

**THE UNITED NATIONS COMMISSION ON SCIENCE AND TECHNOLOGY
FOR DEVELOPMENT**

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Contribution by

Microsoft

Enabling Global Innovation

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The views presented here are the contributor's and do not necessarily reflect the views and the position of the United Nations or the United Nations Conference on Trade and Development

Enabling global innovation

Dr. Daniel Reed | Technology Policy Group

Complex challenges ...

Social Inclusion Economic Uncertainty Humanitarian Disasters Public Debt



Jobs & Economic Growth



Key Societal Challenges

Online Safety Interoperability **Cyber Security** Environmental Sustainability

Glo

with a Foundation for Future Innovation in a Rapidly Changing World

Infrastructure Digital Citizens





... but it's not getting better fast enough



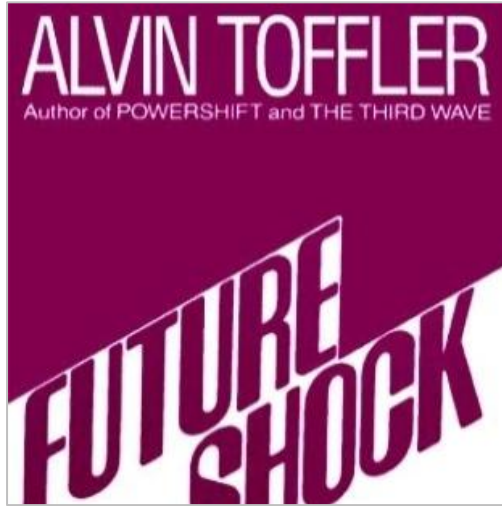
"The world is getting better..."



... and it's not getting better for everyone."

- Bill Gates

Exponentials & future shock



Exponential
change

Rapid technology change is challenging our historical social processes and mechanisms

We can facilitate an innovative future with thoughtful policy and effective technology

Not long ago ...

There were few or no experiences with...

- web sites, email, spam, phishing, computer viruses
- e-commerce, digital photography or Internet telephony
- streaming video on mobile devices

Mobile phones were rare and expensive

A portable cassette player was still cool

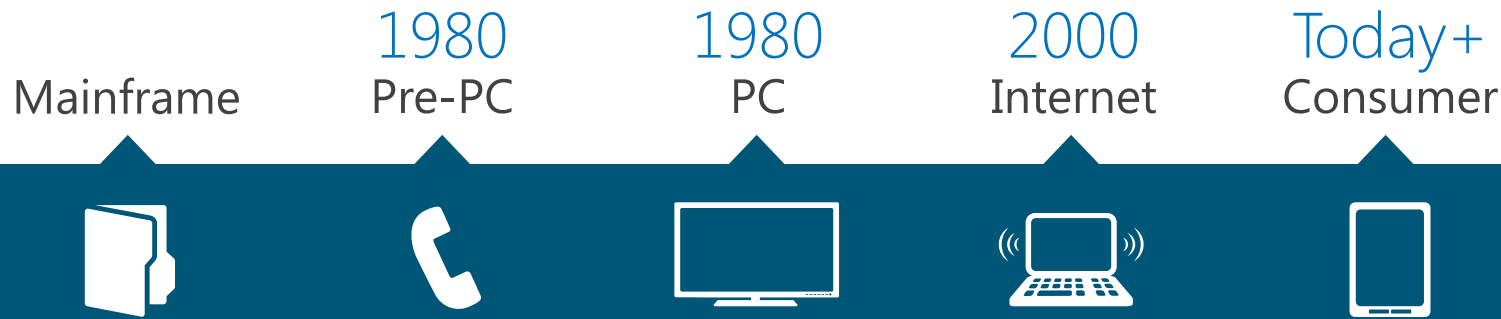
HiFi was more common than Wi-Fi

Books did not require batteries

A "friend" was someone you actually knew



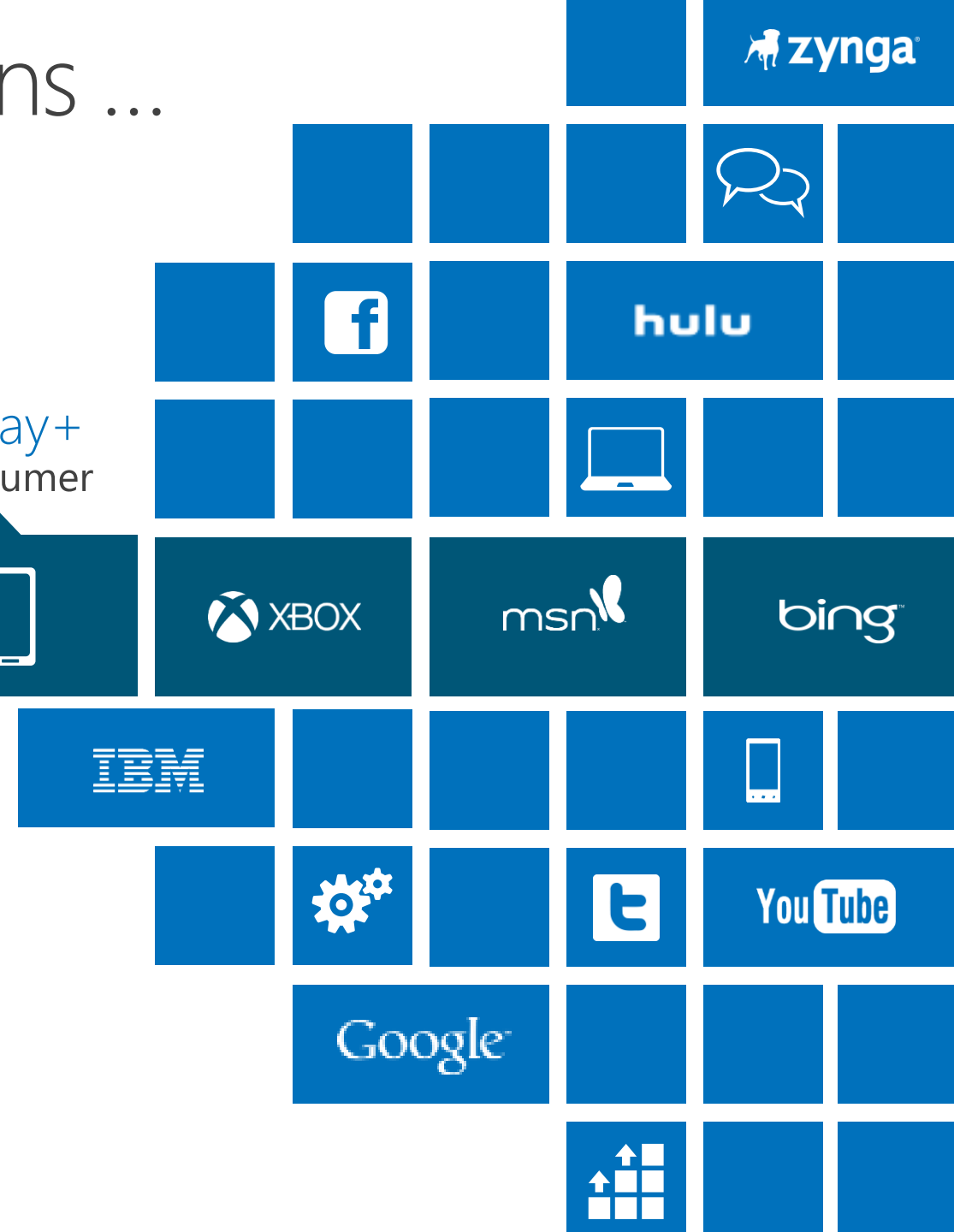
Computing eras and implications ...



21st century implicit and natural computing

- Increasingly natural interfaces
- Embedded intelligence in everyday objects
- Big data and machine learning
- Ubiquitous network access

It's about democratizing access ...



Broadband access and digital inclusion



Broadband is the oxygen of a digital economy

The **global village** is real, but not fully inclusive



2 billion internet connected consumers

555 million wired broadband subscribers

943 million wireless broadband subscribers

5 billion cell phones

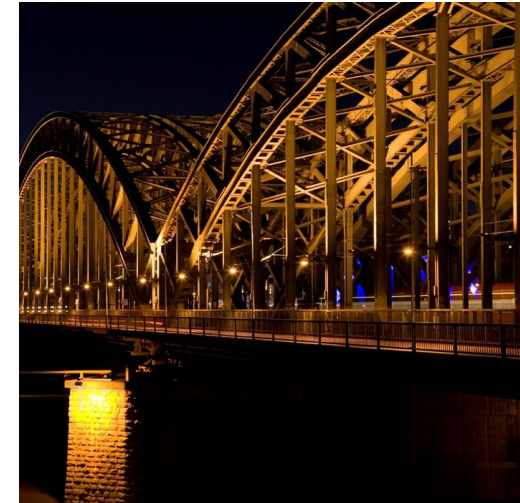
More connected objects than people ...



The internet
of things



50 billion
by 2020



TV white spaces: “super Wi-Fi” for digital inclusion

Broadcast TV channels are “allotted” to serve the local area

- Other licensed and unlicensed services also operate in the TV bands
- “White spaces” are unused channels at a given location

Spectrum below 1 GHz is ideal “real estate”

- Propagation characteristics mean easier coverage for large areas
- Simplifies broadband delivery to unserved/underserved communities
- Supports M2M communication



whitespace.i24.a-star.edu.sg



Cambridge, UK Trial Report



Asia Development Bank Demo (Manila)

The changing nature of innovation

Thousand years ago – Experimental Science

- Description of natural phenomena

Last few hundred years – Theoretical Science

- Newton's laws, Maxwell's equations...

Last few decades – Computational Science

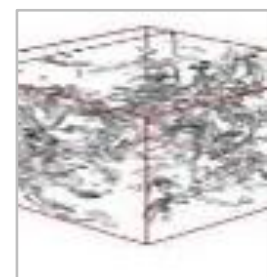
- Simulation of complex phenomena

Today – Data-centric Science

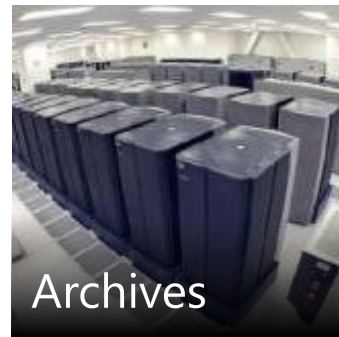
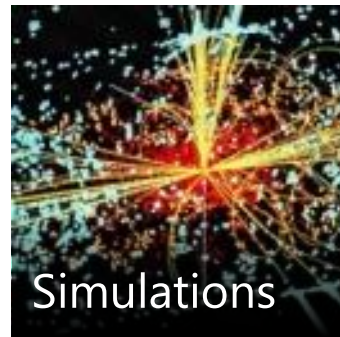
- Unify theory, experiment and simulation
- Using data exploration and data mining
 - Data captured by instruments
 - Data generated by simulations
 - Data generated by sensor networks
 - Data generated by humans



$$\left(\frac{\dot{a}}{a} \right)^2 = \frac{4\pi G \rho}{3} - K \frac{c^2}{a^2}$$



The data explosion is transforming research



THE RESPONSE

Every area of researchers is now engaged in data-intensive research

Researchers need

- Technology to publish and share data
- Simple yet powerful data analytics tools to explore massive data collections
- A sustainable economic model for scientific analysis, collaboration and data curation

Research4Life

HINARI = World Health Organisation

- "Health InterNetwork for Access to Research on the Internet"
- Yale University administers
- c 2002 (flagship)

AGORA = Food & Agriculture Organisation

- "Agricultural Online Research Access"
- Cornell University administers
- c 2003

OARE = UN Environment Programme

- "Online Access to Research on the Environment"
- Yale University administers
- c 2006

ARDI = World Intellectual Property Organization

- "Access to Research for Development and Innovation"
- c 2009

"...free or very low cost online access to the major science journals in biomedical, food and agriculture and environment to local, not-for-profit institutions in developing countries.."

Research4Life is the collective name for four research programmes
HINARI | AGORA | OARE | ARDI

ABOUT PROGRAMMES INSTITUTIONS CASE STUDIES NEWS TESTIMONIALS CONTACT FAQs

HINARI
provides access to
over 5500 peer-reviewed journals

CASE STUDY (4/4)
Health InterNetwork Access to Research Initiative
Antiretroviral drugs give HIV/AIDS sufferers a new lease of life in Uganda
Improving people's lives:
Uganda, which lies in the Sub-Saharan region in Africa, was one of the hardest hit countries by the HIV/AIDS scourge in the 1980s, wiping out entire villages in certain parts of the country. (...)

RESEARCH4LIFE NEWS
Research4Life Greatly Expands Peer Reviewed Research Available to Developing World
May 2012
Content available through Research4Life has dramatically increased since 2011 to reach 17,000 peer reviewed scientific journals, books and databases with the recent addition of Elsevier's contribution of 7,000 books. (...)

RESEARCH4LIFE NEWS
New Book highlights Impact of Research4Life Programmes
January 2012
This illuminating series of case studies provides insights into how access to Research4Life publisher partners is benefiting the health, well-being, and economic and social development of communities in the developing world, as well as contributing to greater environmental health and awareness. (...)

RESEARCH4LIFE NEWS
Research4Life in Ethiopia - User Shares His Experiences
January 2012
Physiotherapist Mulugeta Bayisa's experience with Research4Life's HINARI programme has helped him find better ways to treat his patients and teach his students. More than that, though, it has changed the way he thinks. (...)

RESEARCH4LIFE NEWS
Research4Life Strategy: Beyond the 2015 Horizon
March 2012
Our latest strategic plan, Beyond the 2015 Horizon, was published in 2011. Its content and structure reflect the findings and recommendations of detailed external reviews conducted during the previous year. (...)

TESTIMONIALS
"A few years ago we carried out an experiment for surgical operations of some livestock animals and as we thought it was excellent research, we wrote a manuscript on the findings for publication in a journal. However, after a review of the manuscript it came back with the comment that the drug which we used as anaesthesia for the animals had been banned about 5 years earlier. Had we had access to up-to-date published literature through such resources like AGORA this would not have happened."
Prof. Shehu U. Abdulahj, Vice-Chancellor, Ahmadu Bello University, Zaria, Nigeria

Streaming Low res High res
See all videos

<http://www.research4life.org/>

Local access to the world's knowledge base

Automatic translation

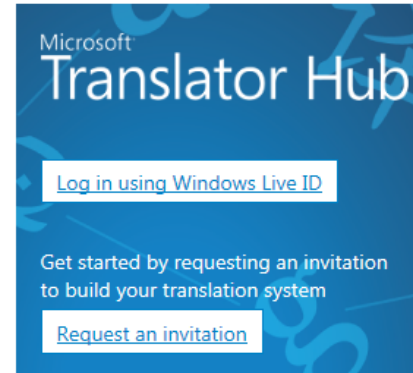
- Covers less than 100 of 7000 languages

Knowledge and data in local context

- Education and research
- Entrepreneurship
- Civil discourse
- Emergency and disaster response

Cultural preservation

- Indigenous languages and culture



Where language meets the world

Bridging languages, cultures and technology



Microsoft Translator Hub is helping smaller languages thrive by putting the power to build machine translation systems in the hands of local communities.

- K. David Harrison,
National Geographic Fellow, author and linguist

ABOUT MICROSOFT TRANSLATOR HUB

Microsoft Translator Hub empowers businesses and communities to build, improve, and deploy customized automatic language translation systems—bringing better and specialized translation quality to established languages, as well as the many native languages of the world that are not yet supported by major translation providers.

Powered by Windows Azure, Microsoft Translator Hub is an extension of the Microsoft Translator platform and service. You can build a superior translation system easily, within a private website, by combining your translated documents with the power of Microsoft Translator's big data back end. Once you are satisfied with your translation, you may share it publicly on the web.

MORE INFORMATION

[Microsoft Translator Hub Overview](#)

[Microsoft Translator Hub Forum](#)



<http://hub.microsofttranslator.com>

A new model: research and data as a service



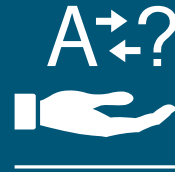
Marketplace

Marketplace of services offered to other researchers



Services + storage

Services offered alongside/powered by highly scalable storage & compute infrastructure



'Long-tail' research client tools

Simple client tools with rich features, accelerated and extended into the cloud, with expert services atop



Revenue streams

Other revenue streams can contribute to long-term data archiving and data curation costs



Integrated platform

An integrated platform for scientific & commercial innovation

A transition in computing, communications & experiences



As individuals, we have more computing power than nations once did

We have enough computing and enough data that when combined, new kinds of experiences can emerge



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