

# A Renaissance of Engineering in the Internet Age ?

- Industrial dynamics in the Stockholm/Lake Mälaren and the Bavaria/Baden-Württemberg Regions

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# THREE STORIES

1. The past and the future of engineering as the backbone of the industrial economies
2. Experimental regional dynamics
  - some theory
3. Comparison of Stockholm/Lake Mälaren and Bavaria/Baden- Württemberg regions

# Technology/Policy Concoctions

1. First Industrial Revolution (Beginning in late 18th century in England)
  - Machine tools/Decentralization/ Abolishment of craft-system/Massive income diversity
2. Internet Revolution (Accelerating around mid 1990s)
  - Computing and Communications (C&C) technologies/ Globalization of production/National financial regulation policies inoperative/ Massive income diversity?
  - Probably more revolutionary

C&C technologies have created new opportunities for engineering industries at three levels

1. Revolutionized Innovative new product development
2. Made business hierarchies more transparent and allowed for more complex management structures
3. Globally distributed production has opened access to systems productivities (Networking Externalities) and new optimal organizational solutions

Crude economies of scale and  
volume production

no longer as important

# **Global Break up of Internal (Firm)**

## **Value Chains means**

- a new life for the **SMEs** and the **markets for specialist subcontractors,**
- a more important role for the **entrepreneurs,** and (perhaps)
- a collapse of volume production among the wealthy economies ?

# But Difficult for

Firms to get their new production  
organization right

Business Mistakes Abound

**Industrial Development**

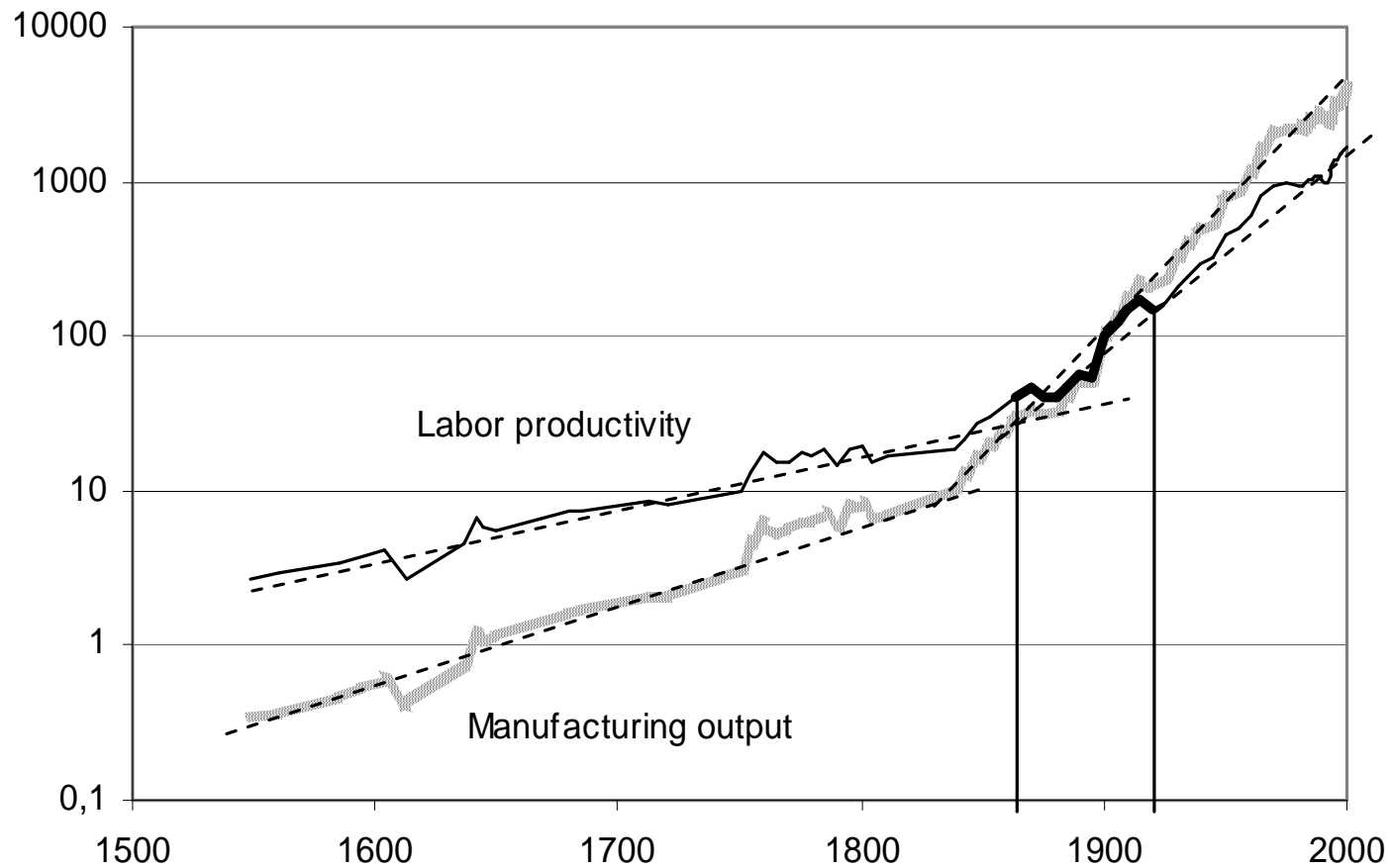
**becomes truly**

**Experimental**

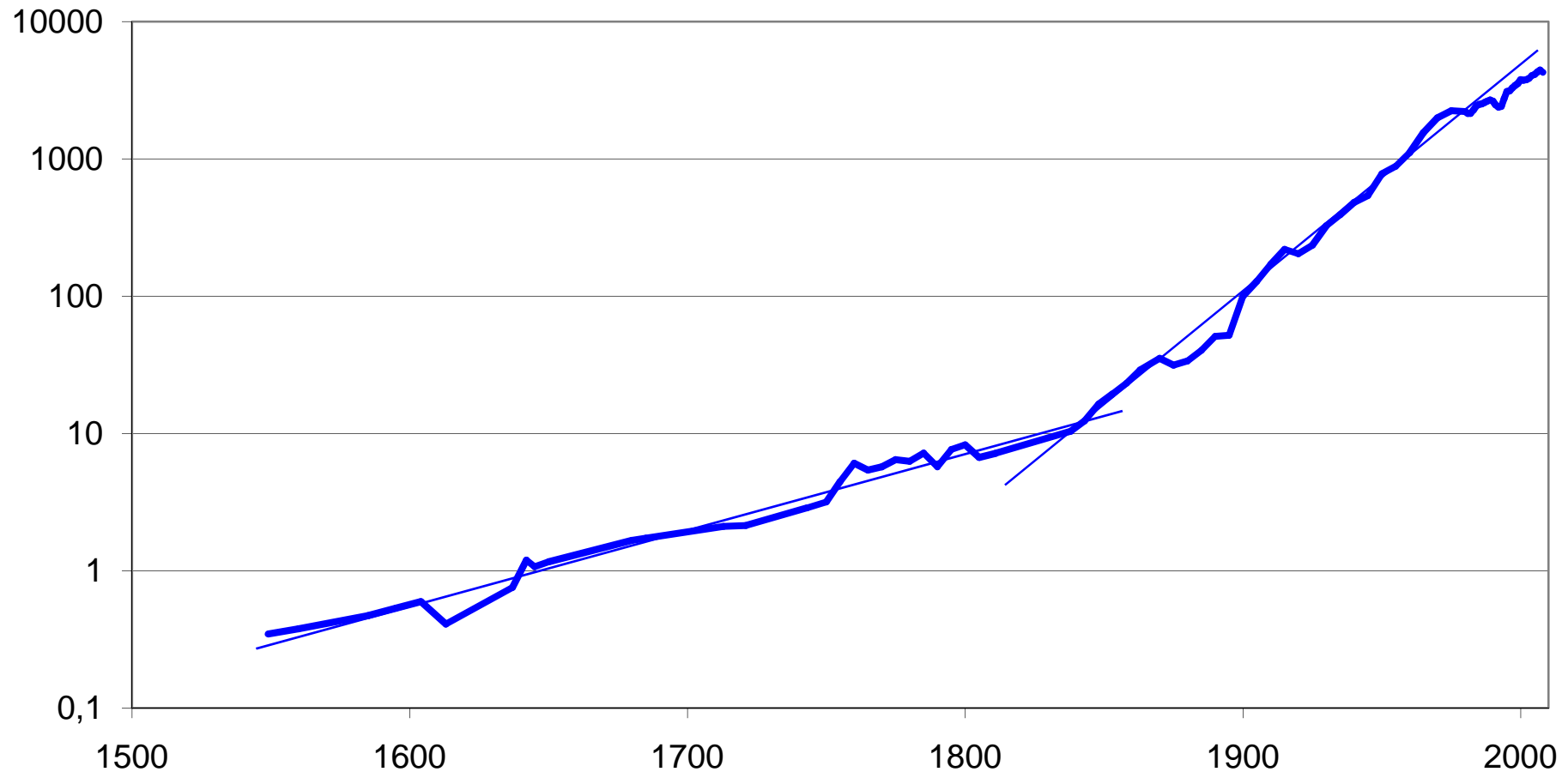
# UNDERINVESTMENT PROPOSITION



# Swedish Manufacturing production and Productivity 1546 - 2002



## Manufacturing Output in Sweden 1549-2008 (Index 1900=100)



Source: Eliasson (1988), Schumpeterian innovation, market structure, and the stability of industrial development in Hanusch (ed.)  
*Evolutionary economics - application of Schumpeter's ideas*, page 158, Cambridge, New York etc: Cambridge University Press and updatings.

## Alternating

1. Experimental, messy & unpredictable  
with
2. Steady state, orderly and predictable

## phases of development

During the former "shake outs" the allocation of resources may improve

During the latter growth may be faster for a while, because predictability improves, and volume production increases.

# Engineering is the Old Industry in the New Economy

Sophisticated mechanical Products  
will always be demanded  
and produced in the high wage  
industrial economies

- that have
1. overcome the underinvestment
- and
2. the experimental transformation
- needed for

the renaissance of engineering as  
the future backbone of the rich,  
high wage industrial economy

But not all industrial economies  
will cope

so the world is probably set for a  
new era of major income diversity

Current mainstream economic  
models not capable of capturing  
this

You need the  
**Theory of the Experimentally  
Organized Economy (EOE) and of  
competence blocs**  
to understand what is going on

# THE EXPERIMENTALLY ORGANIZED ECONOMY (EOE)

## 1. The Knowledge Based Economy

defines the assumptions necessary to make room for real *Entrepreneurs*

## 2. Schumpeterian Creative Destruction

endogenizes growth through *competitive selection*

## 3. Competence Bloc Theory

defines efficiency of selection and the *commercialization process*

## 4. Institutions

orient incentives, direct competition and reduce uncertainty

## 5. Social Capital

makes the unpredictability and arbitrariness of life in the EOE socially more acceptable

Source: Eliasson , 2005, *The Birth, the Life and the Death of Firms*, Stockholm:The Ratio Institute



**THE NATURE OF  
EQUILIBRIUM  
IN THE MODEL  
DETERMINES THE NATURE  
OF THE THEORETICAL  
ENTREPRENEUR**

*Source: Eliasson, 2005, The Birth, the Life and the Death of Firms, Stockholm: The Ratio Institute*

# In the EOE there are always Better Allocations of Resources than the Existing One

During the shake out necessary to achieve a  
significantly better allocation

- Many business mistakes
- Widening income distributions

*Source: Eliasson, 2005, The Birth, the Life and the Death of Firms, Stockholm:  
The Ratio Institute*

# Macroeconomic Growth through Schumpeterian Creative Destruction

1. Innovative **Entry** enforces through  
competition

**2.Reorganization**

**3.Rationalization**

or

4. **Exit** ( shut down or death)  
of Firms

Source:Gunnar Eliasson, 1996,*Firm Objectives, Controls and Organization- the use of information and the transfer of knowledge within the firm*,Boston,Dordrecht,London:  
Kluwer Academic Publishers (p.45)

# The Actors in the COMPETENCE BLOC

1. Competent and active **Customers**

## **Technology Supply**

2. Innovators who integrate technologies in new ways

## **Commercialization Actors**

**3. Entrepreneurs** who identify profitable innovations

4. Industrially competent **Venture Capitalists** who recognize and finance the entrepreneurs

5. **Exit** market actors who facilitate ownership change

6. **Industrialists** who take winners on to industrial scale production

*Source: G. Eliasson and Å. Eliasson, 1996, The Biotechnological Competence Bloc  
Revue d'Economie Industrielle 78-4, Trimestre*

Since the range of  
commercialization competences  
always  
**more narrow** than range of  
innovative technology supplies  
Business mistakes will be  
constantly committed

*Source:* Eliasson (ed), 2005, The Birth , the Life and the Death of Firms,  
Stockholm:The Ratio Institute (pp 39ff)

When the Competence Bloc is  
- **Vertically Complete** and  
- **Horizontally Varied**  
Critical mass has been reached

The economic consequences of business  
mistakes are minimized  
The competence bloc becomes an **attractor** and  
**spillover generator**, and  
growth is endogenized  
a **WINNER** can now confidently carry on its  
search for resources

# The Underinvestment Proposition

# Volume manufacturing as the source of industrial wealth

- It was in the past
- Will it still be in the future ?



# The FOUR COMPETENCE BLOCS in the Lake Mälär and Bavaria/Baden- Württemberg regions

1. Engineering

2. Computing &  
Communications (C&C)

3. Biotech/  
Pharmaceuticals

4. Finance

**THE LARGE FIRMS AND DOMINANT COMPETENCE BLOCS IN THE LAKE MÄLAR REGION**

ENGINEERING

**ABB**

**AGA**

**ALFA LAVAL**

**ASSA ABLOY**

**ATLAS COPCO**

**AUTOLIV**

**ELECTROLUX**

**HALDEX**

**DANA/ GERTRAG/ VOLVO**

**SCANIA**

**VOLVO CONSTRUCTION EQUIPMENT (VCE)**

**BIOTECH/ PHARMACEUTICALS/ MEDICAL EQUIPMENT**

**PHARMACIA**

**GEH**

**PFIZER**

**BIOTAGE**

**BIACORE**

**BIOVITRUM**

**GYROS**

**PHARMACIA DIAGNOSTICS (PHADIA)**

**Q-MED**

**etc**

**ASTRA ZENECA**

**AKZO NOBEL**

**KAROBIO**

**(GAMBRO)**

**ELEKTA**

**COMPUTING & COMMUNICATIONS ( C&C )**

**ERICSSON**

**TELIA SONERA**

**(NOKIA)**

**FINANCIAL MARKETS**

**OMX**

# Automotive and Transport Outside Stockholm/Lake Mälaren Region

Häggglund/Bae Systems (Örnsköldsvik)

Saab (Linköping)

Saab Automobile (Trollhättan)

Volvo Aero (Trollhättan)

Volvo Car (Göteborg)

Volvo (Göteborg)

## **LARGE FIRMS AND COMPETENCE BLOCS IN BAVARIA/ BADEN-WÜRTTEMBERG**

ENGINEERING

**AUDI** (Ingolstadt)

**BMW** (Munich)

**BOSCH** (Stuttgart)

**DAIMLER BENZ** (Stuttgart)

**PORSCHE** (Stuttgart)

**MAN** (Munich)

**HEIDELBERGER DRUCK**

BIOTECH/ PHARMACEUTICALS

**ALTANA**

**BASF**

**BOEHRINGER- MANNHEIM**

COMPUTING & COMMUNICATIONS

**SIEMENS**

**EPCOS**

**INFINEON**

**SAP**

AEROSPACE

**EADS**

FINANCIAL MARKETS

**ALLIANS**

**(DEUTSCHE BANK)**

**BAYERISCHE HYPOVEREINSBANK**

**BAYERISCHE LANDESBANK**

**MUNICH RE**

# EXPERIMENTAL INDUSTRIAL DYNAMICS in automotive industry

## Sweden

Scania (VW?)

Volvo Car (Ford, Geely)

Saab Automobile (GM, Spyker)

## Southern Germany

Audi (VW)

BMW

Daimler Benz (previously Daimler Chrysler)

Porsche (VW?)

MAN (VW?)

Source: Eliasson, 2010, The Internet as a Global Production Reorganizer  
- The moving forces of distributed and flexibly integrated manufacturing

Paper (revised) prepared for the 13<sup>th</sup> Conference of the International Joseph A. Schumpeter Society , Aalborg, 21-24 June 2010

## CONCLUSIONS FOR SWEDEN

- 1. NO LACK OF TECHNOLOGY , but**
- 2. SIGNIFICANT LACK OF COMMERCIALISATION COMPETENCE**
- 3. SWEDEN MAY HAVE LOST ITS PREVIOUS COMPETITIVE ADVANTAGE IN INNOVATIVE BIG BUSINESS MANAGEMENT and OVEREMPHASIZED VOLUME PRODUCTION**
- 4. SINCE SWEDISH INSTITUTIONS HAVE LONG BEEN PROTECTIVE OF BIG BUSINESS, BUT DESTIMULATED NEW FIRM ESTABLISHMENT AND SME GROWTH SWEDEN LACKS THE BROAD COMMERCIALISATION COMPETENCE NEEDED TO FILL IN WITH NEW ESTABLISHMENT AND EXPANDING SMEs WHERE FAILING LARGE FIRMS LEAVE**
- 5. SUSTAINABLE LOCAL FINANCE TO RESTRUCTURE LARGE FIRMS INSUFFICIENT**
- 6. THANKS TO FOREIGN INVESTOR COMPETENCE AND FINANCE THE GROWTH PICTURE, HOWEVER, STILL LOOKS **OK****

Source: Eliasson,2005, The Birth, the Life and the Death of Firms, Stockholm: RATIO:

# Comparison

## Lake Mälardalen and Bavaria/Baden-Württemberg

# Comparison

## LAKE MÄLAR TRANSFORMATION

### DIAGNOSIS

- **SPECIALIZED LARGE FIRMS**
- **OVEREMPHASIS OF SCALE**
- **DEFICIENT COMMERCIALISATION COMPETENCE**
- **NON ATTRACTIVE ENVIRONMENT FOR NEW AND SMALL BUSINESS**

### SHAKE LOOSE HYPOTHESIS

- **THOROUGH COMPETITIVE SHAKE UP**
- **RICH TECHNOLOGY SPILL**
- **MANY LARGE PREVIOUS FLAGSHIPS NOW FOREIGN OWNED**
- **HIGH RISK OF TRANSFORMATION FAILURE, but**
  - **POTENTIAL FOR RADICALLY POSITIVE TRANSFORMATION WITH HELP OF FOREIGN INVESTOR COMPETENCE**



# BAVARIA/ BADEN- WÜRTTEMBERG TRANSFORMATION

## DIAGNOSIS

- LESS SPECIALIZED FIRMS
- BROADER INDUSTRIAL COMPETENCE BASE
- MORE ATTRACTIVE ECONOMIC ENVIRONMENT

## SHAKE LOOSE HYPOTHESIS

- LESS PROFOUND
- LOWER RISK OF TRANSFORMATION FAILURE
- RAPID BURNING OF RESOURCES
- THE LARGE FIRMS STILL AUTONOMOUS AND GERMAN OWNED

**LESS POTENTIAL FOR RADICAL TRANSFORMATION** - But maybe not needed

*Source: Eliasson , 2005, The Birth, the Life and the Death of Firms, Stockholm:Ratio*