Beyond Market Failure
the *entrepreneurial state:*
taking risks and reaping back a reward

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Financial intermediation and aggregate gross value added compared

Rebalancing via industrial strategy?

Source: Bank of England (2011)
Industrial Strategy is back…

Advanced Manufacturing
- Aerospace
- Automotive
- Life Sciences

Knowledge-intensive traded services
- Professional / business services
- The information economy
- Further and Higher Education

Enabling Industries
- Energy
- Construction
But what if ‘real’ economy is just as ‘sick’ as banks?
Fortune 500 companies have spent $3 trillion on buybacks over the last decade.
In 2011, Pfizer repurchased $9 billion in stock, equivalent to 90 per cent of its net income and 99 per cent of its R&D expenditures.

Amgen repurchased stock in every year since 1992, for a total of $42.2 billion through 2011, including $8.3 billion in 2011. Since 2002 the cost of Amgen’s stock repurchases has surpassed the company’s R&D expenditures in every year except 2004, and for the period 1992–2011 was equal to fully 115 per cent of R&D outlays and 113 per cent of net income.


This is not only market ‘short-termism’ but organisational choices within sectors. Ericsson & Huawei vs. CISCO.
Cure: requires innovation/industrial policy to work alongside financial reform and de-financialization of the real economy.

‘smart’ and ‘inclusive’ growth
What is the State’s role in the economy?

Correcting:
1. Output failure (Keynesians)
2. Market failure (even free marketeers)
3. System failure (Schumpeterians)

Creating/shaping:
4. Something more interesting (Polanyi)
system failure policies

e.g. Europe’s *Innovation Union*

Strengthening the knowledge base & reducing fragmentation

- Education and skills
- European Research Area
- EU financing instruments

Getting good ideas to market

- Access to finance
- Single innovation market
- Openness and creative potential

Social and territorial cohesion

European Innovation Partnerships

International cooperation

Source: Innovation Union
Flagship Initiative presentation, Oct, 2010
all based on false contrast…

Private sector = fast, innovative, dynamic, entrepreneurial…

Public sector = slow, bureaucratic, inertial...or even worse: ‘enemies of enterprise’ (David Cameron, 2011)
Governments have always been lousy at picking winners, and they are likely to become more so, as legions of entrepreneurs and tinkerers swap designs online, turn them into products at home and market them globally from a garage. As the revolution rages, governments should stick to the basics: better schools for a skilled workforce, clear rules and a level playing field for enterprises of all kinds. 

*Leave the rest to the revolutionaries.*

*The Third Industrial Revolution*, *The Economist*, April 21, 2012
Businessmen have a different set of delusions from politicians, and need, therefore, different handling. They are, however, much milder than politicians, at the same time allured and terrified by the glare of publicity, easily persuaded to be ‘patriots’, perplexed, bemused, indeed terrified, yet only too anxious to take a cheerful view, vain perhaps but very unsure of themselves, pathetically responsive to a kind word. You could do anything you liked with them, if you would treat them (even the big ones), not as wolves or tigers, but as domestic animals by nature, even though they have been badly brought up and not trained as you would wish…. 

John M. Keynes’s private letter to Franklin D. Roosevelt, Feb 1, 1938
Entrepreneurial (risk taking) State

• Government doesn’t only ‘fix’ markets but does what private sector not willing to do

• Catalyst, lead investor. Creator not facilitator of knowledge economy

• Engaging with very high risk, uncertainty, radical change

• MISSION ORIENTED

• Courageous but naïve on returns
“The important thing for Government is not to do things which individuals are doing already, and to do them a little better or a little worse; but to do those things which at present are not done at all.”  J.M.Keynes, *The End of Laissez Faire, 1926*
market and technology risk

![Risk Matrix Diagram]

- Discontinuity
- Radical
- Evolutionary
- Leverage base

Increasing risk

MARKET

Existing

New

TECHNOLOGY

Existing

New
## Bumpy Investment Landscape

<table>
<thead>
<tr>
<th>Point at which investment made</th>
<th>Risk of loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seed stage</td>
<td>66.2%</td>
</tr>
<tr>
<td>Start-up stage</td>
<td>53.0%</td>
</tr>
<tr>
<td>Second stage</td>
<td>33.7%</td>
</tr>
<tr>
<td>Third stage</td>
<td>20.1%</td>
</tr>
<tr>
<td>Bridge or pre-public stage</td>
<td>20.9%</td>
</tr>
</tbody>
</table>
Valleys of death and Darwinian seas

1. research
2. concept/invention
3. early stage technology development (ESTD)
4. Product development
5. production/marketing

Source frequently funds this technological stage
Source occasionally funds this technological stage

Patent
Invention: functional prototype
Business Validation
Innovation new firm or program
Viable business

NSF, NIH, DARPA
Corporate research
Angel investors, corporations, technology labs, SBIR
VC, public venture capital, NIH, labs, ARPA-E
Corporate venture funds, equity, commercial debt

Source: Auerswald/Branscomb, 2003
Microchips powering the iPhone owe their emergence to the U.S. military and space programs, which made up almost the entire early market for the breakthrough technology. In the 1960s, the government bought enough of the initially costly chips to drive down their price 50x in a few short years, enabling numerous new applications.

The early foundation of cellular communication lies in radiotelephony capabilities advanced throughout the 20th century with support from the U.S. military. The technologies underpinning the Internet, which gives the “smart phone” its smarts, were developed and funded by the Defense Department’s Advanced Research Projects Agency in the 1960s and 70s.

GPS was created/deployed in 1980s/90s by the military’s NAVSTAR satellite program and still today maintained via public funds.

The multi-touch display that makes using an iPhone so intuitive has the government’s fingerprints all over it. The revolutionary interface was first developed by a brilliant pair of University of Delaware researchers supported by NSF and CIA grants. Source: The Breakthrough Institute, Where Good Technologies Come From?, 2011

SIRI, iPhone 5’s personal assistant, developed initially in DARPA.
Fig. 13, p. 109, *The Entrepreneurial State: debunking public vs. private sector myths*
new vs. ‘me too’ in pharma (1993-94)

Variations of existing drugs: 67%
Priority NMEs: 14%
Standard NMEs: 19%

Radical innovation funded almost entirely by public sector labs

Angell (2004)
Total NIH spending, 1936-2011 in 2011 dollars=$792 billion

NIH budget for 2012=$30.9 billion

Changing framing of Obama-care debate: Is State "meddling" in your healthcare or "creating" it?

Source: http://officeofbudget.od.nih.gov/approp_hist.html
technology risk in clean tech

(*GIB will nudge, VC will ride the wave, who will kick/push?*)

- **High**
  - Wind farms
  - Utility-scale solar
  - ‘First-gen’ biofuel refineries
  - Fabs for solar cells using established technologies
  - First commercial plants for unproven solar cell technologies
  - Advanced biofuel refineries
  - Offshore wind farms
  - Carbon sequestration

- **Low**
  - Wind and solar components of proven technologies
  - Internal combustion engines
  - Insulation / building material
  - Energy efficiency services
  - Energy efficiency software
  - Lighting
  - Electric drive trains
  - Fuel cells / power storage
  - Wind and solar components of unproven technologies

Figure source: Ghosh and Nanda, 2011
Cost, maturity and risk associated with different electricity generation technologies

Source: Based on Frankfurt School-UNEP Centre/BNEF (2013).
Renewable energy R&D investments in the U.S.
in million 2002 dollars

Source: Nemet and Kammen (2007)
Who is funding the green revolution?

Renewable energy investments

- Development bank (data available for 2007-2012 only)
- Venture capital, private equity and stock markets
- Government R&D
- Corporate R&D

Source:
Frankfurt School-UNEP Centre/BNEF (2013).
2012 Public & Private Investment in renewable energy

**Public market** (stock exchange) investment US$ 4.1 billion
**Venture capital and private equity** investment US$ 3.6 billion
**Corporate** investment US$ 4.8 billion


**Development bank** finance for renewable energy projects: 2012: US$ 50.8 billion

**Development bank** finance for efficiency, transmission and distribution (clean energy) projects: 2012: US$ 28.3 billion

Total development bank finance for broad clean energy projects: 2012: US$ 79.1 billion  (2011: US$ 80.2 billion)
A key element to get an energy breakthrough is more basic research. And that requires the government to take the lead. Only when that research is pointing towards a product then we can expect the private sector to kick in.
2010: US American Energy Innovation Council (AEIC) asked for 3x spending on clean technology to $16 billion annually, with an additional $1 billion given to the Advanced Research Projects Agency for Energy (ARPA-E)

Yet AEIC have together spent $237 billion on stock repurchases between 2001-2010.

The major directors of the AEIC hail from companies with collective 2011 net incomes of $37 billion and R&D expenditures of approximately $16 billion. That they believe their own companies enormous resources are inadequate to foster greater clean technology innovation is indicative of the state's true role as the first driver of innovation.
Risks and Rewards

Moving beyond eco-system hype (old wine in new bottles) to a division of innovative labour, and getting something back.

Are we building ‘symbiotic’ or ‘parasitic’ eco-systems of innovation?

Socialising not only risks but also rewards
A new pharmaceutical that brings in more than $1 billion per year in revenue is a drug marketed by Genzyme. It is a drug for a rare disease that was initially developed by scientists at the National Institutes of Health. The firm set the price for a year’s dosage at upward of $350,000. While legislation gives the government the right to sell such government-developed drugs at ‘reasonable’ prices, policymakers have not exercised this right.

The result is an extreme instance where the costs of developing this drug were socialized, while the profits were privatized. Moreover, some of the taxpayers who financed the development of the drug cannot obtain it for their family members because they cannot afford it. (Vallas et al. 2011).
When **SITRA**, the Finnish government’s public innovation fund, provided the early stage funding for **Nokia**, it later reaped a significant return on this investment – a fact accepted by the Finnish business community and politicians.

The reason why the US government has not reaped a return from its early stage investments in companies like **Google** (which benefitted from a state-funded grant for its early algorithm) and other such success stories including Apple, Intel and Compaq (which received public SBIR funding) is due to the lack of understanding in the USA, and many other economies, of state-led growth-inducing investments, which allow conservative forces to portray the state as only a menace in the economy.
Creative thinking on tools to claim back return

- IPR golden share
- Income contingent loans
- Retain some equity and shares
- Public VC (reinvested back), e.g. SITRA
- National Investment Bank (e.g. Brazil’s BNDES 20% return on equity!)

Must change way we talk about risks and rewards. Not just ‘de-risking’. Not just ‘crowding in’.
think again!

private sector

vs.

public sector