



Disruptive Technologies

Opportunities and threats for New Zealand

Malcolm Fraser,
executive director - *The Future Cities Institute.* director - *the.collaborative.studio*

The future is already here — it's just not very evenly distributed.

William Gibson

The 4th Industrial Revolution and Disruptive Technologies

disruptive technologies of artificial intelligence, robotics, the internet of things, autonomous vehicles, 3D printing, the blockchain, biotechnology, material science etc.

4th Industrial Revolution

2016

3rd
Automation/ICTs

1969 - 2016

2nd
Electricity

1870 - 1969

1st
Steam

1784 - 1870

Industrial Revolutions
The Rise of the Machine

1784

Scientific Revolution

The systematic accumulation of empirical knowledge

1543

Agricultural Revolution

Departure from hunter-gathers to the emergence of permanent settlements

Cognitive Revolution

The Emergence of Language Capable of Formulating Speculative Propositions

30,000 BC

70,000 BC

The Fourth Industrial Revolution

Professor Klaus Schwab, Founder and Executive Chairman of the World Economic Forum

Originally published: 11 January 2016

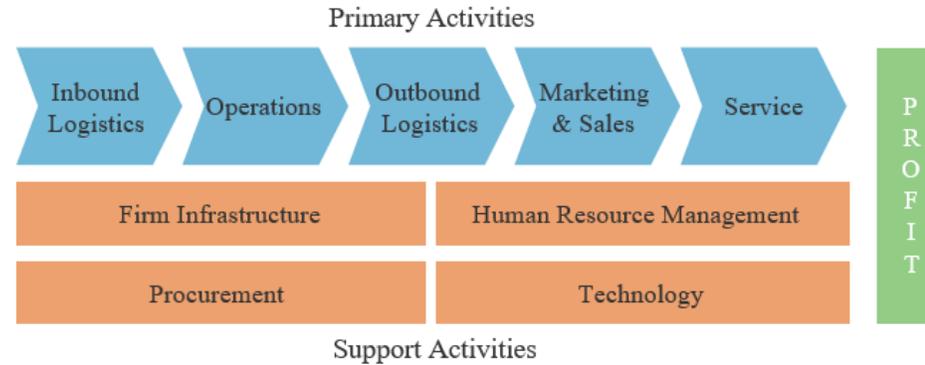
90% of the data in the world (ergo the last 70,000 years!)
has been produced in the past 2 years

Reform Context of Digital Technologies?

3rd Industrial Revolution



Linear Mode of Innovation:
Cascade down from fundamental science and applied research to Global Supply Chains, Value Chains and Business Ecosystems

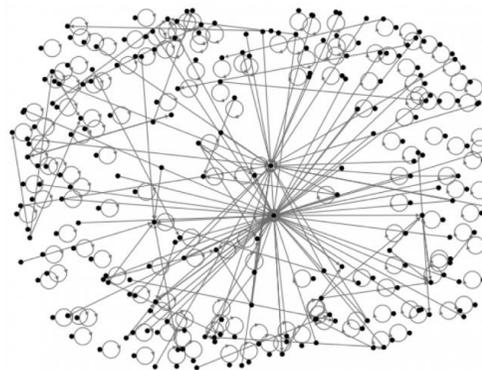


Old Work:
Assembly Line, Command and Control, Power Hierarchies, National Policies + National Competitiveness

4th Industrial Revolution



Non-Linear Mode of Innovation:
Innovation from many resources; Collaborative Networks, Innovation Ecosystems, Digital Platforms

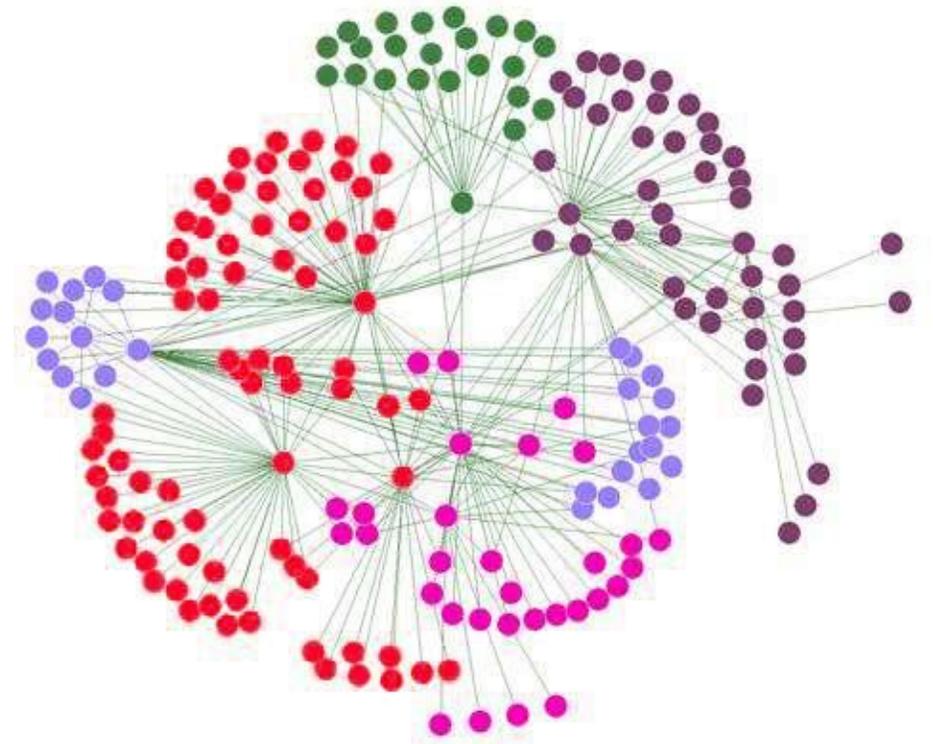


New Work:
Creative, Collaborative, Competency Hierarchies, Regional Policies + Local Innovation

The Future?

The Future (which is here now) is non-linear, where:

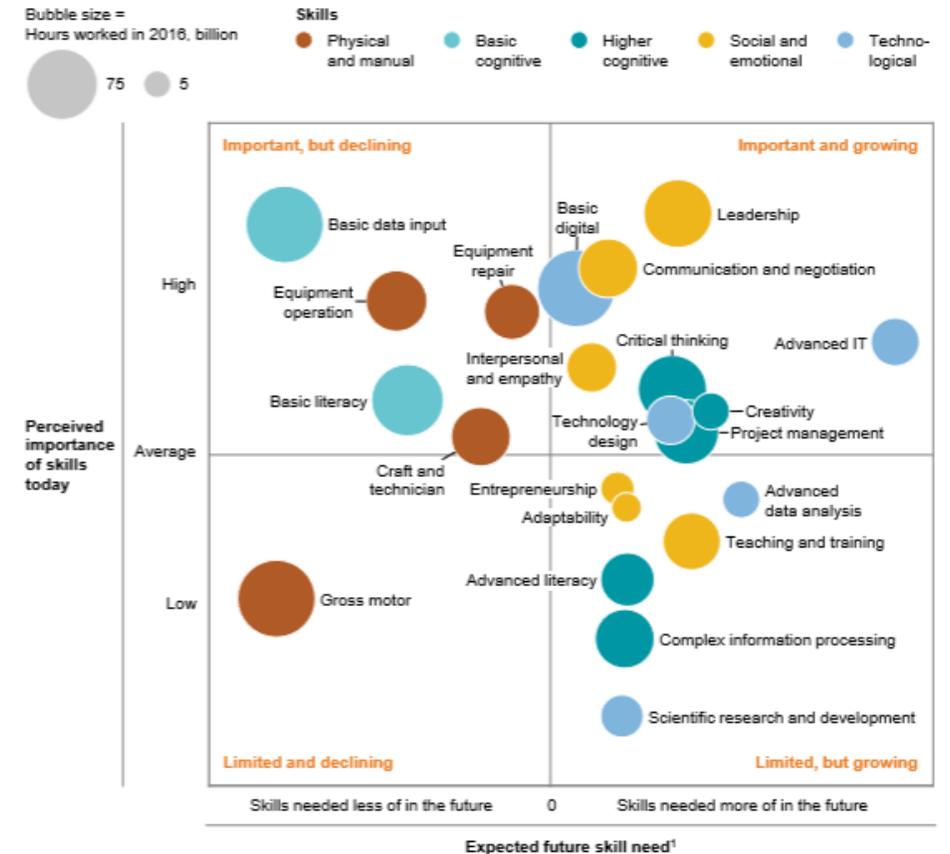
- collaborative (triple helix) networks of individuals, firms and organisations...
- spawn innovation ecosystems, digital platforms and local clusters...
- that co-create value via cooperative projects based on new ways of working powered by digital



Competency Hierarchies?

The Digital Divide

- Firms need to collaborate with educators to reshape school and college curricula.
- Industry associations need to build talent pipelines, while labour unions need to help with cross-sector mobility.
- Governments need to strengthen safeguards for workers in transition and encourage mobility



*McKinsey Global Institute Skill Shift: Automation and the Future of the Workforce May 2018

The Future of Construction?



Opportunities and Threats

New Zealand's reliance on its primary sector for its economic prosperity is unique amongst other OECD countries.

The disruptive technologies of the 4th Industrial Revolution are impacting New Zealand now and we need to accelerate skill uplift and the use of smart technologies by our primary sectors over the next **3 – 5 years to:**

- achieve better environmental outcomes.
- build trusted relationships with consumers and society
- improve outputs from the New Zealand Primary Sector (without impacting the environment), and
- increase our international competitiveness by adding value to the goods and services we produce

Policy Implications

This collaborative approach of producing innovations within ecosystems alters traditional policies for enhancing productivity and growth, thus having serious implications for effective policy making*.

1. Public and Private sectors are no longer separate in terms of ensuing sustainable growth and need to build tools for interactive dialogue and joint working (in and across innovation ecosystems)
2. Government programmes prioritizing certain groups of business, industries or technologies are no longer effective in the age of accelerating technology change and growing organizational complexity, we need to improve the institutional and business contexts (capabilities) to foster the development of 'Local Innovation Ecosystems' (planting trees is not enough!)
3. Government intervention must shift from linear to an increasing 'flat' ecosystemic work where government is no longer the administrator, rather the focus should be on soft industrial policy that supports the development of triple-helix collaborations and supports development of advanced manufacturing in local economies.

What are you going to do in the next 90 Days?

Q&A

 the collaborative

the.collaborative.studio