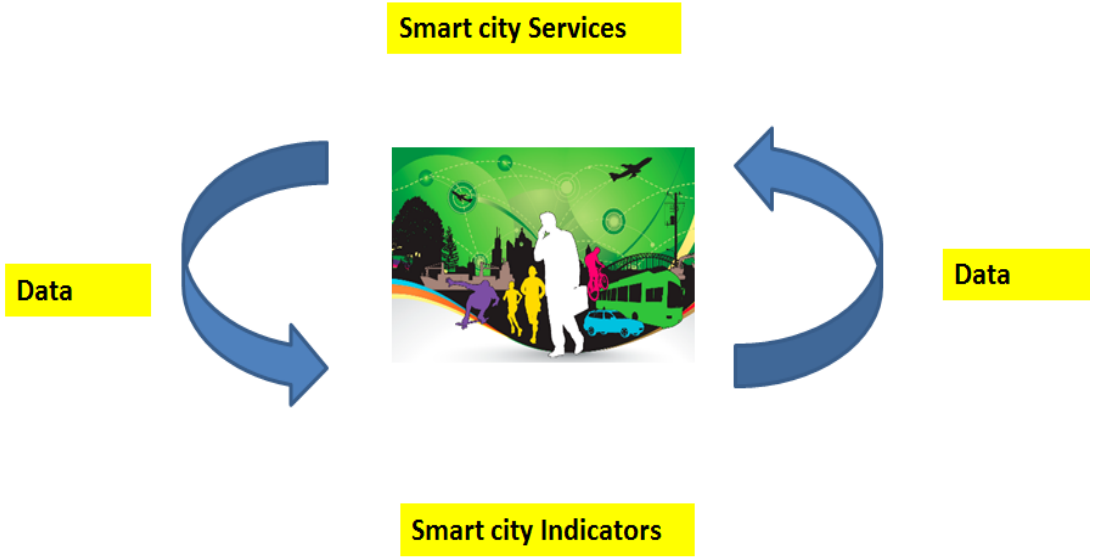
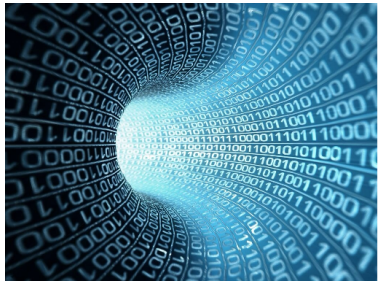
Smart cities - the city is now seen as a vibrant ecosystem. We see Smart city services as a feedback loop based on Smart city indicators, Big Data and the idea of the city as a platform





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Flurry – apps and mortar economy

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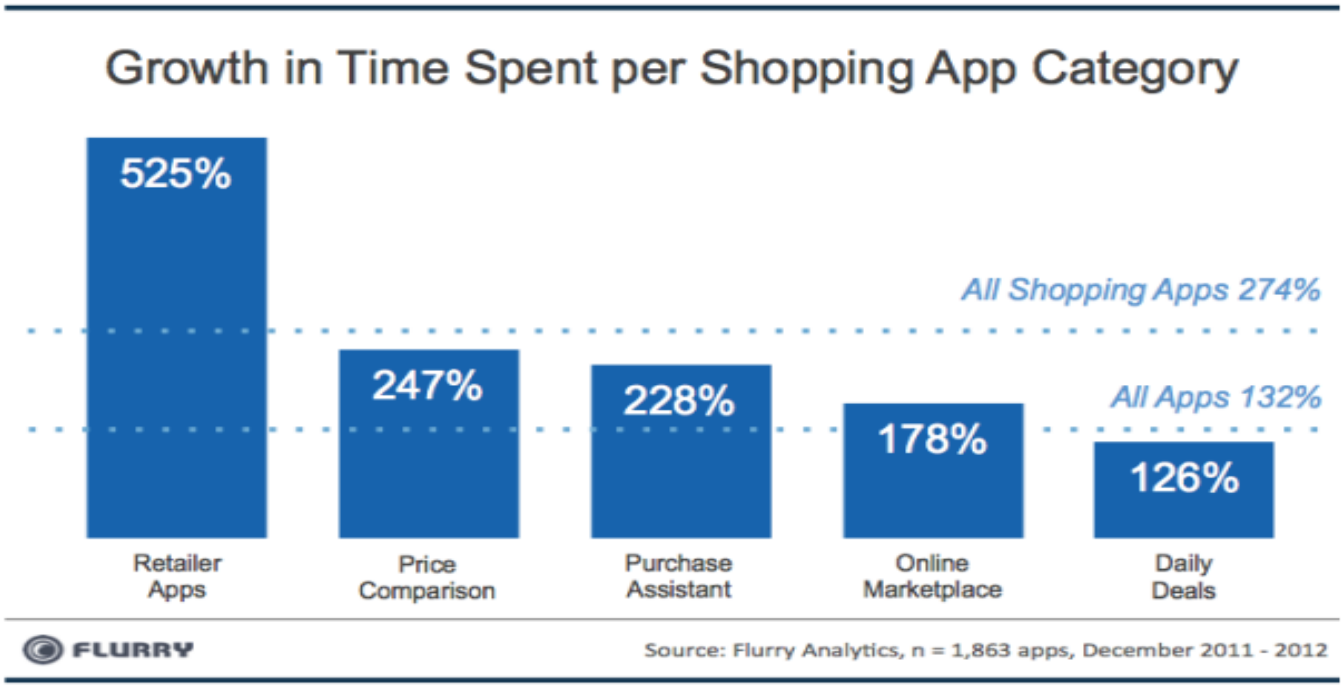

Apps and mortar economy

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Flurry – apps and mortar economy

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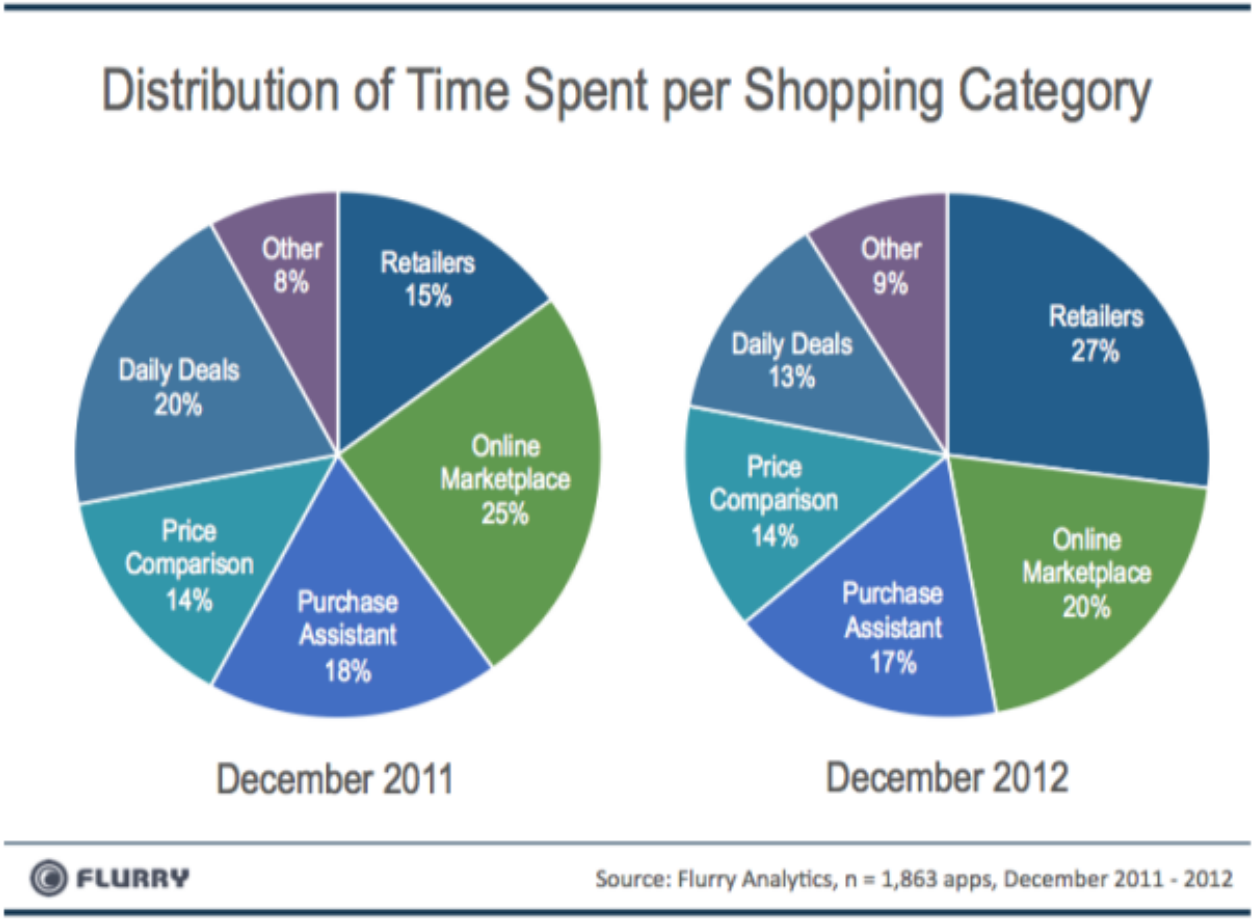

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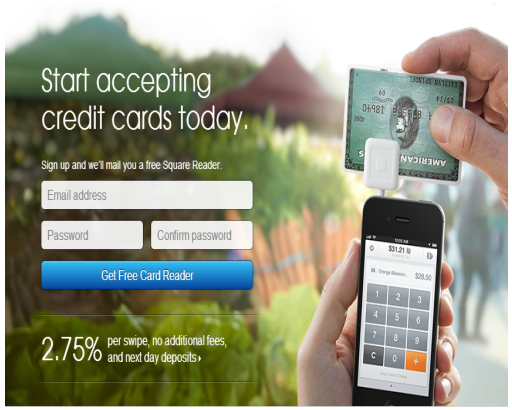
Retail engagement

- Walmart **Kosmix - OneRiot,** - insights from social media for real shopping
- **ThinkNear** extend mobile offers to nearby consumers – takes into consideration factors like business is slow, weather, traffic etc
- NFC – the physical 'click' – not just for transactions
- **Square** https://squareup.com/
- **Stampt** tracking and redeeming reward cards



stampt
powered by mobivity

OneRiot
socially targeted mobile advertising

BETA-ISH
Kosmix

thinknear

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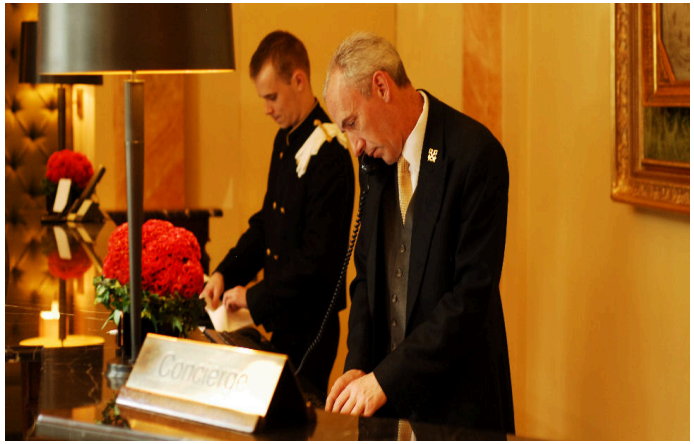
Apps as glue to bridge the parallel worlds through Loyalty

- Enrolment – Simple signup
- Rewards - simple rewards – But this is just the first step
- Broker = trusted intermediary – real estate, jobs
- Companion – looks out for your interests – genuinely tries to solve problems – city maps
- Concierge = encyclopaedic knowledge – hotel apps (Signature, Guest driven)
- Coach – you trust, you share, works with you, listens, gives feedback



Humana

NIKE, INC.

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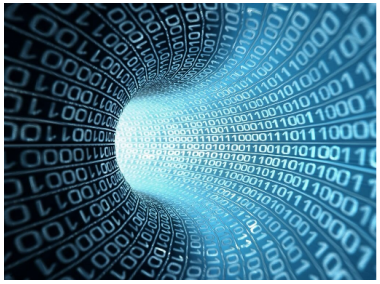
- Big data is data that exceeds the processing capacity of conventional database systems.
- The benefits lie in identifying valuable patterns and information,
- Driven by low cost/commodity hardware and Open source software(Hadoop)
- 3 Vs (Volume, Velocity and Variety)
- However ... Big data is not objective ..
- Kate Crawford, a researcher at Microsoft Research, calls the problem “Big Data fundamentalism — the idea with larger data sets, we get closer to objective truth.”



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IOT appstores - How does an appstore fit in with IOT?

- "**IOT appstores differ from traditional appstores** for two reasons a) Their reliance on multiple sources of sensor based open data and b) The need of actuating devices in (almost) real time.

- In contrast, conventional appstores do not need data from a variety of sources.Nor do they need to immediately actuate. IOT devices may also send data about themselves periodically, on demand or triggered by an event. The IOT service would thus need to "sense - compute and actuate" in almost real time.

Therefore, the concept of conventional appstores as we understand from mobile devices does not directly apply to IOT.

Conventional appstores add commercial features like packaging, discovery, monetization etc but do not extend to the sense-compute-actuate paradigm.

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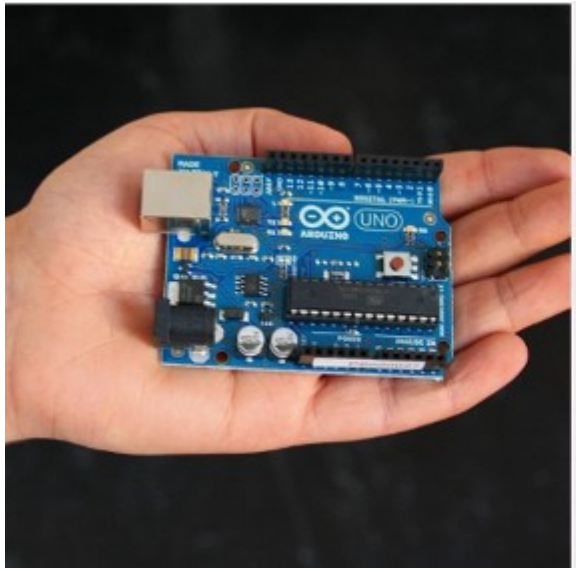
Open source hardware



Open source hardware and software – Arduino – Raspberry Pi – www.feynlabs.com

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How do the parallel worlds meet?
Smart cities – Retail - Apps and appstores -
Open source hardware

BIG DATA

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Who orchestrates the industry?
What does the rate of change mean for Standards?
Would NFC be a standard if the iPhone adopted it?

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The process is the destination ..

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