

Global Sourcing, Industrial Competitiveness, and the Future of Regional Clusters

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HARVARD | BUSINESS | SCHOOL

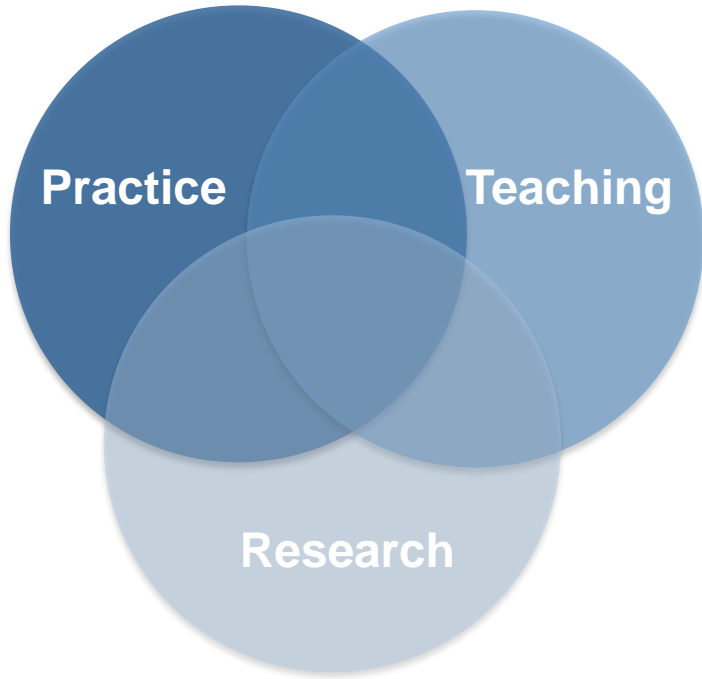
Agenda

- The power of clusters

- Comparison: Two clusters in Denmark

- Global sourcing





28 Years

My 9th year at HBS

“Willy, you always were an academic, you just did a 28 year field experiment ...”

“... and you were a little slow interpreting the data”

A quick look at the Massachusetts Life Sciences Cluster ...

A confluence of multiple factors

- World-leading research science base
- Large healthcare sector
- Enormous investments in public goods

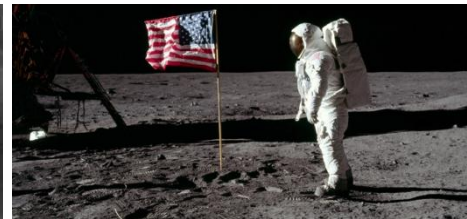
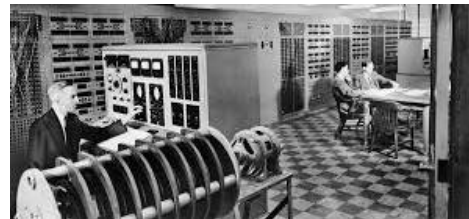


Public Goods ...

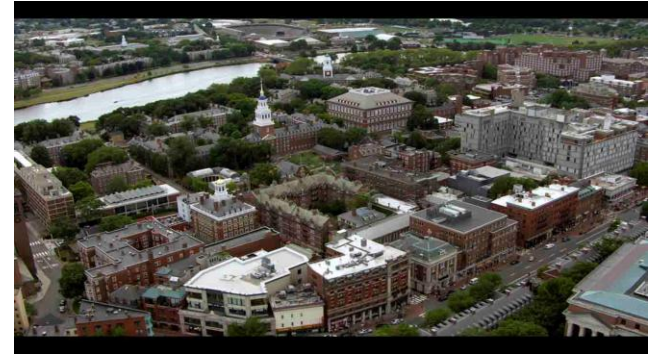
The economists say ... “non-excludable and non-rivalrous”

Willy says ...

- Public infrastructure, knowledge, investments in basic scientific research
- Extraordinary public investments since pre-WW II



And institutions who have organized around these opportunities – 122 colleges and universities



What makes a cluster attractive?



[INNOVATION STRATEGY]

What to Know About Locating in a Cluster

As a study of two industry clusters in Denmark shows, factors that can make clusters attractive—easy people movement and knowledge spillovers—can also make it harder for individual companies to retain proprietary knowledge.

BY WILLY C. SHIH AND SEN CHAI

There is ample evidence that geography matters for innovation. Innovation flourishes when workers are in close proximity to each other, where face-to-face encounters and job changes foster the flow of knowledge and the exchange of ideas. As Michael E. Porter of Harvard Business School and other scholars have noted, many companies choose to locate in industry clusters—regional concentrations involving a particular industry—on the presumption that they will gain an advantage in learning or in hiring workers with relevant skills and knowledge, and by being near suppliers and complementary businesses. Face-to-face interactions, formal and informal, frequent and repeated, become more valuable in an uncertain, complex world in which context is very important (what Eric von Hippel of the MIT Sloan School of Management calls “sticky knowledge”).

One of the most effective ways knowledge gets transferred is via people changing jobs. The knowledge might be know-how or

Businesses that impose noncompete provisions on their employees recognize this as “residual knowledge,” knowledge that a person cannot be prevented from taking upon leaving. That’s also why they target specific competitors when recruiting. In recruiting, local job switches are easier than long-distance ones—hence, the benefit of being in a cluster.

If the knowledge carried around in people’s heads is one of the valuable assets of a cluster, then tracking job changes should yield insights. Are there patterns that help companies be more competitive or respond to market threats? Does the makeup or the organization of a cluster make one cluster more attractive than another? How can a manager leverage the strengths of a cluster to maximum advantage? Are there any downsides to being in a cluster?

To explore these questions, we used LinkedIn’s Recruiter Lite tool to trace the career paths that many professionals display in

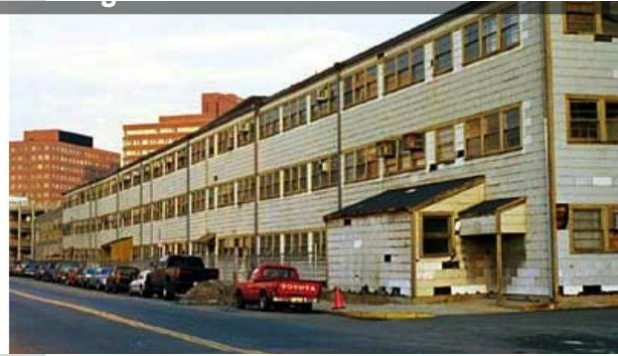
- Core institutions with scale and scope in relevant fields
- Platform strengths that span non-competing sectors
- Easy people movement and knowledge spillovers
- Linkage into sub-communities

Shih, Willy C., and Sen Chai, “What to Know About Locating in a Cluster,” *MIT Sloan Management Review*, Vol. 57, No. 1 (Fall 2015)

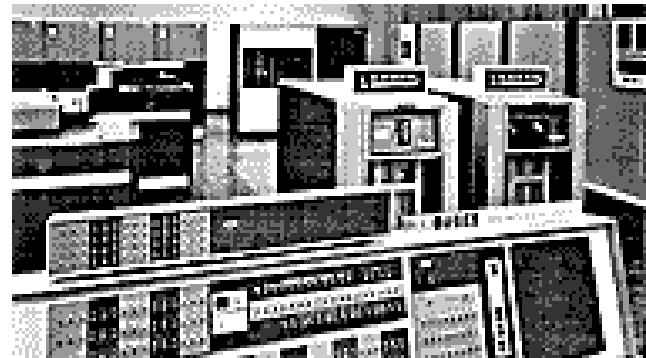
Pulling in more and more ...



Willy's THIRD "tour of duty" through the area



Are there lessons?



Today in the U.S. ... lost capabilities



Recognition of the “commons” problem



Setting: July, 1997 at Eastman Kodak

Why was it so hard to make things like digital cameras in the United States?

Paralleled Gareth Harding's *tragedy of the commons*

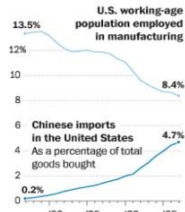
Inside President Obama's economic briefing book

The president has studied trends in U.S. manufacturing and the effects of global competition to develop strategies for rebuilding America's manufacturing sector. Here are examples of some of the information he studied. [Read related article.](#)

"The China Syndrome: Local Labor Market Effects of Import Competition in the United States" by David H. Autor, David Dorn and Gordon H. Hanson



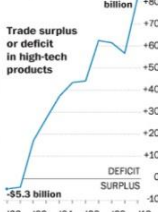
Rising exposure to Chinese imports has increased unemployment and reduced wages around the country, driving increases in demand for government benefits. The trend accelerated after China gained easy access to U.S. markets after 2001.



"Restoring American Competitiveness" by Gary Pisano and Willy Shih, Harvard Business Review



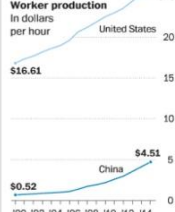
As a result of outsourcing and reduced government investment in research, the United States has lost and will soon lose ability to manufacture a wide range of high-tech products.



"Made in America, Again," by Harold L. Sirkin, Michael Zinser, and Douglas Hohner, Boston Consulting Group



Rapidly rising labor costs in China, combined with other costs associated with manufacturing overseas, are making it more competitive for U.S. companies to keep work at home.



Sources: "The China Syndrome: Local Labor Market Effects of Import Competition in the United States." Harvard Business Review; Bureau of Labor Statistics; Boston Consulting Group. The Washington Post. Published on July 14, 2012, 6:51 p.m.

U.S.: Finally "worrying" about the problem

Building a National Network for Manufacturing Innovation

The NMMI program has invested \$240 million of federal funds in specialized manufacturing institutes:

DETROIT
\$70 million

Lightweight & Modern Metals Manufacturing Innovation Institute

CHICAGO
\$70 million

Digital Manufacturing & Design Innovation Institute

YOUNGSTOWN
\$30 million

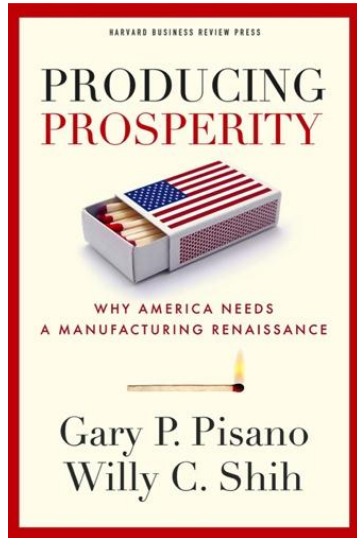
National Additive Manufacturing Innovation Institute

RALEIGH
\$70 million

Next Generation Power Electronics Manufacturing Innovation Institute

To date, federal funding is supporting the creation of four specialized manufacturing innovation institutes.

Read more on the importance of these regional hubs in the [original Brookings proposal](#), which called for a nationwide network of at least 25 advanced industry hubs.



Dear Prof. Shih,

In 2013, we introduced the book *Producing Prosperity: Why America Needs a Manufacturing Renaissance* to China. At present, the book has been translated into Chinese and ready for publication. We have an optimistic expectation on the value and market of the book in China ... we will appreciate if you could write preface for the Chinese version of the book.

A Strong Link Between Manufacturing and Innovation



*What you
can make*



*What you can
design*

How a “commons” works in the industrial context

Michael Porter: *Geography matters*

- Regional clusters of interconnected companies, suppliers, and associated institutions like universities and public research institutions often nurture firms with exceptional global competitiveness



As you know (and tell me all the time) *Denmark is a small country ...*



5.6 million people

- 48% of GDP → exports
- Many “hidden champions”
- Pharmaceuticals
- Agricultural / dairy / meat
- Industrial equipment



A Tale of Two Clusters



One country, two clusters, two very different outcomes

Life Sciences Cluster

Roots in strong agricultural sector

- Extraction of porcine/bovine pancreatic insulin
- Extraction of enzymes for cheese production



“Medicon Valley”

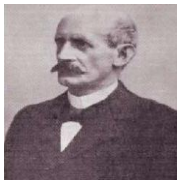


One of the most successful life sciences clusters in Europe

Extraordinary Investments in Public Goods



Bohr



Kjeldahl



Ørsted

... others

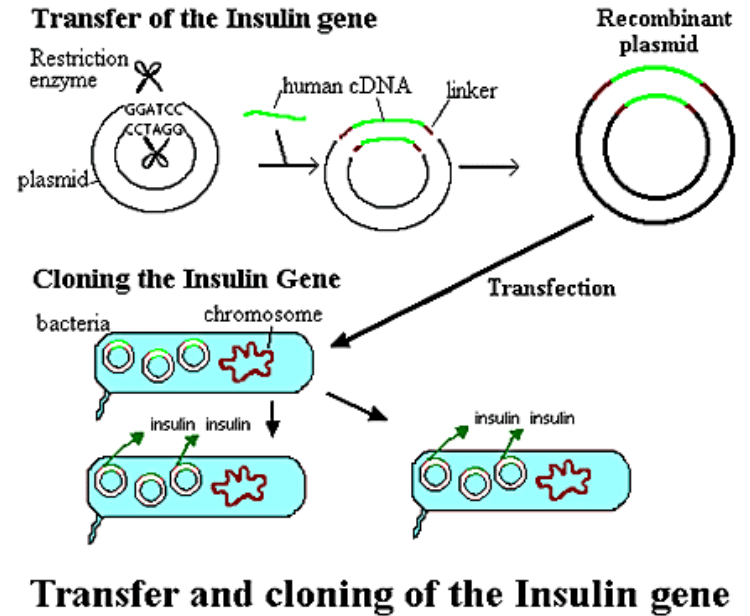
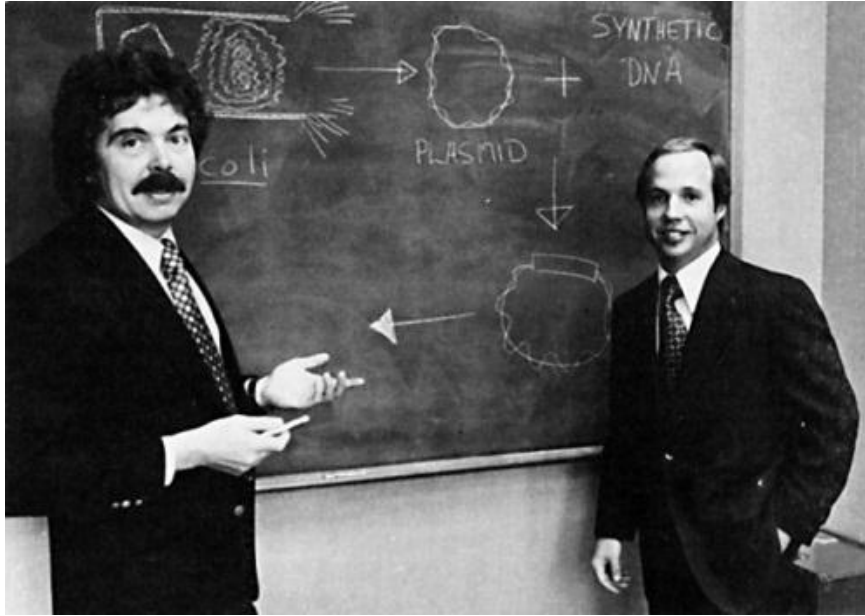
...



“The principal task of the Carlsberg Laboratory shall be to develop as complete a scientific basis as possible for malting, brewing and fermenting operations.”

“No result of the laboratories which is of theoretical or practical importance shall be kept secret”

History of cooperatives for achieving scale
(Civil code in constitution of 1849 framed important aspects of competition law)



Genentech (1978): Cloning, expression, and purification of recombinant human insulin
Offered to Novo, Novo declines (had semi-synthetic route)

Licensed to Eli Lilly (1982)



Meeting the challenge of producing insulin by recombinant methods



“Best gene technologists from Carlsberg Research”

“Best yeast physiologists from Carlsberg”



“Protein expertise”

Today produce 50% of the world's insulin



Methods for studying knowledge spillovers

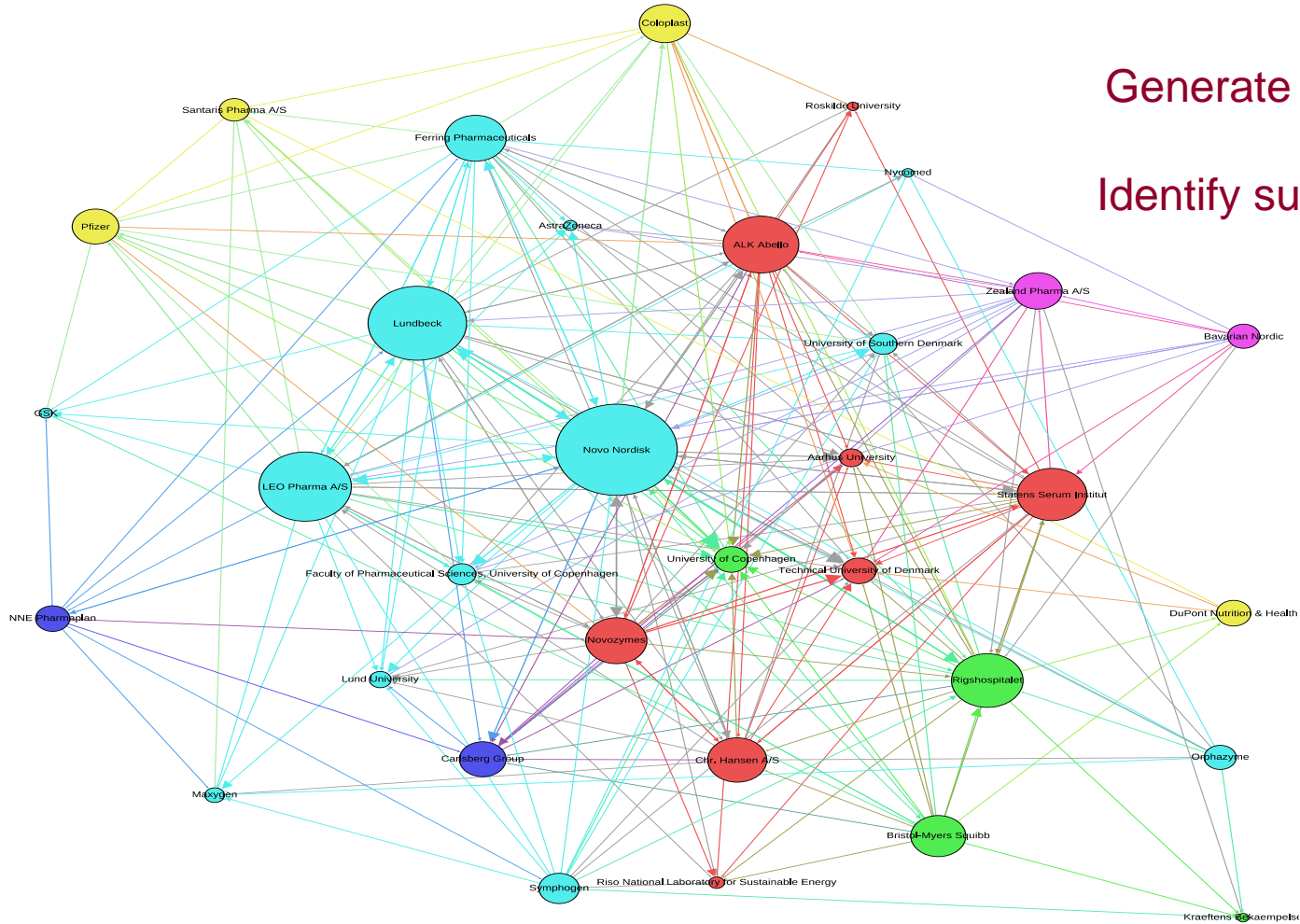
Traditionally ...

- Study knowledge and people movement retrospectively through joint publications, patents

Scary new way ...

- Social network based
 - Search on specific skills
 - Complete trace of career paths

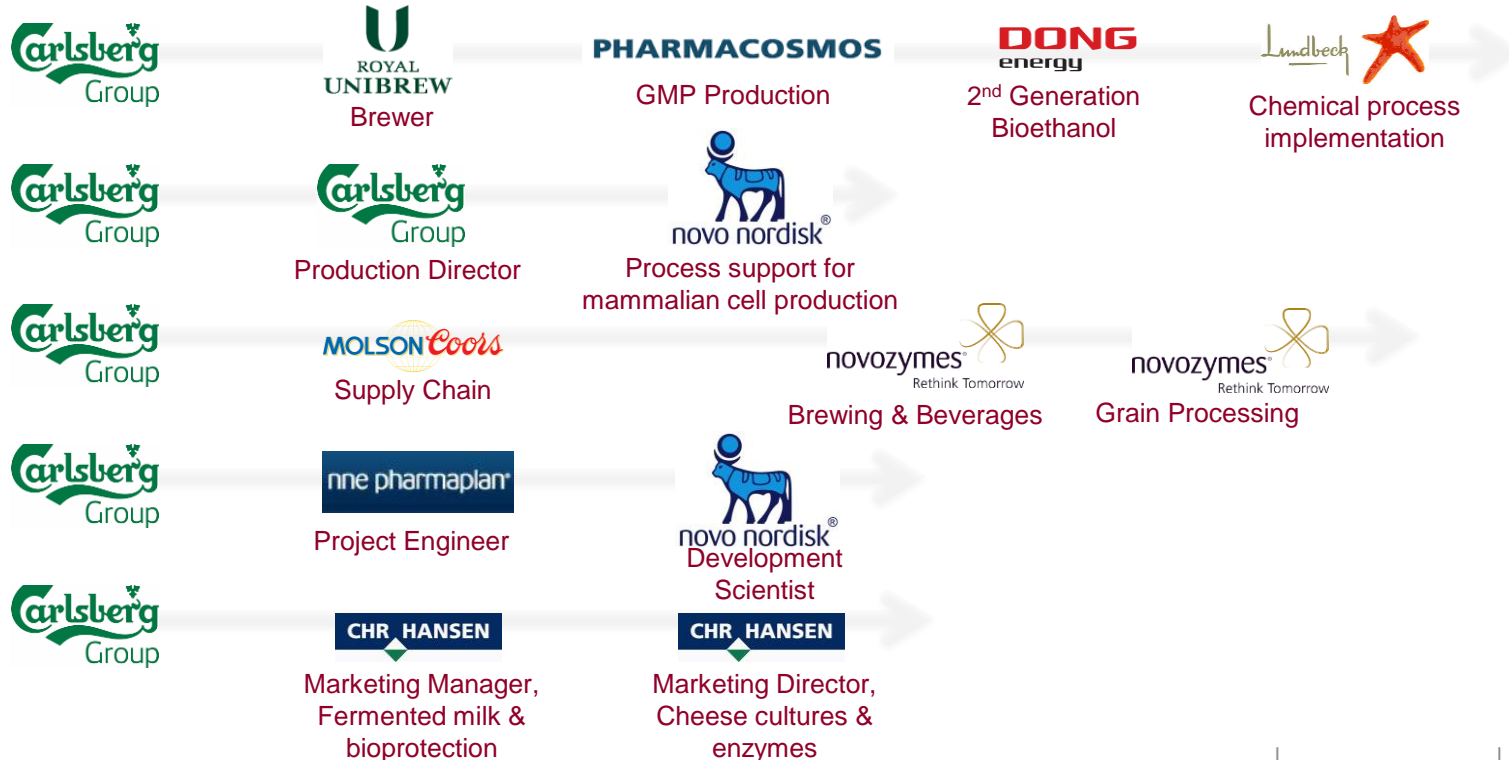




Generate network maps

Identify sub-communities

Trace spillover of specific skills / expertise



The North Jutland Wireless Communications Cluster

Pioneering Nordic
Mobile Telephone
System (NMT)

Lead Role in GSM
Development

Challenges
in 3G



A/S S. P. RADIO · AALBORG · DENMARK

Shipmate

Storno

Dancall

Cetelco

Ammcom

T-Com

BD Consult

LH Mobil Radio

Gatehouse

*Pre-competitive
DC Development*

Amstrad

Haugenuk

Bosch

Siemens
Flextronics

Motorola

X

Life Sciences

- Research science heritage – public goods
 - University of Copenhagen, DTU, University of Southern Denmark, Aarhus University, others
 - Carlsberg Research Labs
 - Statens Serums Institute
 - Rigshospitalet
 - Others
- Production
 - Large scale
- Foundation ownership

Wireless Telecom

- Marine Radio base
 - Aalborg University (relatively young)
- Not much in the way of production
- Foreign takeovers → evolution of sites to become “technology sources”

Adequate Investment Scale and Scope



Critical importance within the cluster

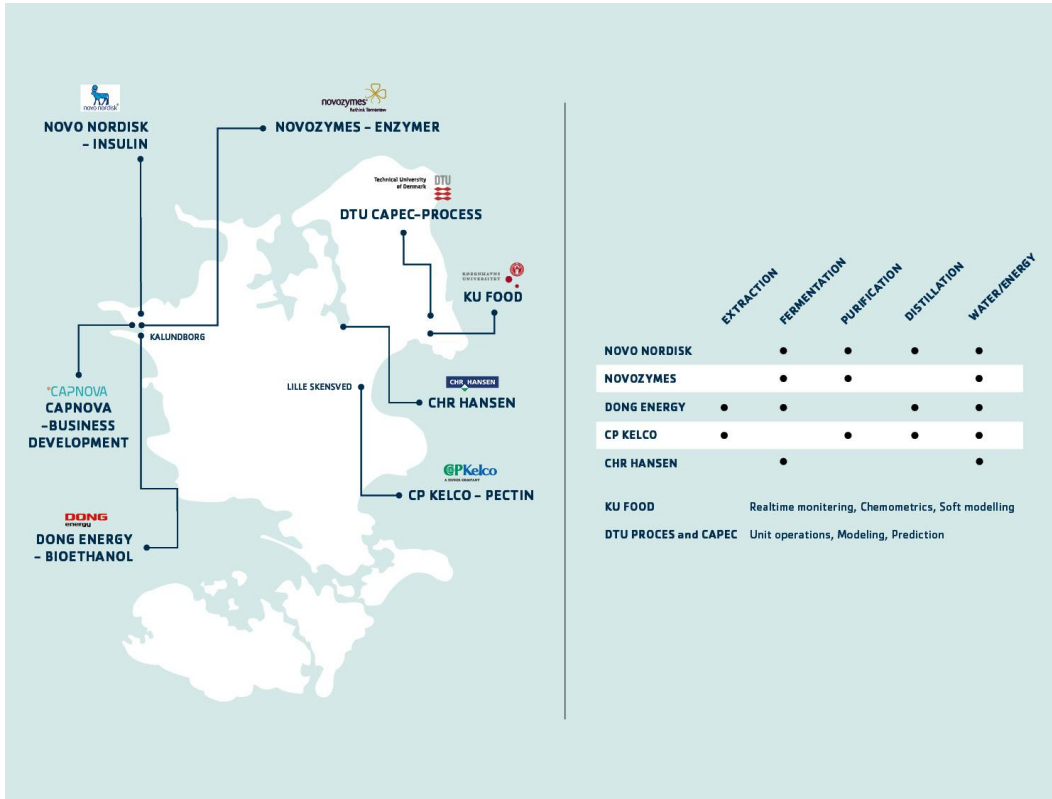
- Need to have broad enough research scope to cover emerging areas
- Can't be in-depth in everything, but develop sufficient *absorptive capacity* to recognize and internalize new ideas
- Attract talent

Constraints on Knowledge Flow



- We always knew knowledge flowed through people movement
- Consistent comments on constraints today imposed by control of IP
- Employee non-competes?
 - Not in California! → The secret of Silicon Valley?

Pre-competitive Collaborations Drive Spillovers



Evidence for this in other clusters

Important to preserve a healthy competitive dynamic

Ownership / Change of Control

Life Sciences

- Extensive foundation ownership
 - Focus is on long-term survival

Wireless Telecom

- Firms largely sold out to multinationals
 - Became “satellite operations”

This study raises more questions ...

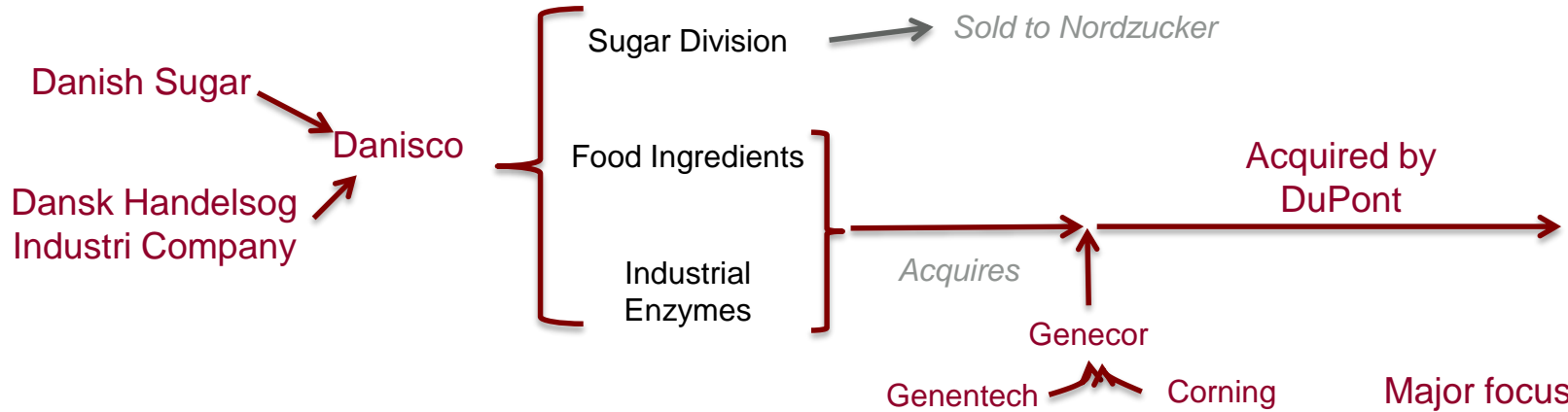


Two sides of foundation ownership question

Are there “anchors” that enhance competition vs. detract from it?

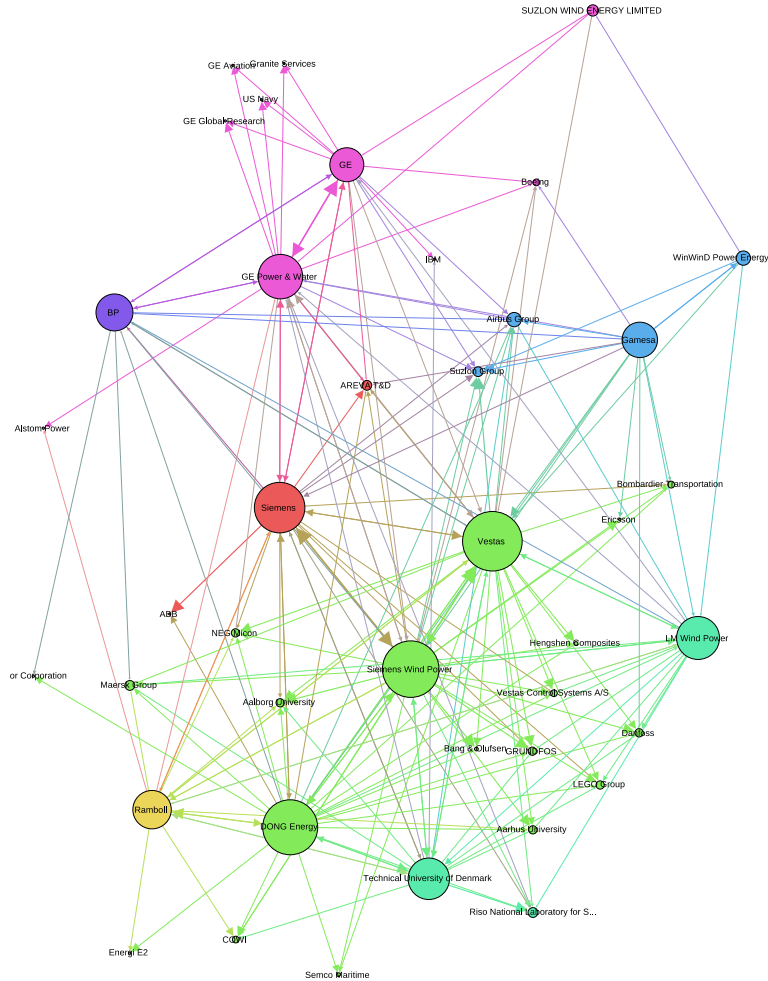
Should firms invest more in public goods?

Notable Other Examples



Major focus of DuPont's food & nutrition R&D is now in Denmark





Another one to watch: Wind Energy Cluster

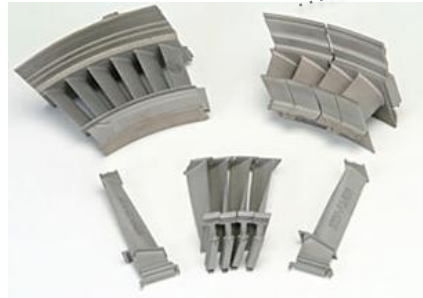
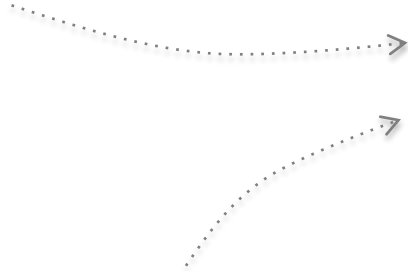
Globalization of Supply Chains

Growth of the Tradable Sector

- Single global market for labor, more and more goods and services
 - Quality and capabilities equalized
- The ultimate global sequential production system

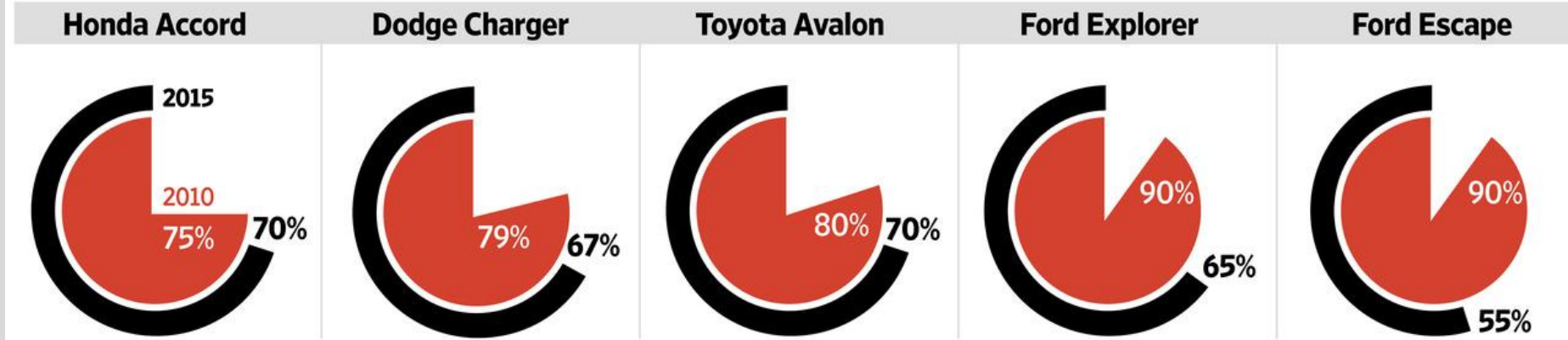


Cost tension in sourcing decisions



As the Wheels Turn

The percentage of U.S. and Canadian content for these car models has declined, as the U.S. imports more car parts.



Source: National Highway Traffic Safety Administration

THE WALL STREET JOURNAL.

Source: James Haggerty, *Wall Street Journal*

Globalization of Supply Chains: Global Sourcing



The job of today's global manager is to match market demands in different regions with products and production sourced advantageously

- Does this mean loss of local advantage?



Separate topic: supply chain complexity and visibility into 3rd, 4th tier and beyond

If I am benefiting from being in cluster ...

Questions

- How much responsibility to I take (as a firm) for the health of this cluster?
- Should I invest in public goods?



How will we respond to the pressures of globalization and opportunities for labor arbitrage?

- Governments in India and China are providing robust funding to kick-start their biotech clusters

And how will we respond to their very different investment horizons?

Are we even thinking about it?



This week in *The Atlantic*



- Willy's prediction of what outsourcing will do to the American motion picture industry
- Same forces
 - National will
 - Large domestic market

What I said in Boston ...

Mass. Biotech jobs growing faster than any time since 2008

- We're all benefiting from the strength of this cluster



Think about it ...

The choices you make today will influence the long term health of this cluster

The easy choices today may not be good for the cluster over the long term, as Kodak, the electronics industry, computer industry, semiconductor industry, have demonstrated



Your challenge here is a little different, but has many common threads ...



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