

Challenge for the next 25 years – Innovation and Change.

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 European CTO of the Year 2015

KOITA Technology Forum,
Seoul,

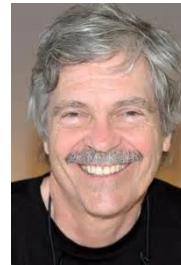
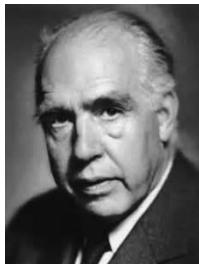


The Future – two views

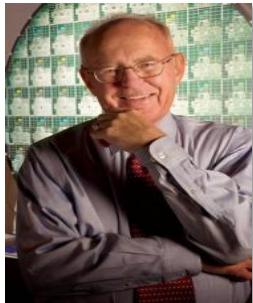
- Prediction is difficult,
especially about the future
 - Neils Bohr

The best way to predict the future is to invent it!
 - Alan Kay

Challenge for the next 25 years – Innovation and Change.

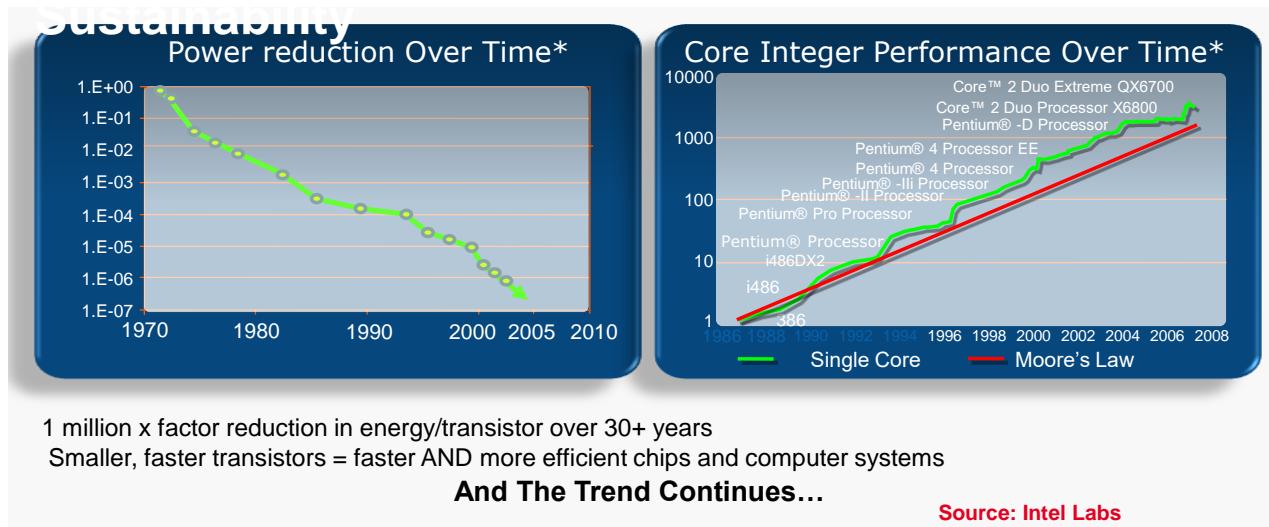


The Collision of Key Mega Trends

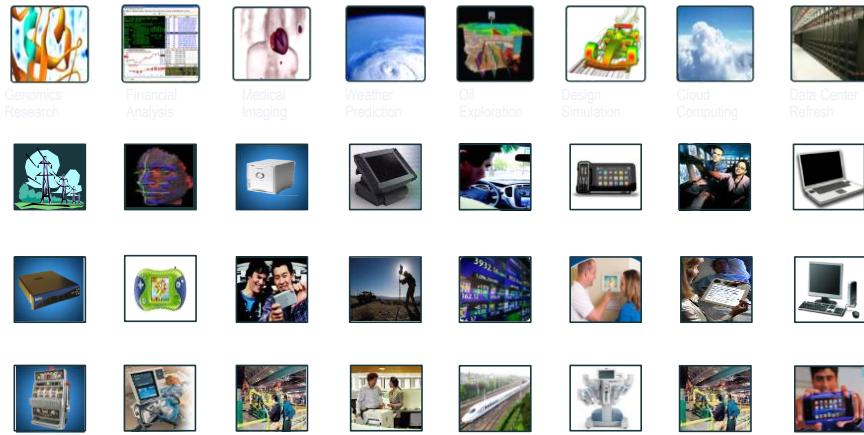


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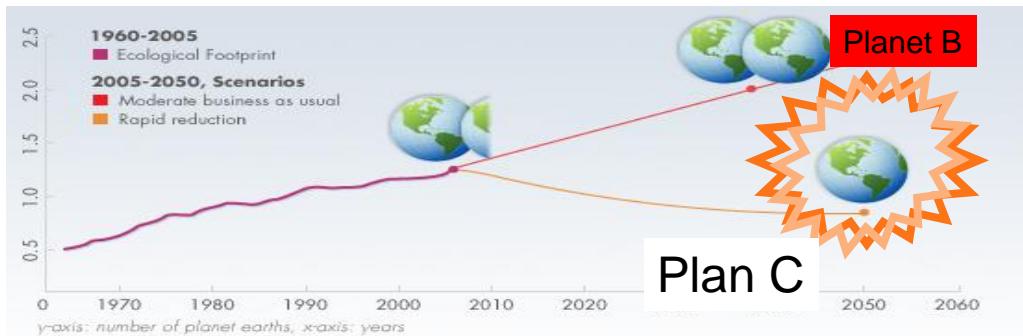
MOORE'S LAW DRIVES CONTINUOUS CHIP-LEVEL ENERGY EFFICIENCY: directly



...Moore's law is colliding with almost every domain



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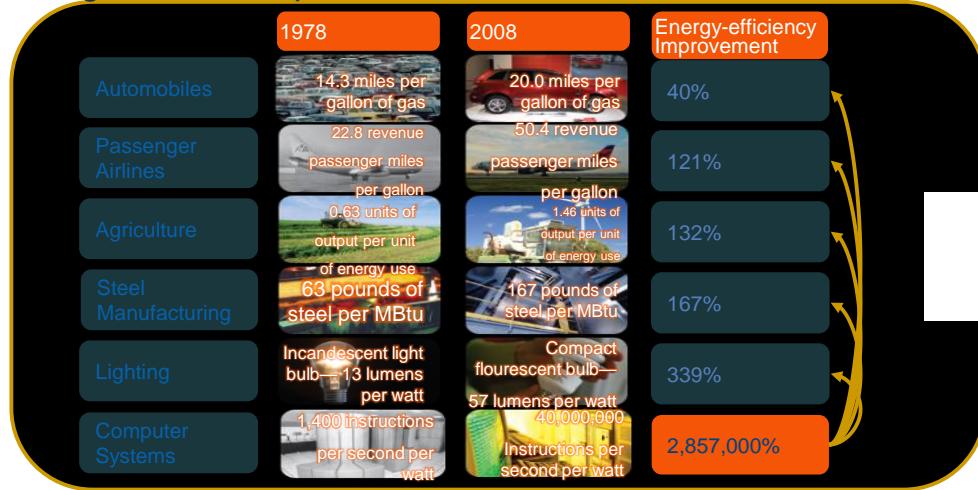
There is no Planet B!

Jose Maria Figueres



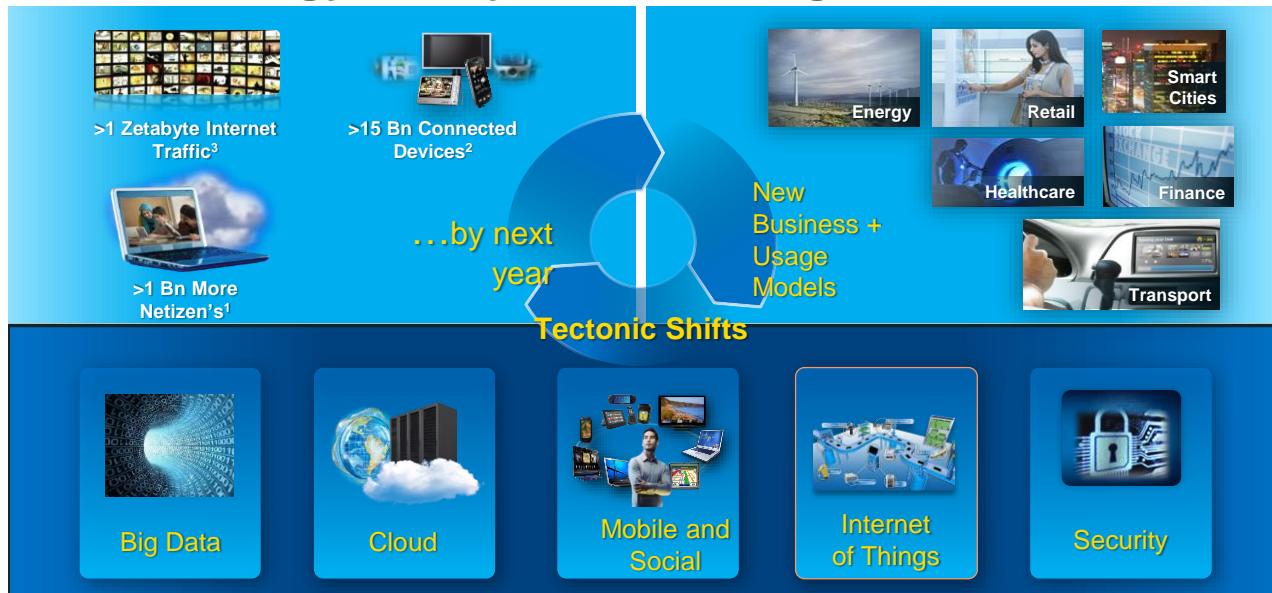
Increasing Energy Efficiency

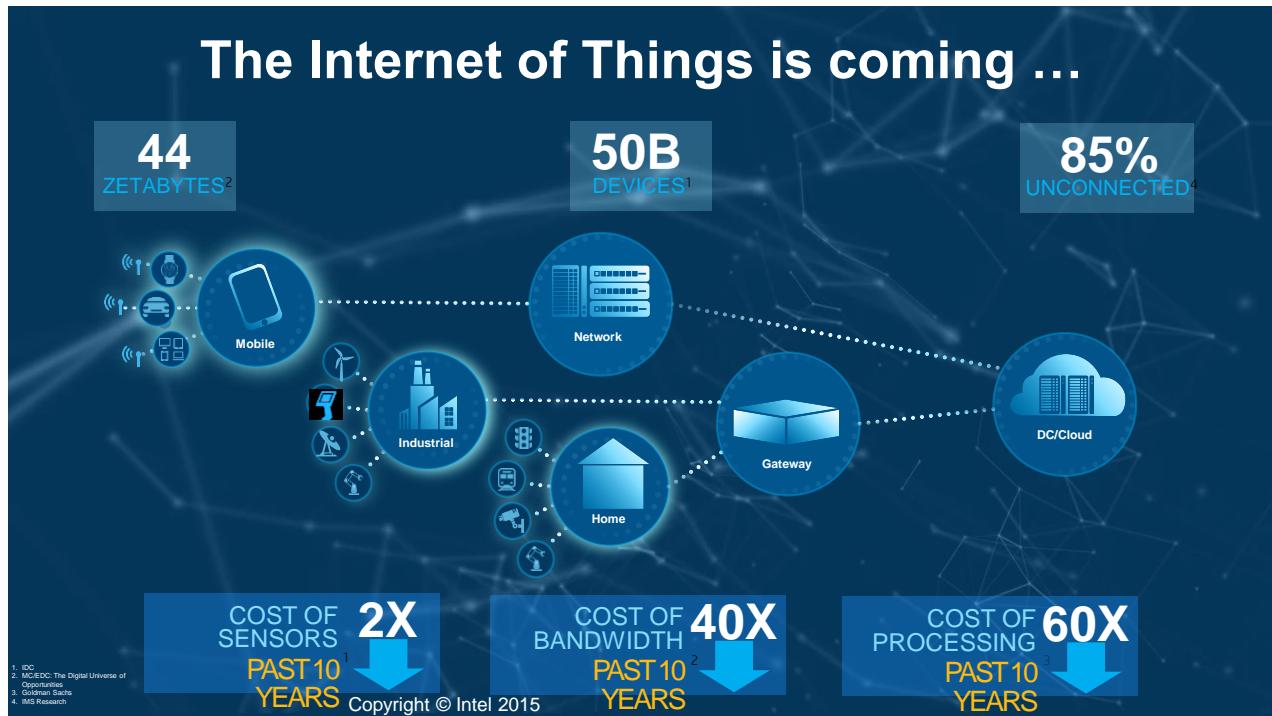
ICT leading sector in energy efficient improvements : need to take advantage of this out-performance.



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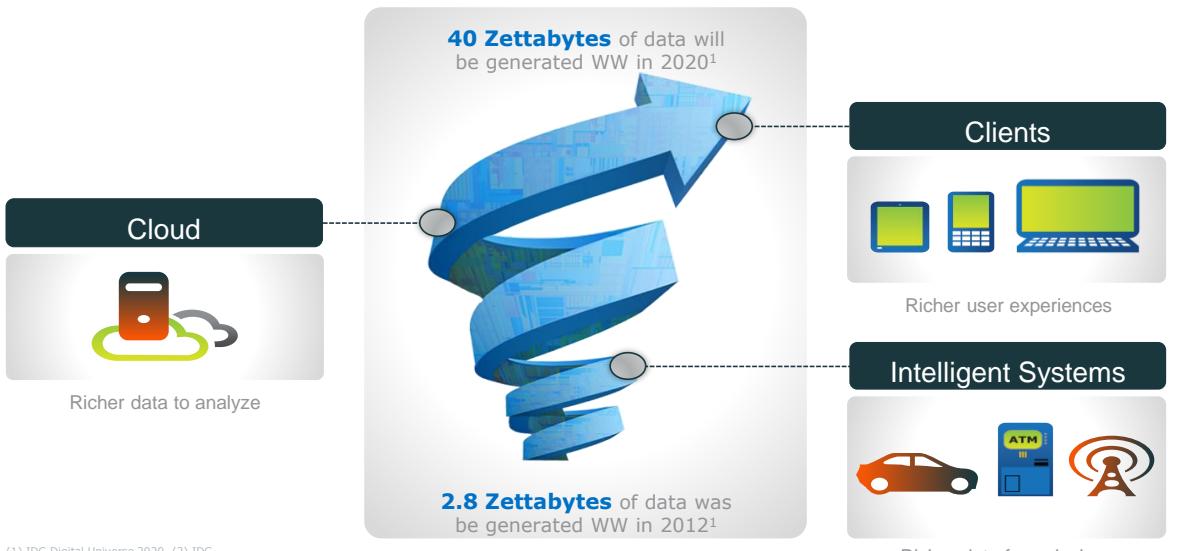
Technology Catalysts for Change



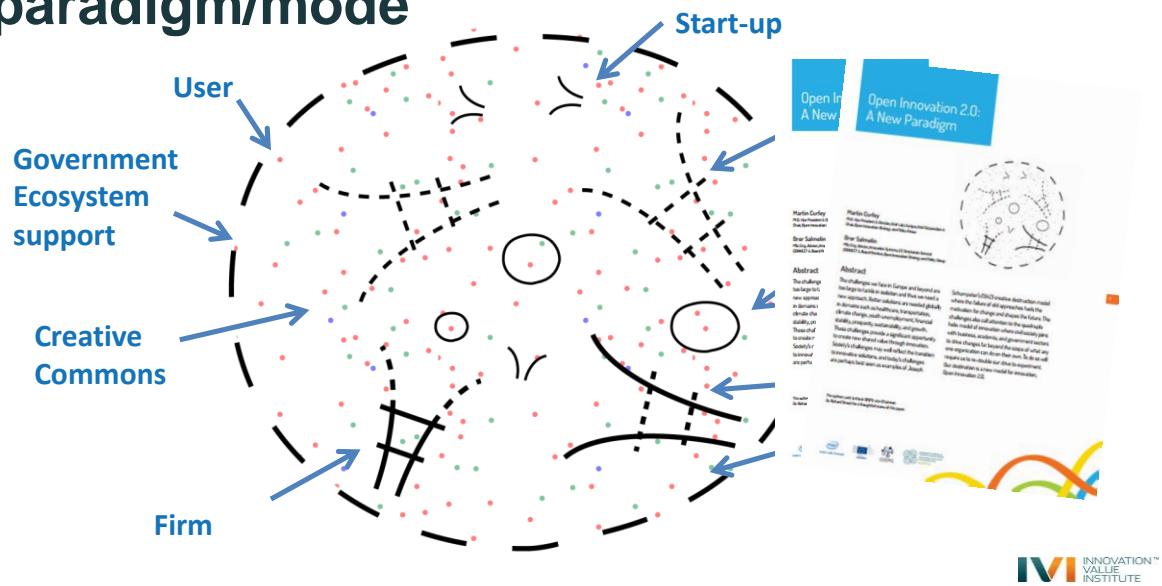


Big Data – A Foundation for Delivering Big Value

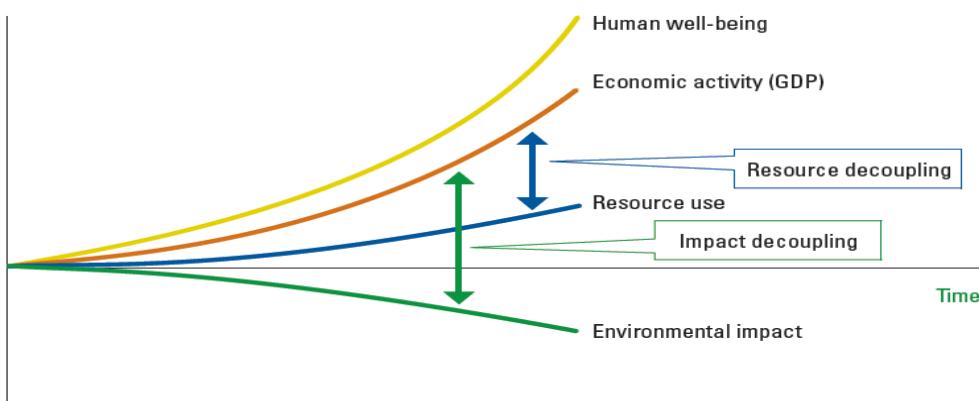
Virtuous Cycle of Data-Driven Innovation



Open Innovation 2.0: A new paradigm/mode



Sustainable Intelligent Living: Resource Decoupling



Source: UneP international resource panel

The World re-imagined at Light Speed



Industries established over a **Century**
re-architected in under a **Decade**

Many more opportunities.....Fashion, Sport etc



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... Re-imagining the World at Light Speed



When the **impossible...**
becomes **possible**

... to the much harder, all enabled by Open Innovation 2.0



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Towards Sustainable Intelligent Living

Former business model	New business model
- Volume driven	Value driven
- Consumption	Preservation
- Energy and resource intensive	Knowledge intensive
- Inherently hazardous/toxic	Inherently safe
- Linear systems	Circular systems
- Chemistry and physics	Biology and information
- Proprietary	Open
- Organization	Ecosystem
- Product	Service

From the Linear to the Circular to the Performance Economy

Adapted from Stahel



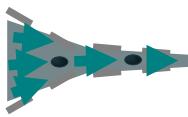
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Modes of Innovation

Closed innovation	Open innovation	Open innovation 2.0
Dependency	Independency	Interdependency
Subcontracting	Cross-licensing	Cross-fertilization
Solo	bilateral	Ecosystem
Linear	Linear, Leaking	Non-linearMash-up
Linear subcontracts	Bi-lateral	Triple/Quadruple Helix
Planning	Validation, pilots	Experimentation
Control	Management	Orchestration
Win-lose game	Win-win game	Win more-Win more
Box thinking	Out of the Box	No Boxes!
Single entity	Single Discipline	Interdisciplinary
Value chain	Value network	Value constellation

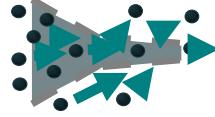


Innovation extending out of the Lab



Centralized inward looking innovation

Closed Innovation



Externally focused, collaborative innovation

Open Innovation

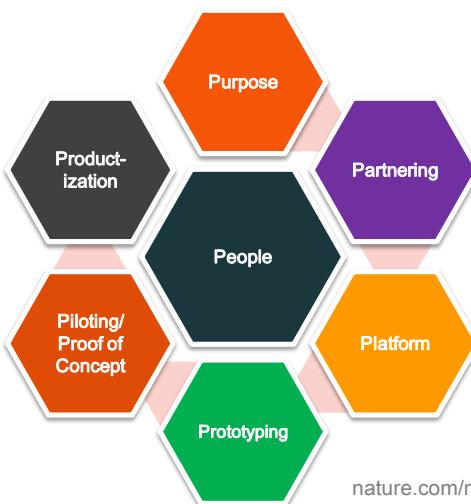


Ecosystem centric, cross-organizational innovation

Innovation Networks/ Ecosystems



Open Innovation 2.0: Some Core Patterns



nature.com/news/twelve-principles-for-open-innovation-2-0-1.19911



Shared Vision

It starts with a Vision.....



....I believe that this nation should commit itself to achieving the goal before this decade is out, of landing a man on the moon...."

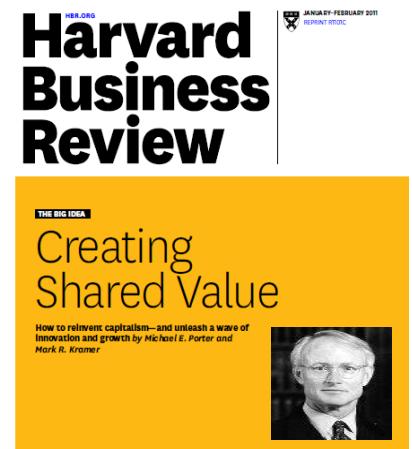
John F. Kennedy 1961

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Shared Value

- Re-conceiving the intersection between society and corporate performance
- Find Win – Win outcomes
- Profit through solving big problems



<http://hbr.org/2011/01/the-big-idea-creating-shared-value>

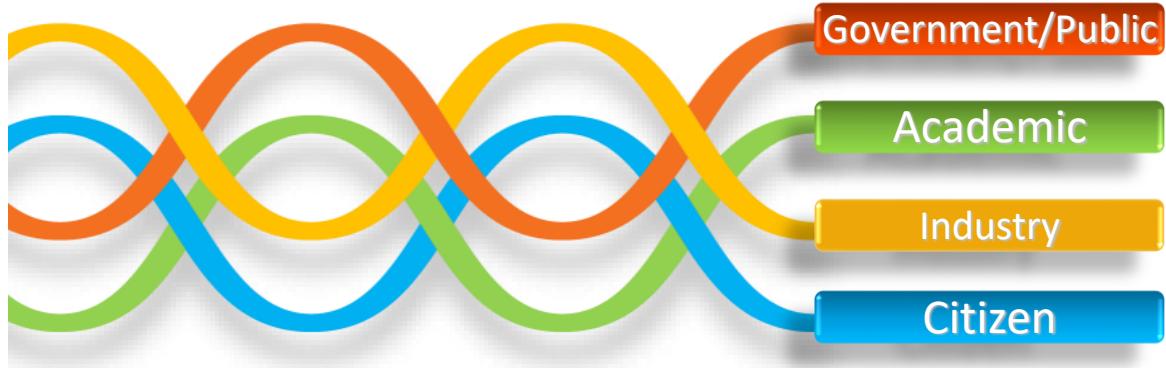
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Partnering

Quadruple Helix Innovation

Government, Academia, Industry and Citizens collaborating together to drive structural changes far beyond the scope of any one organization could achieve on its own



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Intel Sustainable & Connected Cities Institute

*The Concept: driving the computing continuum
and innovating the city of the future*



leads
protocols

more
habitable cities

Open innovation at work!

Imperial
London
C



London's Challenges

Smart London Plan: Enable London to Adapt and Grow



Operations & environment

- 1) Make available the city's performance, consumption, and environmental data as open data

Transport & Environment

- 2) By 2016, develop a robust quantitative understanding of the contributions that smart technical solutions and associated services can make to the management of London's transport and environmental infrastructures.

Energy

- 3) By 2020, stimulate smart grid services in London to restrict growth in peak electricity demand and associated infrastructure costs, with 10,000 MWh/annum of contracted supply and demand response.

Planning and operations

- 4) By 2020 showcase a robust 3-D map of all London's underground assets, accessible and updatable in real-time by all asset owners and works planners.

Environment

- 5) By 2020 ensure London has the best air quality of any major world city, which will require significant (c. 50%) reduction in emissions from London's transport sector.

Environment

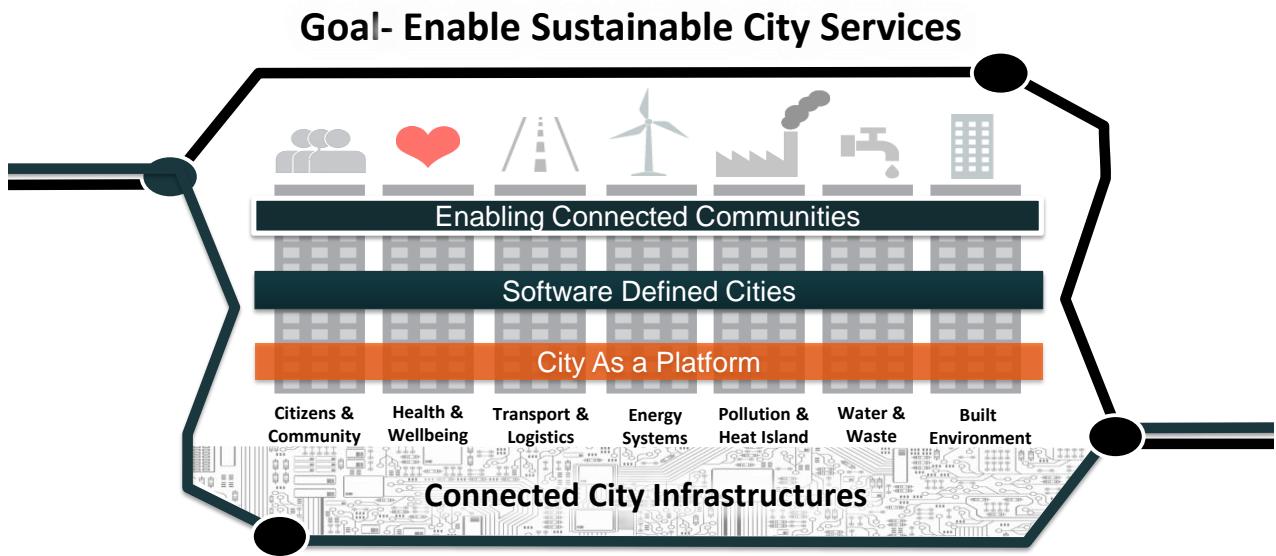
- 6) Work towards a reduction of greenhouse gas emissions to reach 40% below 1990 levels by 2020.



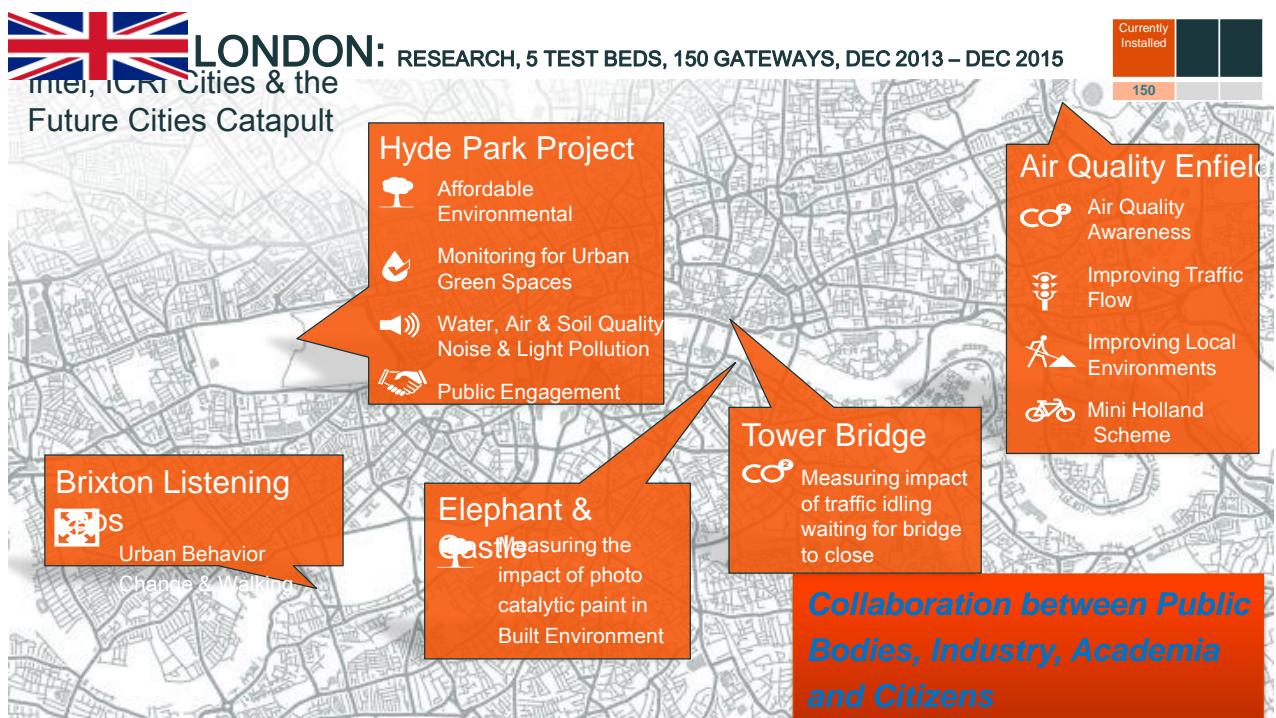
Living Labs

- Marrying technology with real world problems
- Collaboration & Ecosystem enablement
- Multi- disciplinary R&D Platform to continuously iterate, refine





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Disruptive Innovation



Benefits
Cost
Size
Scale
Automation

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Creating sustainable ecosystems **Queen Elizabeth Olympic Park**

Can we create a framework for analysis of "performance-in-use" for IoT technologies that enables the market to make decisions on investing in technology infrastructure.

"A Living Lab of experimental hardware integrated with Smart Park facilities to test IoT services in the park."



Billion device challenge **communication**

Managing radio communications in densely-populated network of sensing devices.
[adaptive radio management to ensure reliability and enhance performance.]

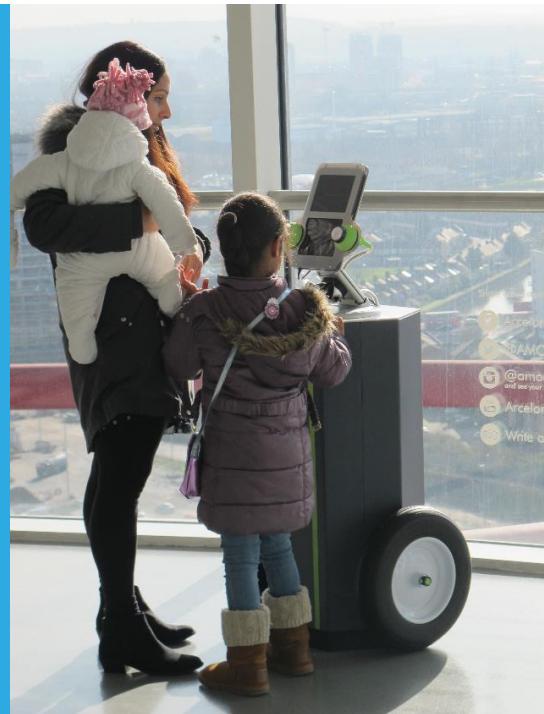
"Adaptive radio protocols to opportunistically route messages adapting to the dynamic application requirements in terms of energy usage and the expected quality of service."



Citizen engagement: sense making with citizens

How to explicitly bring citizens into the loop of Urban IoT and support them as data prosumers; both consuming available urban data for personal / community gain, and providing valuable new data in the form of citizen experiences and feedback.

"Roam.io: Novel (beyond screen) interaction stations that support two-way exchanging of knowledge – from citizen to the city, and from city to the citizen – to the benefit of both parties."



Sustainable Connected Cities Dublin



Dublin Living Lab

Driving the Limits of IoT through Research
in Complex Real World Urban Environments



Flood Monitoring

- River & Tidal Levels
- Hyper-local Rainfall Patterns
- Early Warning Platform
- Emergency Response

Smart Stadium

- Abnormal Crowd Behaviour
- Pitch Management
- Sound Monitoring
- Fan Engagement

EPA Public Engagement

- Citizen Science & Design
- Air Quality Awareness
- Odour Monitoring
- Water Quality

Urban IoT Business Models

- IOT Capability Maturity Framework
- Agile Data Driven Procurement
- KPIs & RoI Evaluation Methods



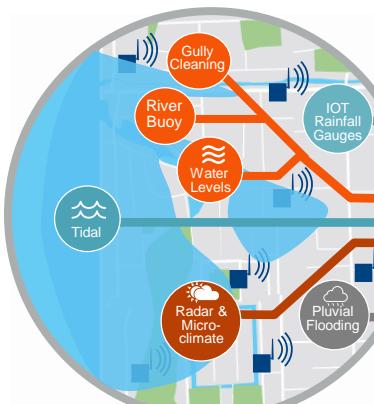
Extreme Weather – Flood Management

Save lives and reduce damage through heightened sensed awareness

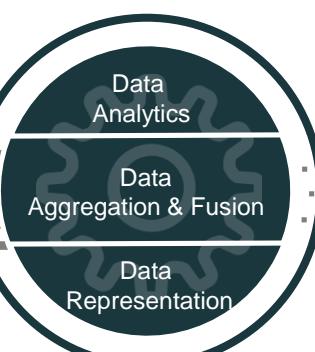
Pervasive environmental sensors & IoT gateways at granular level

Advanced cloud based data processing & analytics

Customised, real-time intelligence & alerts for stakeholders



ACQUISITION

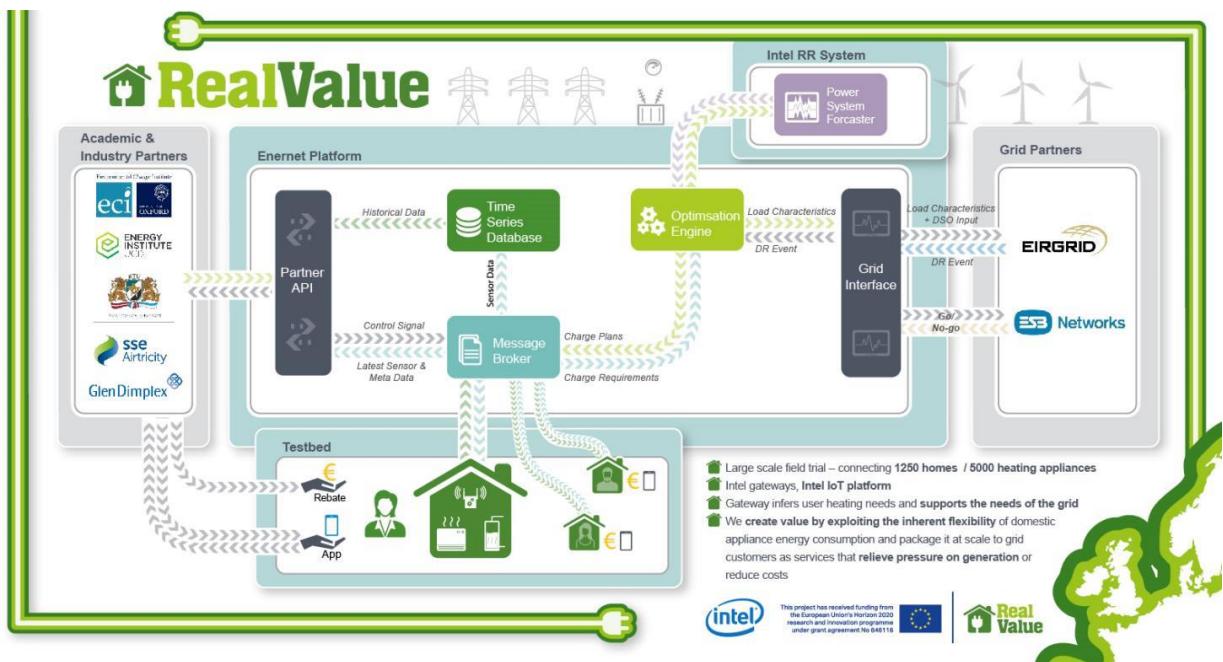


ANALYTICS



ACTION

ENERNET Transformation Project



Co-Creation and Innovation Platforms

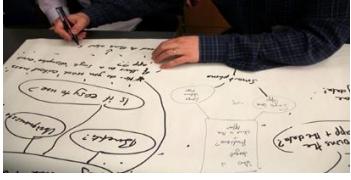
Field Research



Co-Design



User Experience



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The Rise of the User

User as “Research-Object”

- Observation and Surveying
- Prototype Development
- Testing (Usability, Feasibility, Market Testing)
- Piloting



User as Innovator

- Interactive User Feed-back
- Incremental User Innovation Ideas
- User Idea Generation
- User Community innovation
- Services by Definition “Co-creation”

Industry R&D Led

○ Consumers



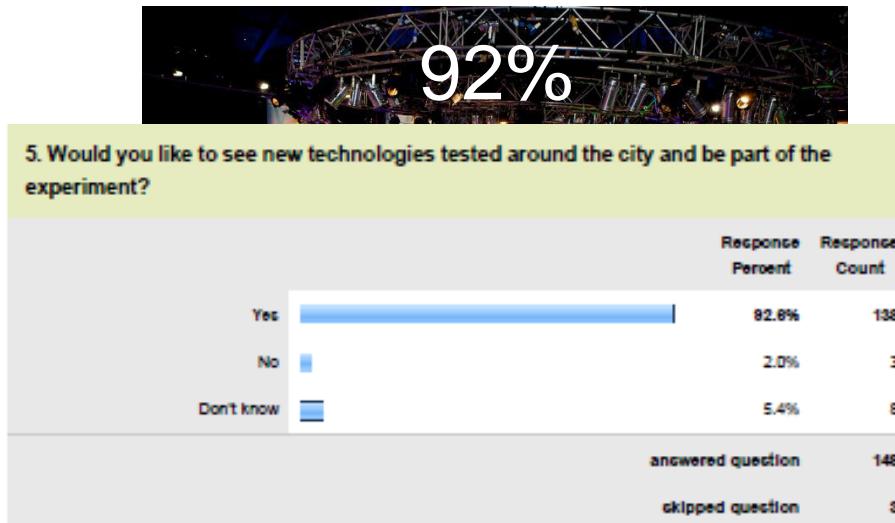
User/User Community Led

○ Contributors
○ Innovators

Source: IPTS; Jean Claude Burgelman, 2007

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Openness to Innovation



Iterative Development and Testing between Dublin and London





**Transform the way
public and private
sector organizations
manage IT for value
and innovation**



IVI Consortium Members

Steering Patrons



Patrons

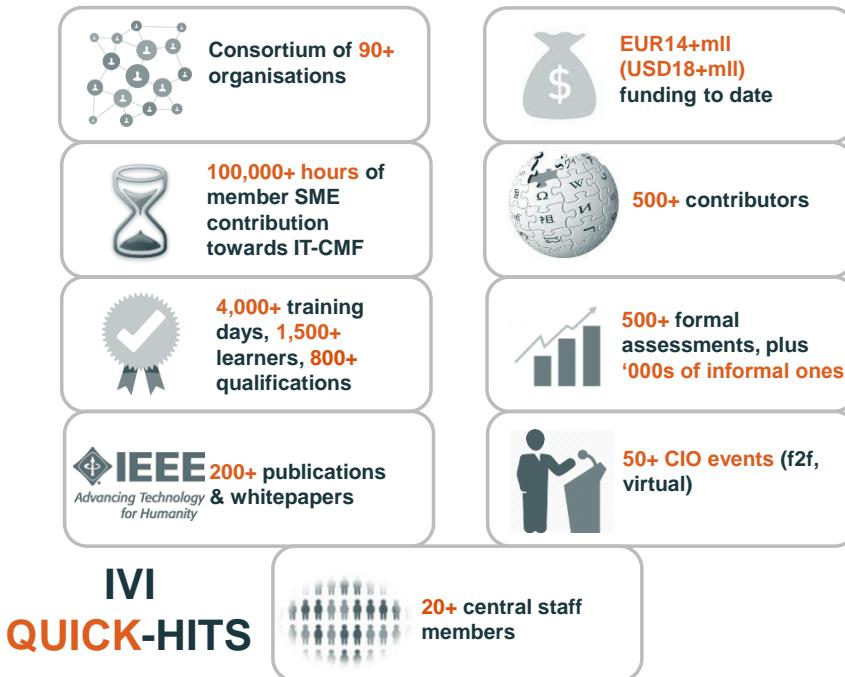


Contributors



Associates





Open Innovation 2.0: It is all about culture!

- The technology is ready.. Are we?