

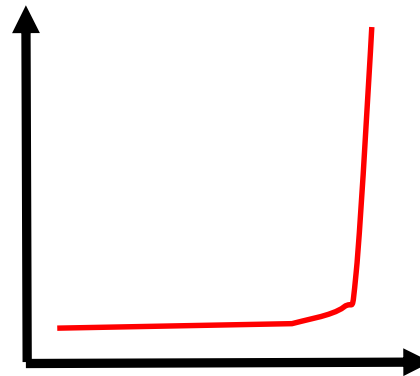
Hvad skal vi mennesker lave, hvis robotterne laver det hele?

Prof. Philipp Schröder
Aarhus University



INSTITUT FOR ØKONOMI
AARHUS UNIVERSITET





Disruptionrådet – Partnerskab for Danmarks fremtid

Regeringen har nedsat Disruptionrådet – Partnerskab for Danmarks fremtid, der skal analysere fremtidens muligheder og udfordringer.

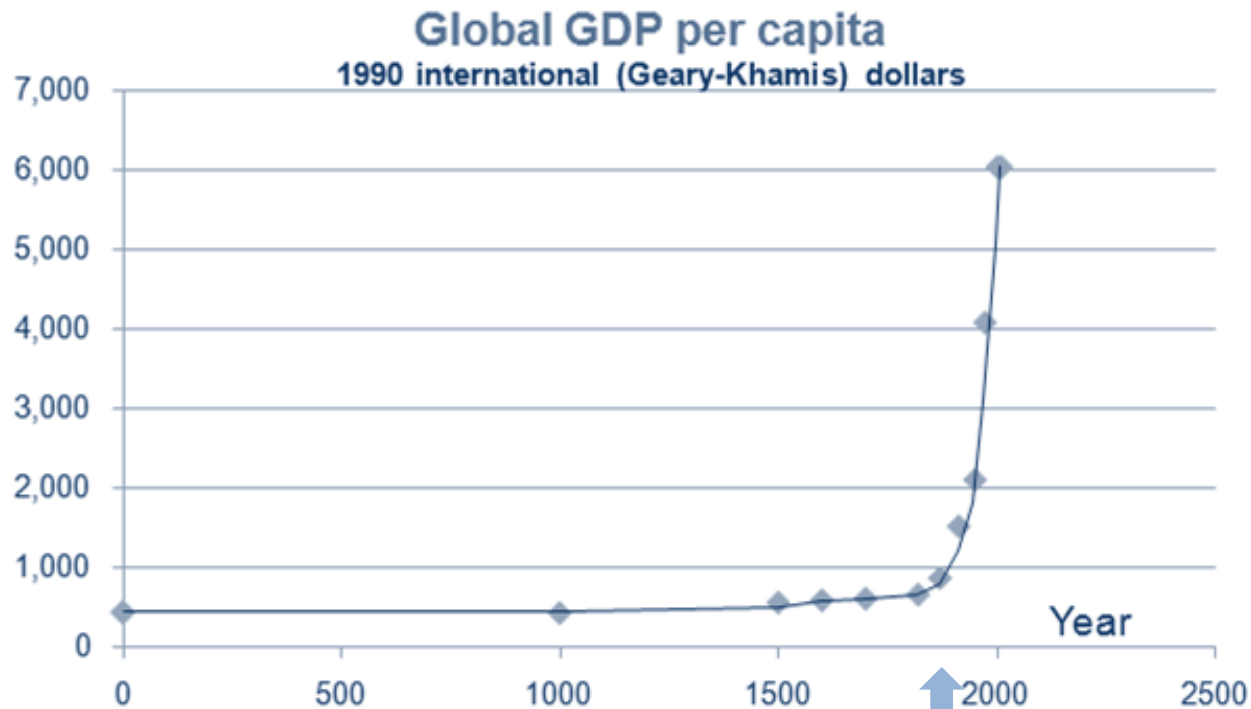


Foto: Statsministeriet

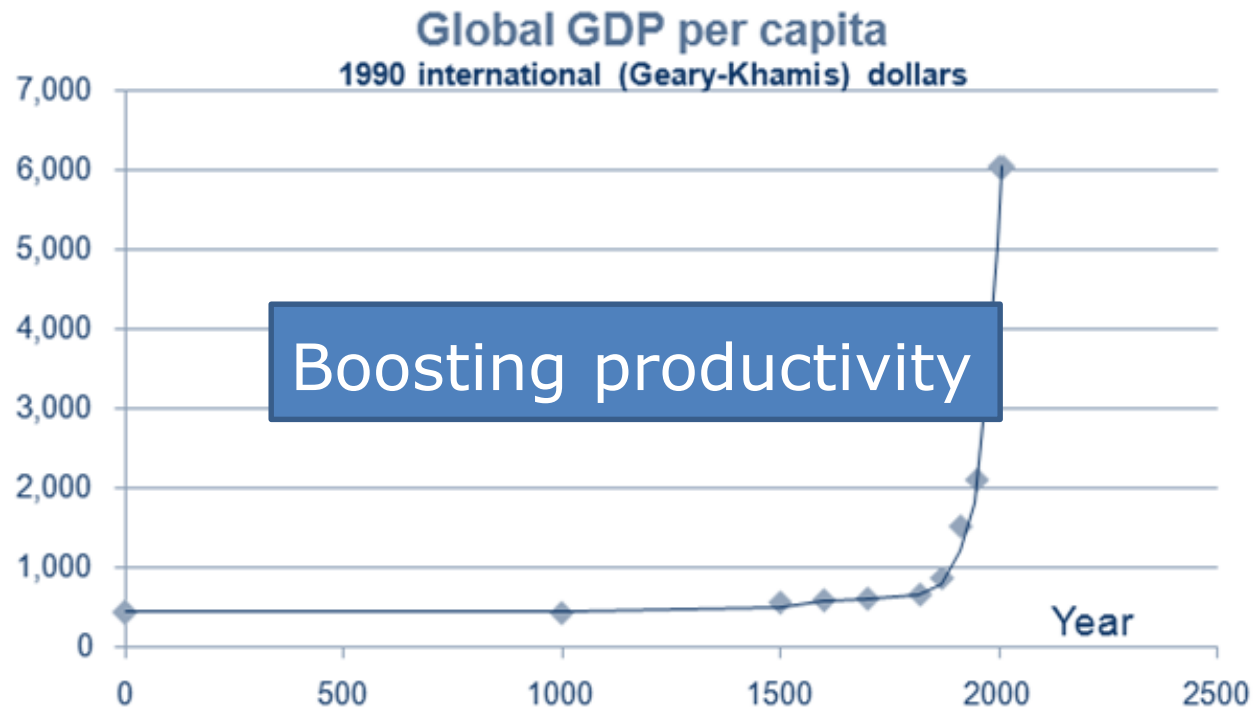
Hvad
ro

e, hvis
e?

Hvordan kan dette forklares?



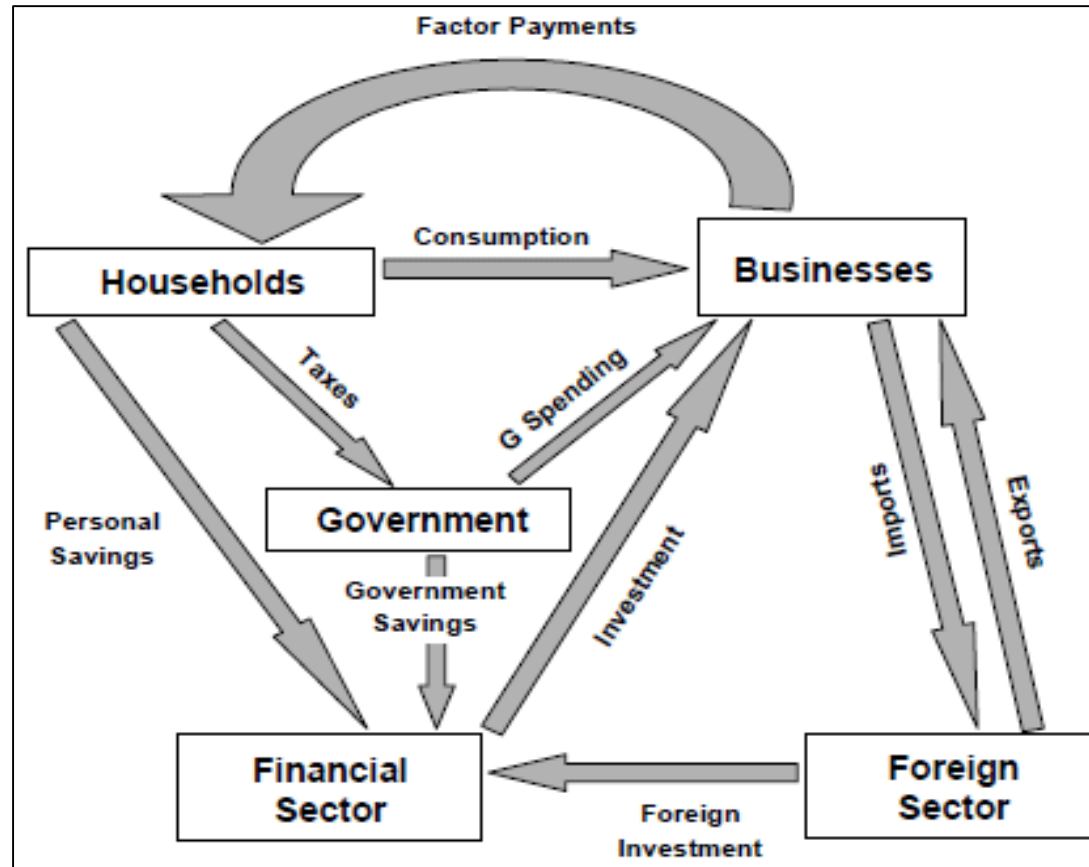
Grundlæggende er det produktivitets vækst



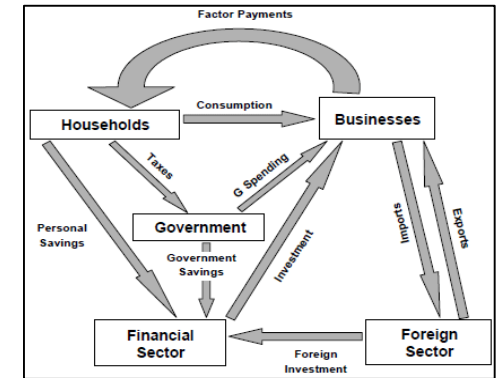
That was the good news ...

Boosting productivity

men, ... case: Yvonne fra Olsen Banden



"Så leg med noget andet!"



Priseffekter

Sektorskift

Generelle ligevægtseffekter

Kan vi så blot regne med at det fortsætter?

Grundlæggende er det produktivitets vækst



men, ... omfordeling

Priseffekter

Sektorskift

Generelle ligevægtseffekter



2019

2020

2030

2040

Future

Teknologi vil komme ligeegyldigt hvad... så de relevante spørgsmål bliver

Can Denmark deal with the reallocation pressure?

What skills will robots take over?

How will the labour market adjustment play out?

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A FUTURE THAT WORKS:

the impact of automation in Denmark

McKinsey&Company

THE TUBORG RESEARCH CENTRE FOR GLOBALIZATION AND FIRMS INSTITUTE FOR ECONOMIC RESEARCH AARHUS UNIVERSITET



INSTITUT FOR ØKONOMI AARHUS UNIVERSITET

Omfordeling er intet nyt for den danske økonomi

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Omfordeling in action (employment, DK)

	1970	2015	
Manufacturing and other industry	600,000	300,000	-300,000 ↓
Business and financial services, ICT and Pharma	200,000	500,000	+300,000 ↑
Total employment	2.6 m	2.7 m	

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Omfordeling in action (banksektoren, DK)



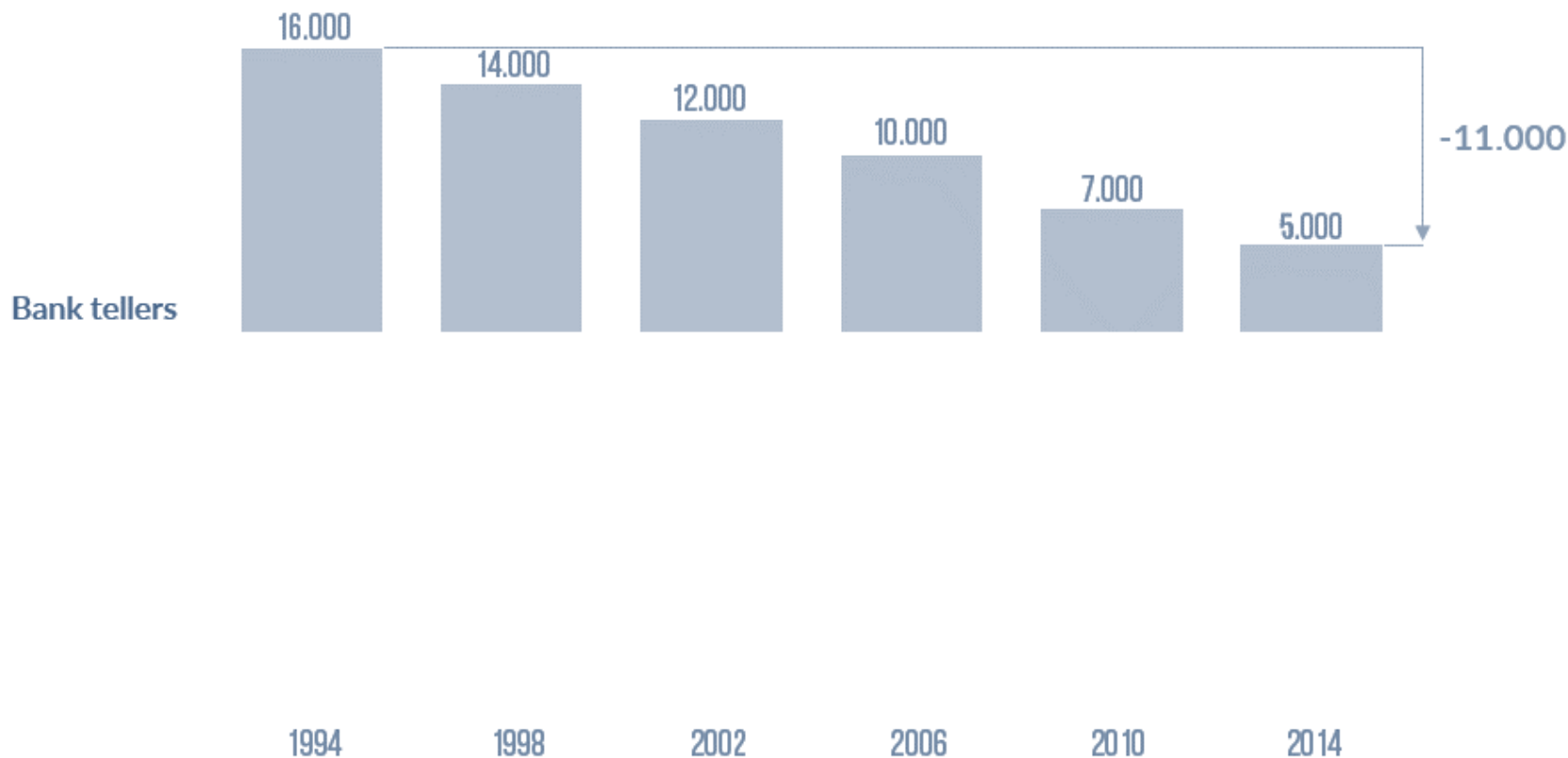
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Omfordeling in action (banksektoren, DK)

Number of employees, 1994-2014 (Denmark)



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Hvilke funktioner vil robotter/AI kunne overtage?

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Virkelig god til...

Genkende kendte mønstre	Generere nye mønstre
Udtrække information	Kreativitet/kritisk tænkning
Optimering og planlægning	Social og emotionel ræsonnering og output

Virkelig dårlig til...

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How to estimate this?

1 Danish workforce is broken down into occupations...

2 ... which each contain a number of tasks...

3 ...which each require a set of technical capabilities

4 Building backwards, each occupation has a fraction of work hours that can be automated

Occupations ~400 in total

- 1 Retail sales persons
- 2 Food and beverage service workers
- 3 Teachers
- ...
- 423 Fishermen and hunters

>2000 tasks across occupations

- Greet customers
- Answer questions about products
- Clean and maintain work areas
- ...
- Process sales and transactions

Technical capability assessment, 18 factors

- Sensory perception
- Natural language understanding
- Social and emotional
- ...
- Fine motor skills/dexterity

Registry data on ~2.7m Danish employees

Hvilke funktioner vil robotter/AI kunne overtage?

Virkelig god til... (upward arrow)

- Genkende kendte mønstre
- Udtrække information
- Optimering og planlægning

Virkelig dårlig til... (downward arrow)

- Generere nye mønstre
- Kreativitet/kritisk tænkning
- Social og emotionel ræsonnering og output

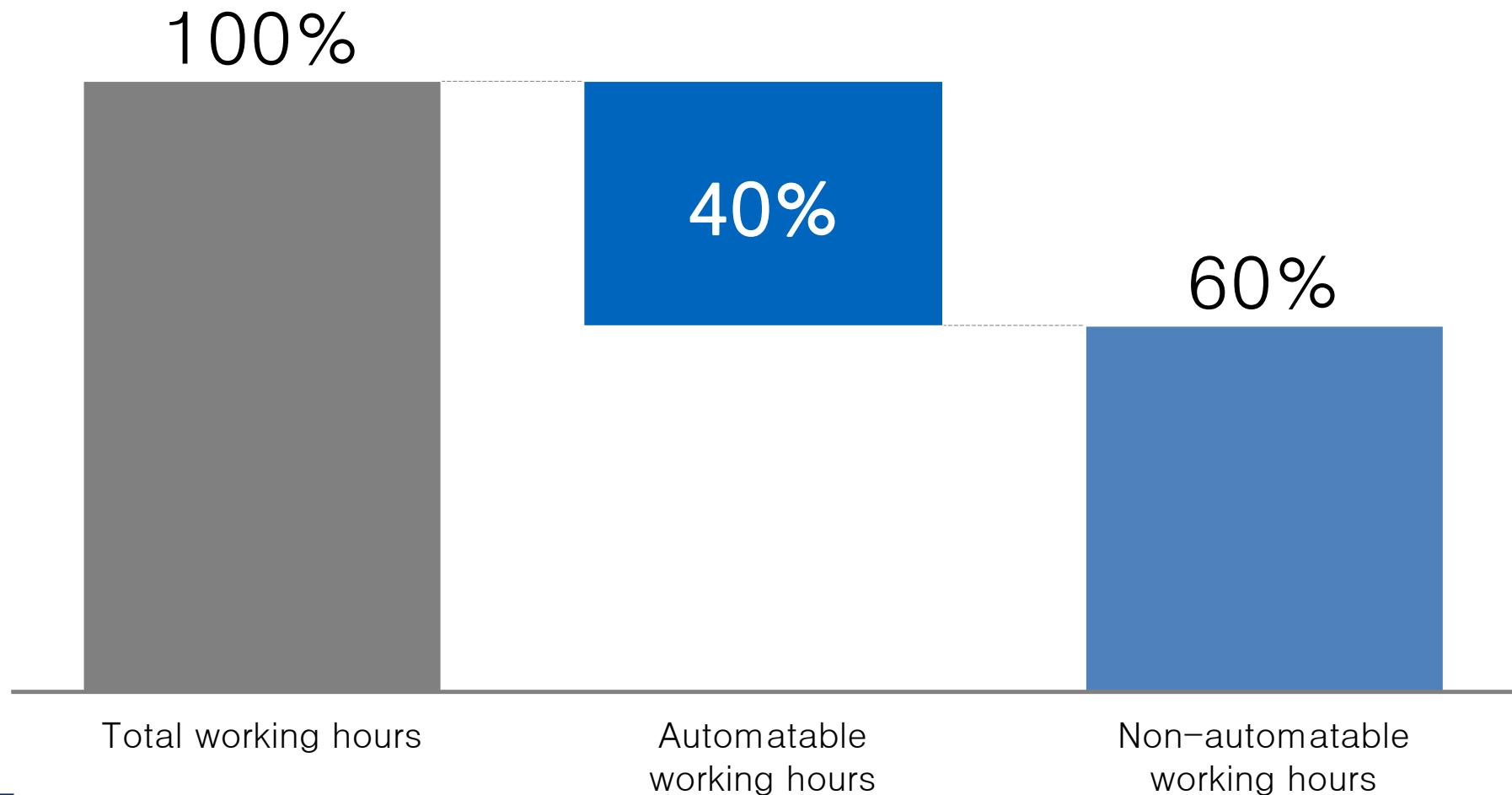
Automation - Challenge or Chance for Society? (page 14)

40% af alle danske arbejdstimer kan blive automatiseret

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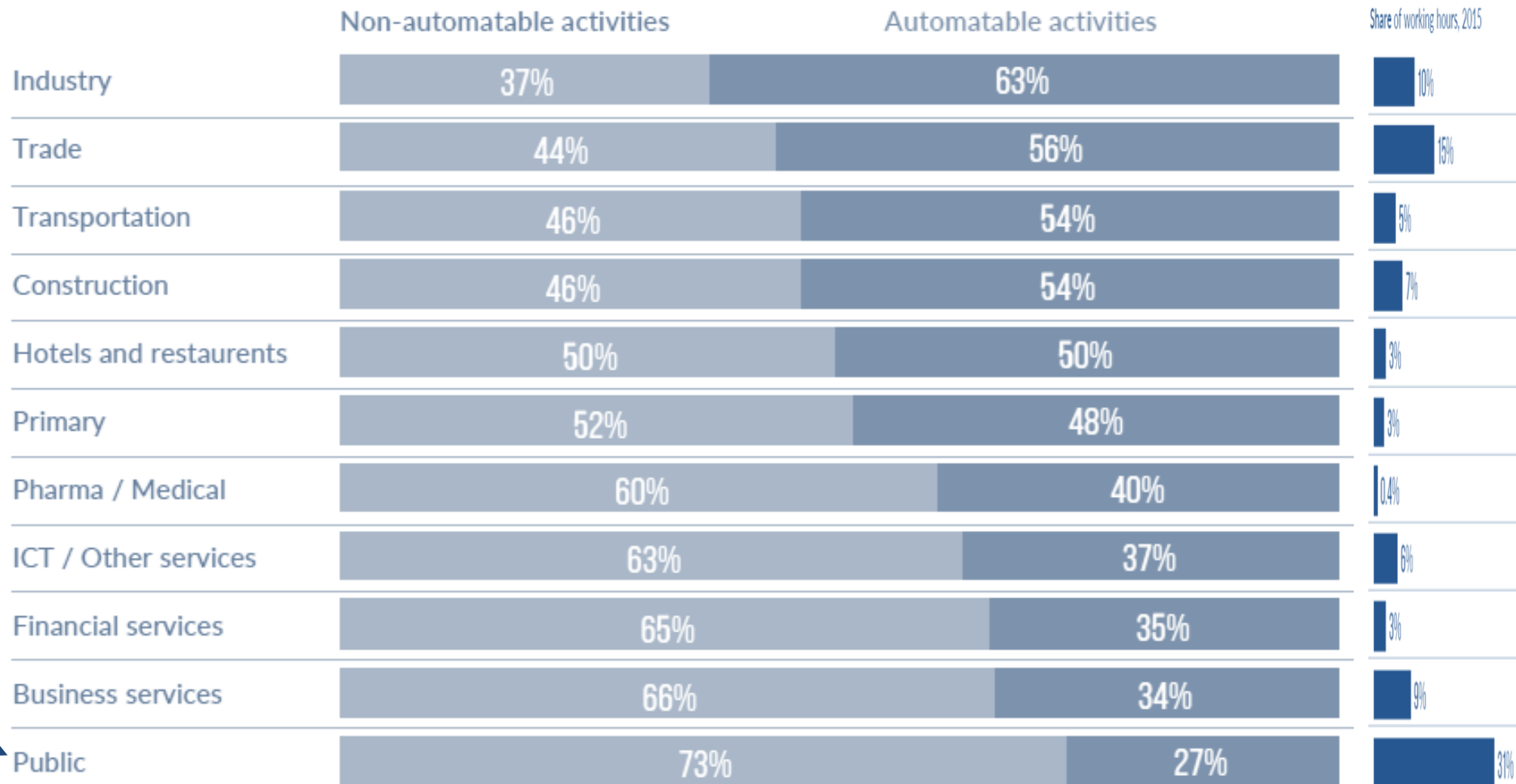


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Automation potential of sectors



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Automation potential of occupations

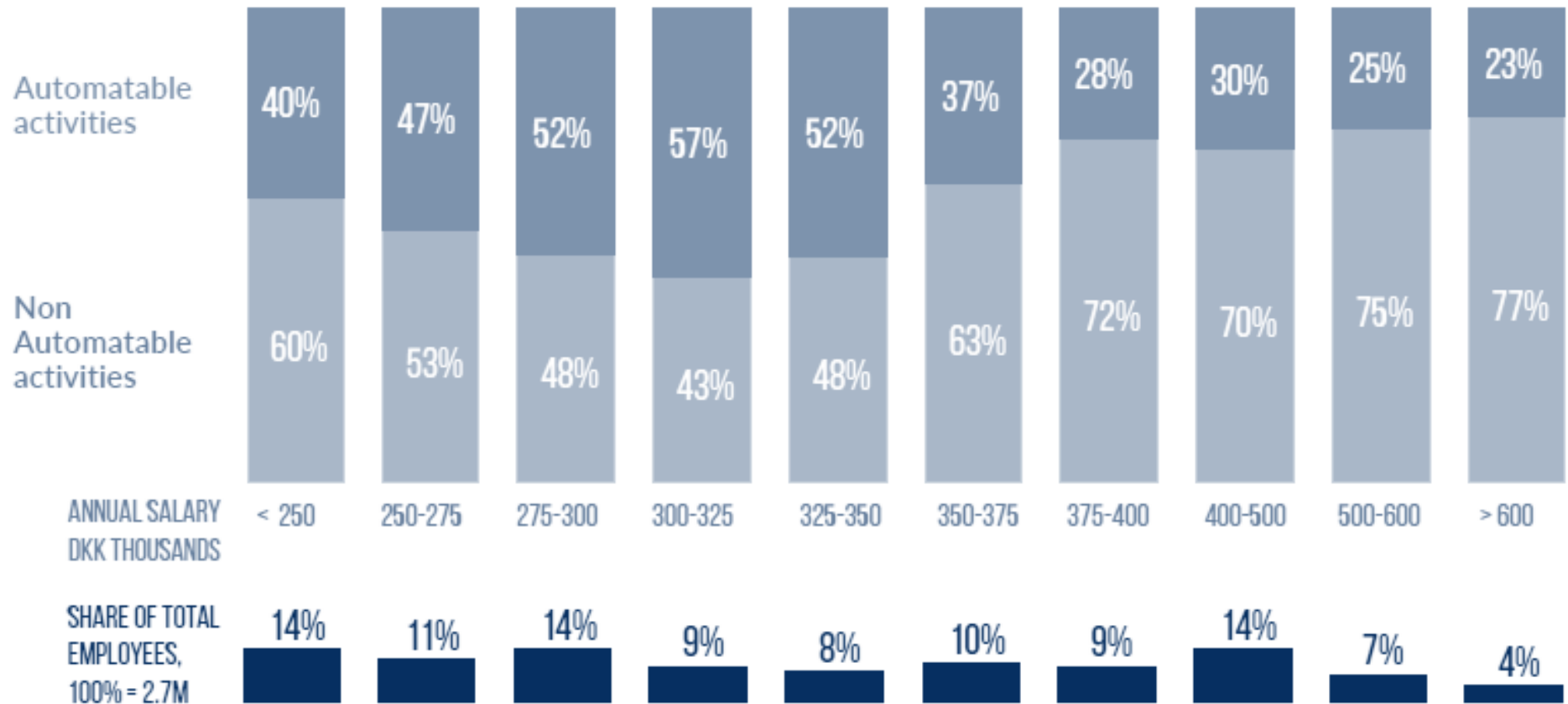
Occupation categories	Example of occupation in category	Degree of automation, % of activities		Share of total employees
		Non-automatable	Automatable	
Machine operators	Assemblers	27%	73%	5%
Craft and related trades workers	Building workers	32%	68%	9%
Clerical support workers	Service clerks	34%	66%	7%
Elementary occupations	Cleaners	51%	49%	9%
Agricultural, forestry and fishery workers	Farmers	51%	49%	2%
Service and sales workers	Salesperson	57%	43%	23%
Technicians	Engineers	57%	43%	14%
Managers	Chief executives	76%	24%	6%
Professionals	Teachers	81%	19%	25%

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Automation potential by income (annual salary)



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When will all this happen?



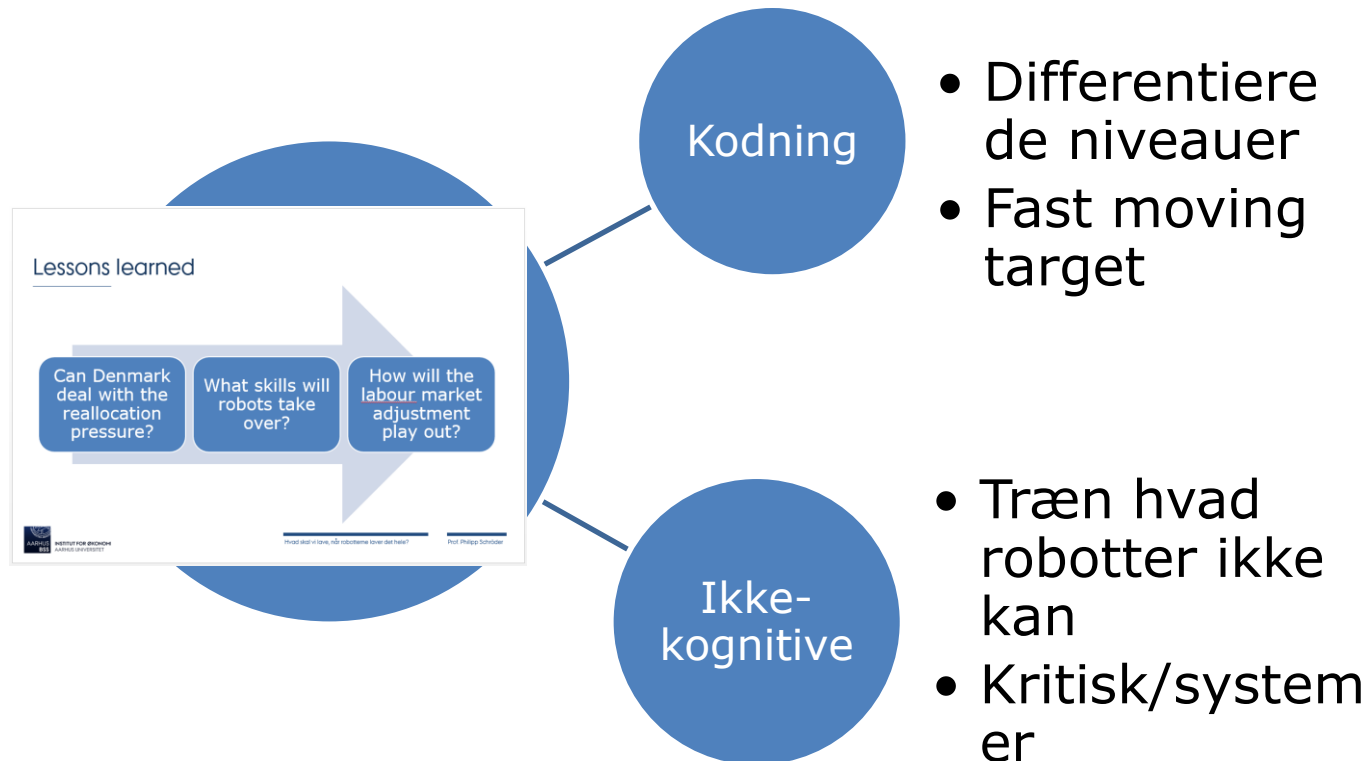
Lessons learned

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HR udfordring for samfundet



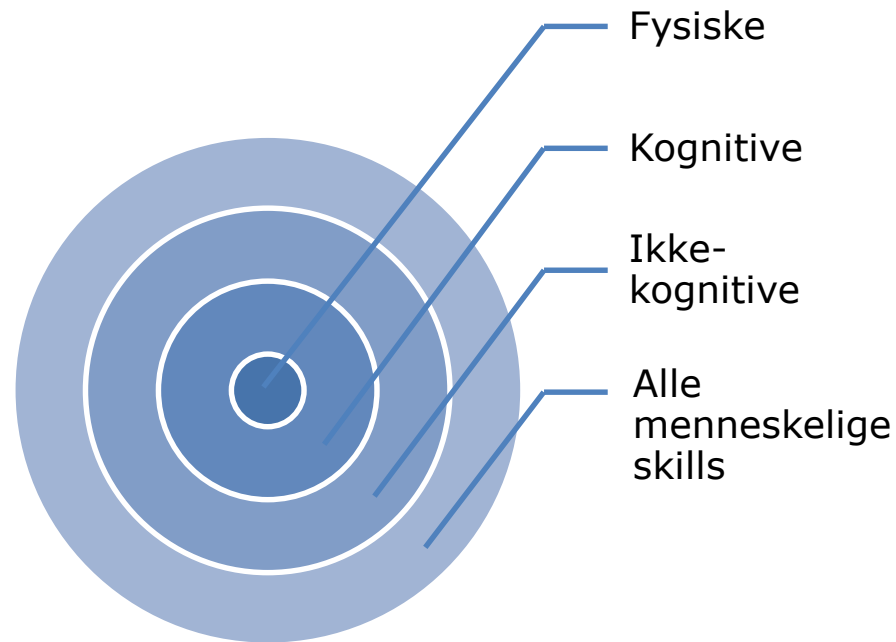
Skift i relativ efterspørgsel og relativ pris for menneskelige skills

Skill-biased teknologisk forandring: Acemoglu (2002), Acemoglu & Autor (2011)

Task approach: Autor, Levy & Murnane (2003), Brynjolfsson and McAfee (2011)

Kognitive/ Non-kognitive: Hanushek/Woessman (2008), Heckman et al. (2006), **Deming (2017)** ...

Nybohm, Edin, Fredriksson Öckert (2018) "The Rising Return to Non-cognitive Skill", WP-Uppsala.



To år senere... hvor står Danmark?

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Foto: Statsministeriet

Hvor vi...

🏠 TechDK Kommissionen - Samfund før teknologi

TechDK Kommissionen - Samfund før teknologi

Hvordan udfordrer ny teknologi vores demokrati, økonomi og kultur? Her kan du følge tech-kommissionens arbejde med at udvikle anbefalinger til hvordan vi tøjler den ny teknologi og møde kommissionens medlemmer.

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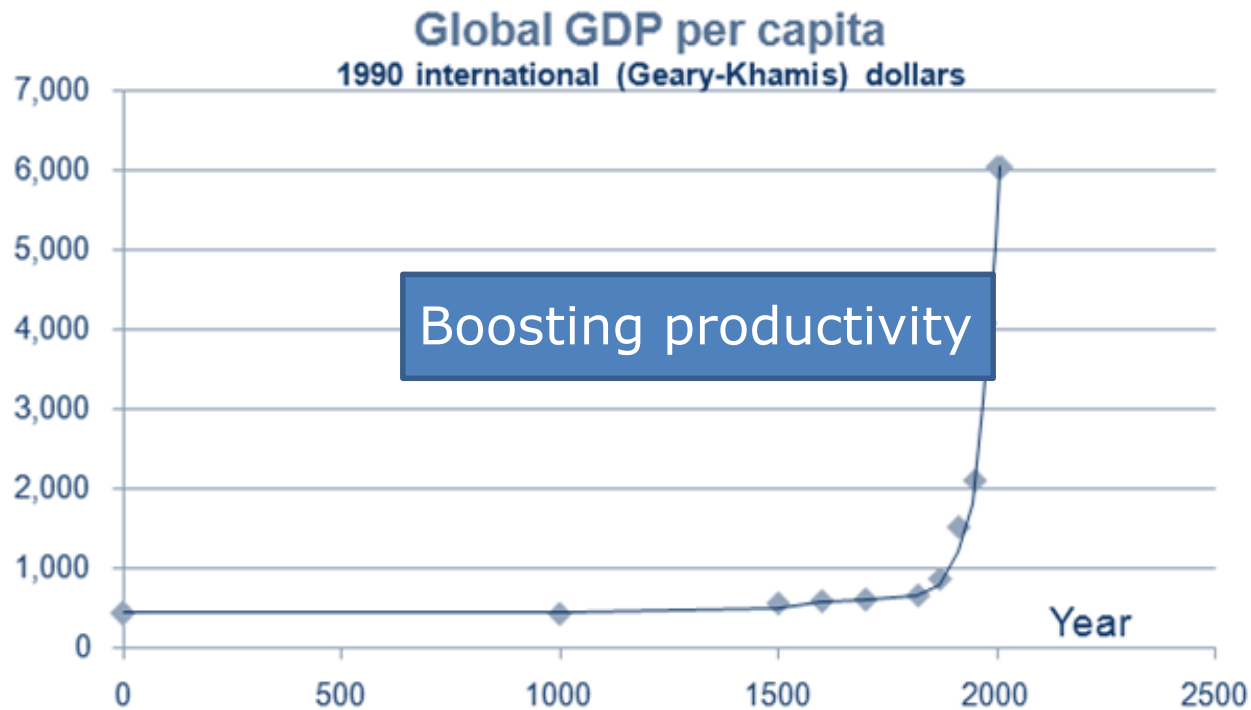
Bekymre os for meget

- Masse arbejdsløshed
- Mangel på ingeniører/IT specialister
- Mangel på teknologiske
entreprenører

Burde bekymre os mere

- Facilitering af omfordeling
- Hvilke fremtidige skills bliver efterspurgt?
- Arbejdsgiver begrebet
- Konkurrencespørgsmål

Husk: Disruption is a good thing



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