

# Denmark's Innovation Capacity in Global Perspective

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A sunset over the ocean with a dark horizontal bar containing the text "Only the paranoid survive." The sky is a gradient of orange and yellow, and the water is dark blue with white-capped waves in the foreground.

Only the paranoid survive.

Andy Grove

- **How bad is it?**

- **What should be done?**

# Denmark and the World's Top Technology Regions

ATV



| TEKNOLOGIOMRÅDE                     | STYRKEFØRHOLD<br>TOP 30-56E-<br>REGIONER | PATERTER         |               | PUBLIKATIONER     |                |
|-------------------------------------|--|------------------|---------------|-------------------|----------------|
|                                     |  | GLOBALT          | DANMARK       | GLOBALT           | DANMARK        |
| Avancerede materialer               | 0,27                                     | 962.781          | 2.110         | 4.832.134         | 21.612         |
| Bioteknologi                        | 2,70                                     | 40.177           | 887           | 1.370.909         | 16.356         |
| Farmaceutisk teknologi              | 0,69                                     | 871.154          | 4.905         | 2.135.914         | 25.387         |
| Fødevarsteknologi                   | 2,19                                     | 50.756           | 909           | 2.591.571         | 30.193         |
| Klimateknologi                      | 0,33                                     | 451.205          | 1.201         | 2.155.911         | 16.907         |
| Kunstig intelligens                 | 0,22                                     | 90.824           | 163           | 5.422.263         | 2.314          |
| Lydtækologi                         | 1,89                                     | 59.921           | 929           | 138.508           | 1.567          |
| Medicinsk teknologi                 | 0,68                                     | 362.579          | 2.019         | 1.747.980         | 18.624         |
| Robottækologi                       | 0,17                                     | 68.573           | 98            | 319.636           | 1.584          |
| Vandteknologi                       | 0,26                                     | 97.915           | 211           | 283.137           | 2.479          |
| Vindteknologi                       | 8,93                                     | 17.411           | 1273          | 61.947            | 3.914          |
| <b>Samlet alle 11</b>               | <b>0,58</b>                              | <b>3.073.296</b> | <b>14.705</b> | <b>16.199.910</b> | <b>140.137</b> |
| Førende teknologier,<br>nov. 2019 * | 0,22                                     | 55.599           | 100           | -                 | -              |

- Denmark far behind top regions on overall patenting intensity
- Denmark behind even in 6 out of 9 areas where it aspires to have a leading position

# Denmark and the World's Top Technology Regions: A Closer Look at the Data

0.58



0.22

Denmark **more focused** on less patenting intensive technology areas\*

1.73



0.37

Denmark **stronger** in narrowly defined tech areas (<75k patents globally per year)\*\*

28%

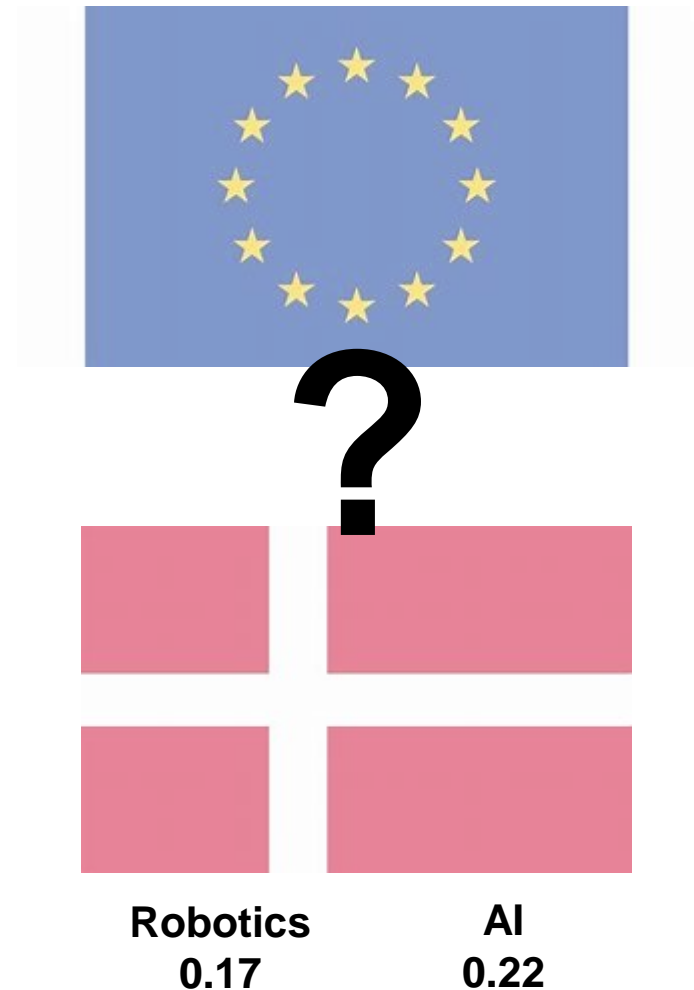
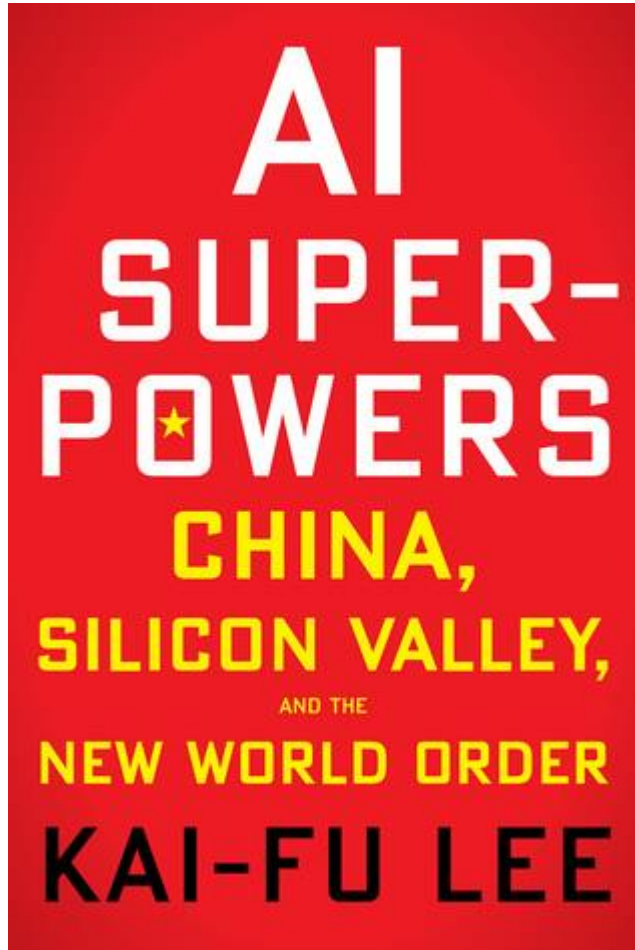
Denmark has close to a third of its patents in technology **areas of relative strengths**\*\*\*

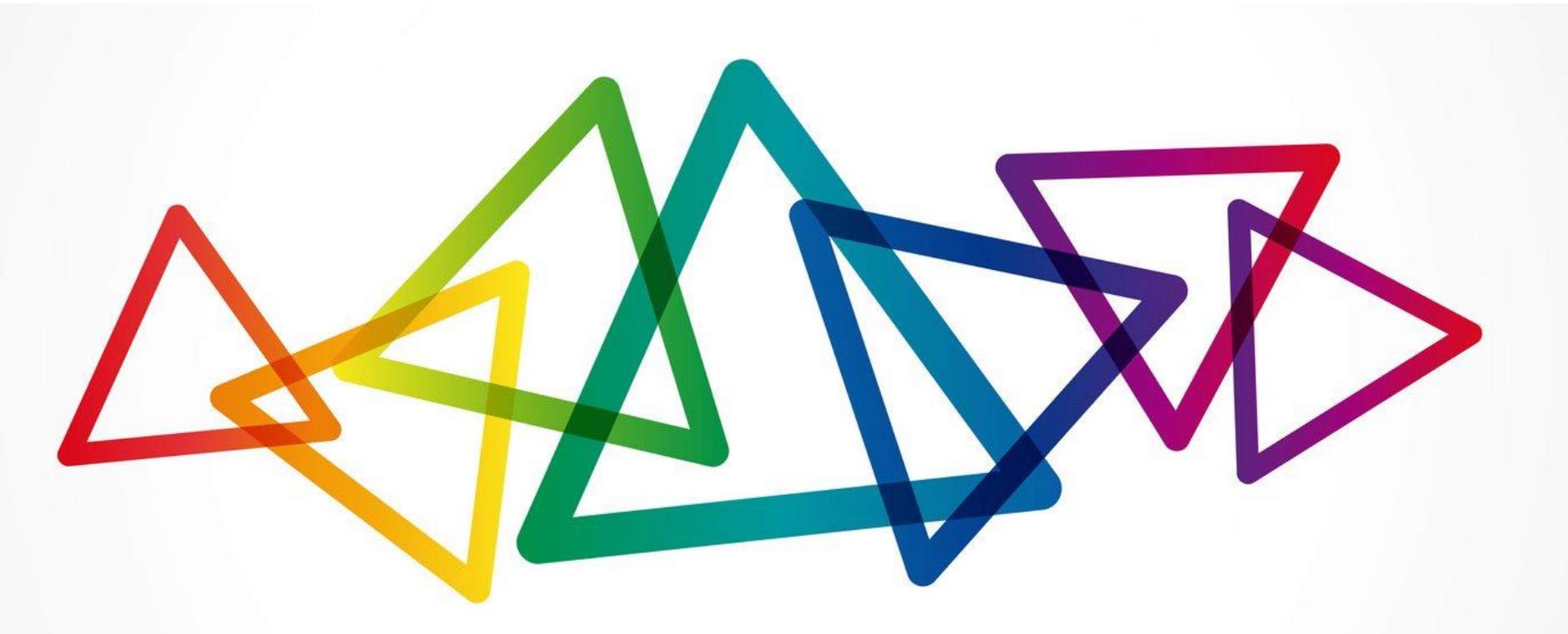
\*Denmark's relative patenting intensity in top 11 tech areas vs in top 10 areas by global patenting intensity

\*\*Denmark's relative patenting intensity in top tech areas with less than 75.000 patents globally per year vs other top tech areas

\*\*\*Share of Danish patenting in top tech areas with relative patenting intensity above 1

# The Emergence of New General-Purpose Technologies?





# Different Views at Denmark's Innovative Capacity



- Total Danish R&D spending as % of GDP above OECD average
- Slight erosion in rank over time; Austria, Germany, and Taiwan surpassed Denmark since 2015

## The Global Competitiveness Report 2019



- Ranked 10<sup>th</sup> overall, 11<sup>th</sup> on innovation ecosystem
- Stronger on business dynamism than on innovation capacity

**Denmark overall strong on innovation capacity, even if not leading and few gains over time**



- Ranked 4<sup>th</sup> overall, slight relative fall over time
- Lowest on innovators and sales-impact; highest on innovation-friendly environment



- Ranked 8<sup>th</sup> overall, stronger on inputs than on outputs
- Strong on articles and patents



- Ranked 2<sup>nd</sup> overall, 11<sup>th</sup> on innovation ecosystem
- Stronger on business dynamism than on innovation capacity



# Shifting Context of Global Innovation

Knowledge is available **everywhere**. Top scientists **co-locate** in few locations. Innovation is increasingly a **team effort**

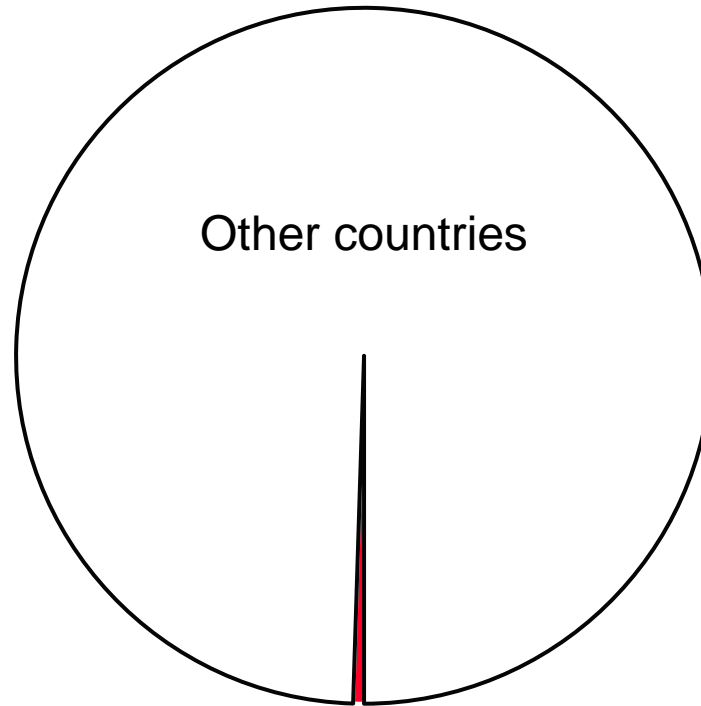
Innovation is increasingly **concentrated** in a few urban hotspots. At the same time, these hotspots are increasingly **connected and collaborating** globally

Emerging economies, **China** in particular, are key players in R&D activity

**Firms** fund a stable 2/3s of R&D spending. A **small number of MNCs** dominate this spending

The **cost of innovation** is rising. At the same time, the **resources committed to innovation** are growing

# Denmark and the World



**0.48%**

Share of Denmark in  
**total R&D spend,**  
OECD + key emerging  
countries

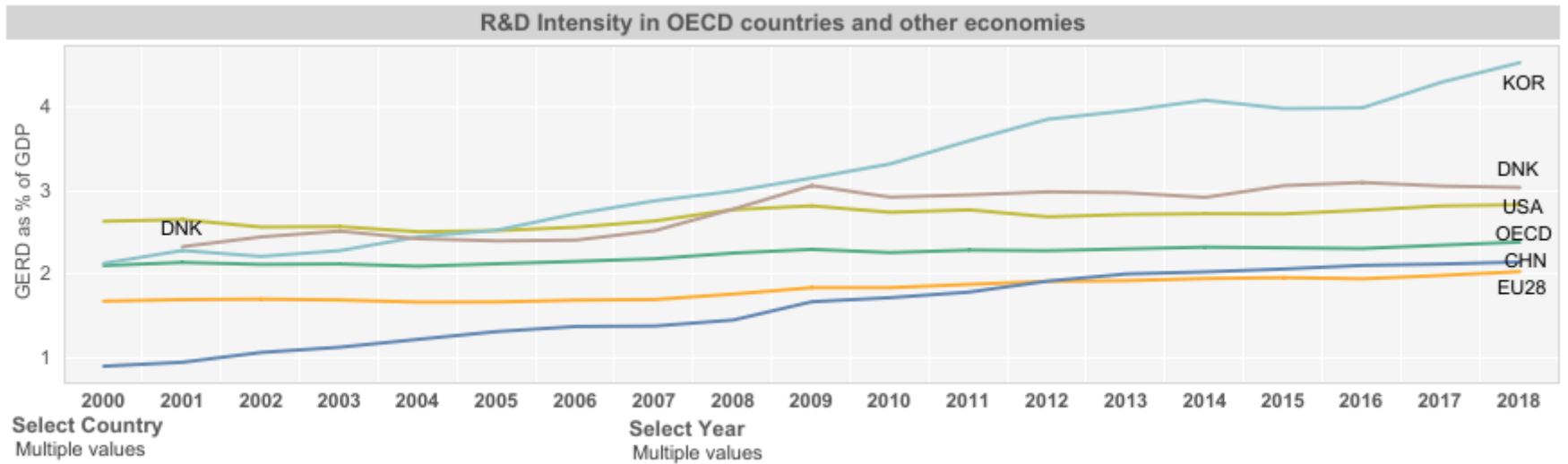
**Denmark**

**0.61%**

Share of Denmark in  
**total researchers,**  
OECD + key emerging  
countries

**What to do now?**

# Spend more?



Source: OECD estimates based on OECD Main Science and Technology Indicators Database, August 2020.

# Focus more?

## Erhvervsmæssige styrkeområder

– Kortlægning af erhvervsstyrker i dansk erhvervsliv

Udarbejdet for Erhvervsstyrelsen, juni 2019



### DE 11 TEKNOLOGIOMRÅDER ER:

- Avancerede materialer
- Bioteknologi
- Farmaceutisk teknologi
- Fødevareteknologi
- Klimateknologi
- Kunstig intelligens
- Lydteknologi
- Medicinsk teknologi
- Robotteknologi
- Vandteknologi
- Vindteknologi

Figur 9. Danmarks stærkeste og mest lovende erhvervsområder

|  |                                   |  |                          |
|--|-----------------------------------|--|--------------------------|
|  | Måjeteknologi                     |  | Avanceret produktion     |
|  | Energiteknologi                   |  | Digitale teknologier     |
|  | Fødevarer og bioressourcer        |  | Finans og fintech        |
|  | Maritime erhverv og logistik      |  | Turisme                  |
|  | Life science og velfærdsteknologi |  | Robot- og droneteknologi |
|  | Byggeri og anlæg                  |  | Animation, spil og film  |
|  | Design, mode og møbler            |  |                          |

- Causality
- Dimension
- Criteria
- Decision maker

# Be strategic!



1. What **goals** is Denmark trying to achieve?
2. What **value** does Denmark provide for companies competing on innovation?
3. What are the **actions** Denmark is taking to provide that value?
4. How is Denmark **organizing** itself to implement these actions consistently over time?

# Be global!

- ***Societal challenges are global***
  - ***Knowledge is global***
  - ***Talent pools are global***
- ***Innovation networks are global***
  - ***Markets are global***

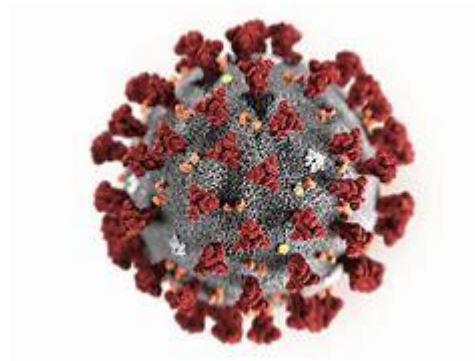


**Being global is more than *competing* globally,  
it also means *collaborating* globally**

# And what about COVID-19?

Huge short-term mobilization of funds to do research on COVID-related issues

Acceleration of structural changes like digitization, increasing the value of innovation



Historically, crises have led to lower spending on innovation, by governments as well as companies