Faculty of Health Sciences

Rigshospitalet

The potential in research across institutions and recommendations from Growth Team for Life Science

Liselotte Højgaard

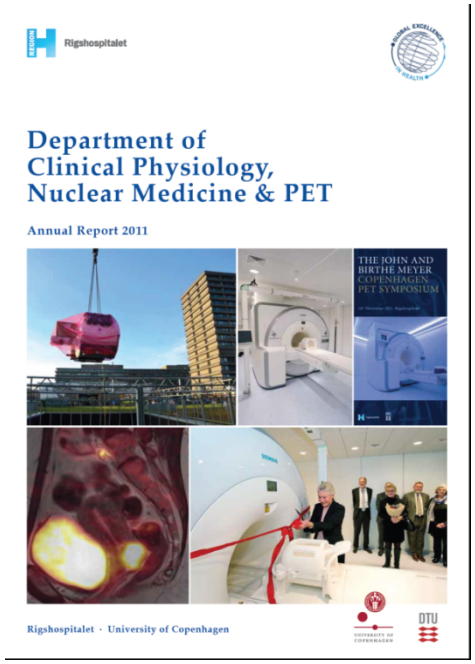
Professor, klinikchef, dr.med., Rigshospitalet, KU og DTU

DTU

Rigshospitalet

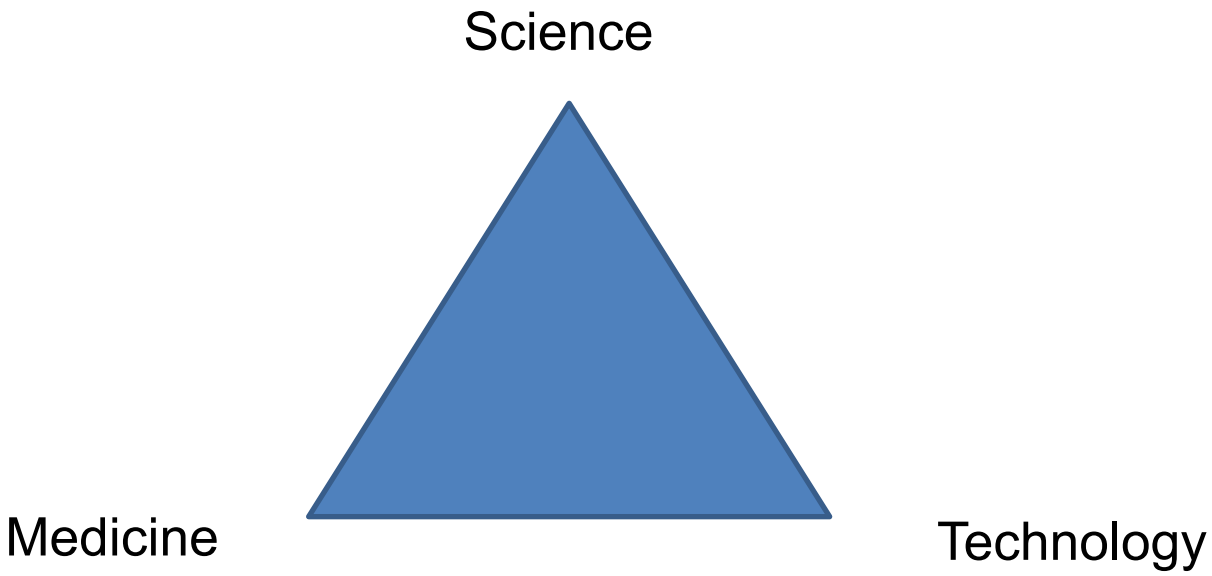
- University hospital 12.000 staff
- 250 ph.d., 2000 publications, 100 professors
- From 1757 – the first hospital in Scandinavia with doctors and research
- Collaboration with KU & DTU

Dept. of Clinical Physiology, Nuclear Medicin & PET



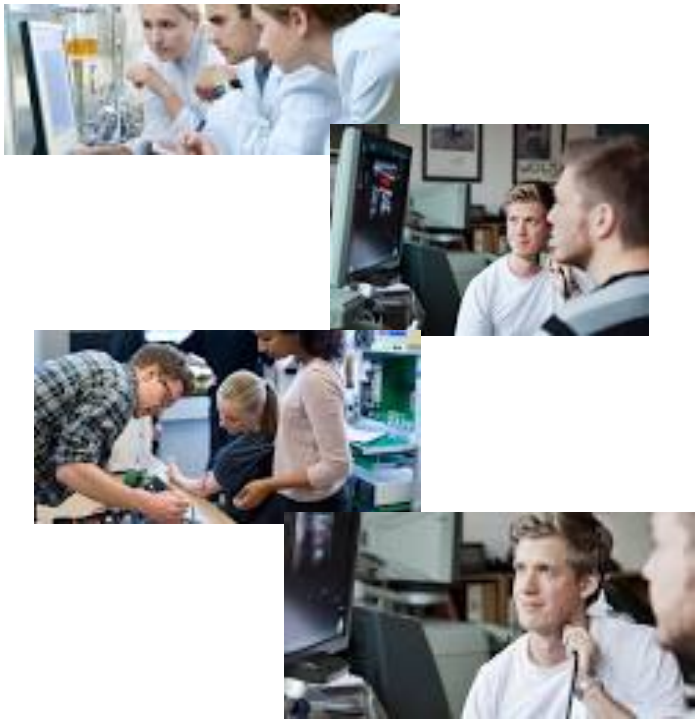
- 120.000 investigations per year
- 160 *peer review* publications
- 200 staff, 25 Ph.d.studens
- Budget 120 mio. kr. + 60 mio. kr. external
- 2 cyklotrons, radiochemistry, PET/CT, PET/MR
- Scanners for small animals Panum
- Equipment 500 mio. kr.

Physicians, engineers, physicists, chemists, molecular biologists, IT & data experts, lab tech., radiographers, secretaries, others – for patients, research and education.



The present paradigm shift => BIG DATA, robotics, 4.0, personalized medicine. New interdiciplinarity is needed also in leadership. More knowledge – less business school.

Bioengineer in medicine & technology



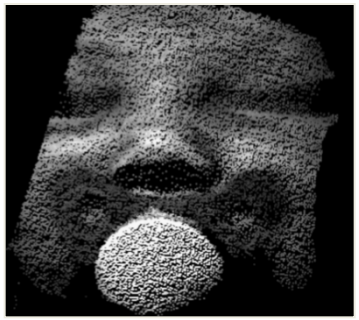
DTU and KU, started 2003 with 60 slots.
Many applicants, gender balance.

Jobs in industry, universities, hospitals, international.

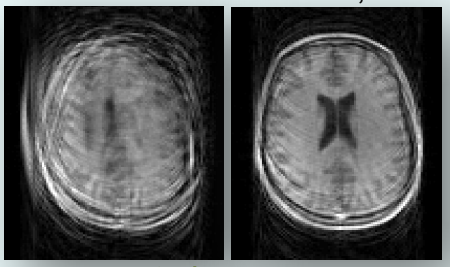
”Student Team & EPIC”

105 studenter from DTU og KU MedTek on call 24/7

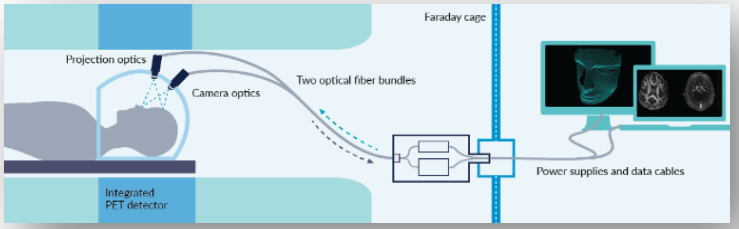
Innovation from MedTek: motion correction



RH/MGH, 2015



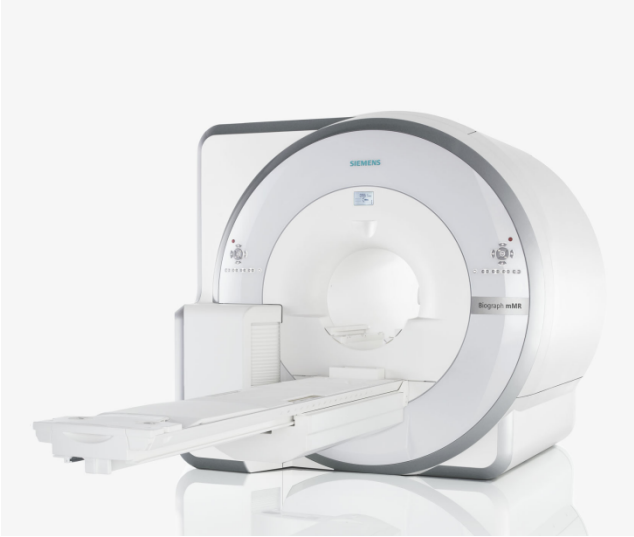
MGH/Harvard, 2014

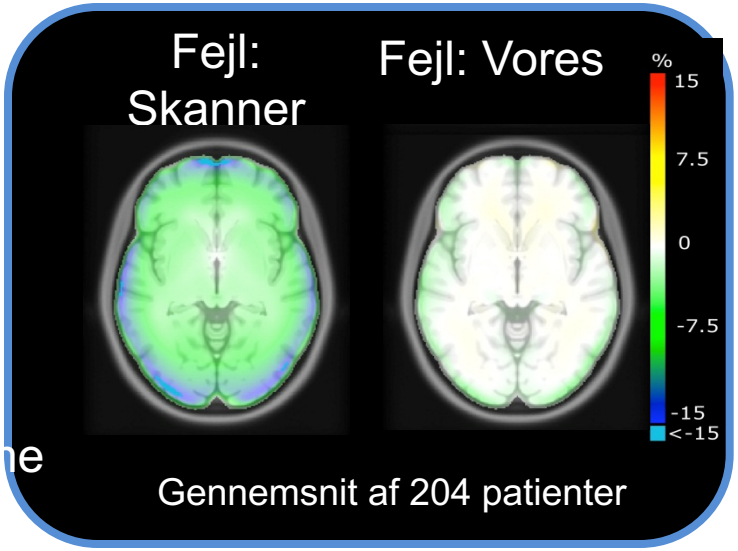


RH, 2017

Oline Vinter Olesen
PhD, MSc (Eng. Medicine and Technology)
Founder & CTO, TracInnovations
Senior Researcher, DTU Compute & RH

New method for PET/MR reconstruction





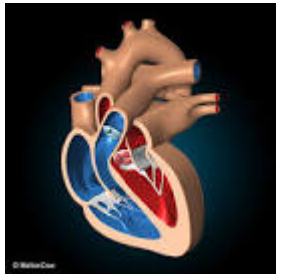
New technique for PET/MR: corrects the wrong reconstruction, <1 %

Claes Ladefoged, cand.scient., ph.d.-student, Lundbeckfonden's Talent Prize

DISRUPTION på tværs

3 D printers for individual pediatric hearts preoperatively.

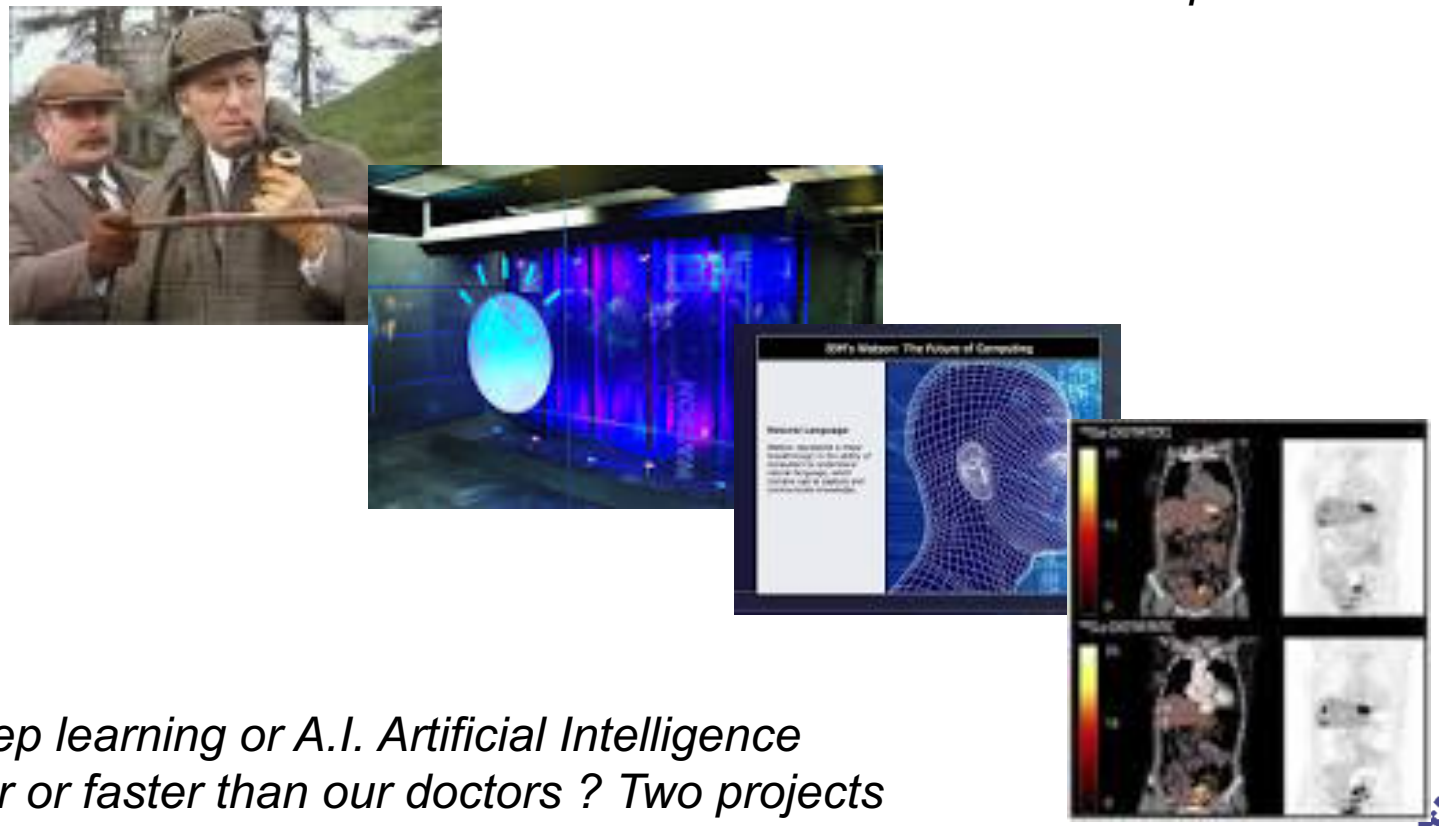
High skills in science and technology needed.



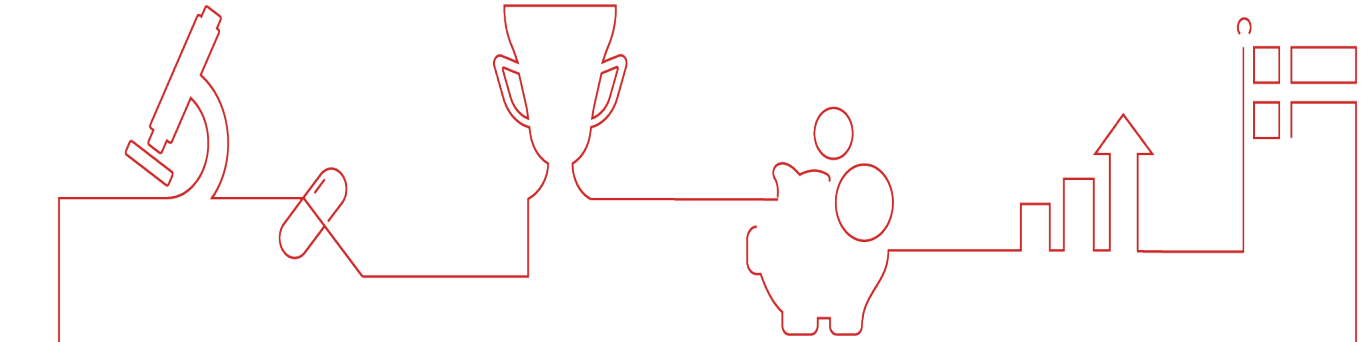
Robots already in place

Sherlock Holmes and Dr. Watson

Can IBM's Watson computer do the readings ?

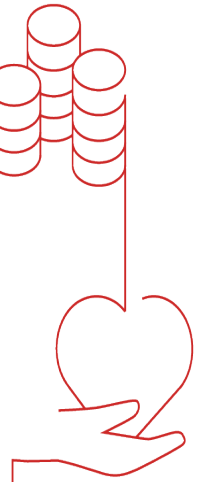


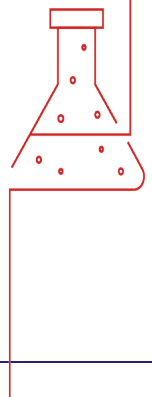
Is deep learning or A.I. Artificial Intelligence Better or faster than our doctors ? Two projects With Watson for PET/CT scans.



Life science i verdensklasse

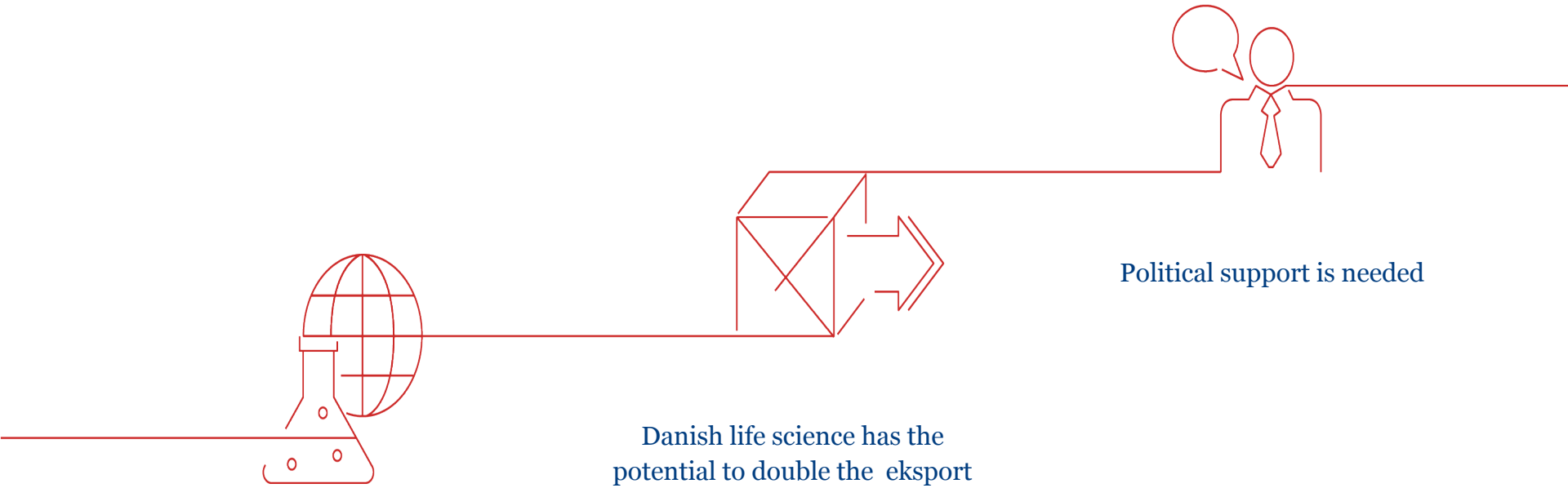
Præsentation af vækstteamets rapport
ved CEO for Lundbeck, Kåre Schultz
Formand for regeringens life science vækstteam





#dklifescience

Main messages



Political support is needed

Danish life science has the potential to double the eksport towards 2025

Vision – Danish life science world class for patients, society and industry

Members

- **Kåre Schultz**, administrerende direktør, Lundbeck (formand)
- **Allan Flyvbjerg**, Centerdirektør, Steno Diabetes Center Copenhagen (SDCC)
- **Hans Schambye**, administrerende direktør, Galecto Biotech
- **Helle Ulrichsen**, formand, Strategisk Alliance for Register og Sundhedsdata
- **Kristian Helin**, professor og direktør, Biotech Research & Innovation Centre ved Københavns Universitet
- **Anders Thelborg**, administrerende direktør, Bristol-Myers Squibb Danmark
- **Lars Rasmussen**, administrerende direktør, Coloplast
- **Liselotte Højgaard**, professor, klinikchef dr.med., Rigshospitalet, Københavns Universitet og Danmarks Tekniske Universitet
- **Mads Krogsgaard Thomsen**, executive vice president, Novo Nordisk
- **Martin Olin**, administrerende direktør, Symphogen
- **Thomas Kongstad Petersen**, vice president, LEO Pharma

Organisation

First meeting September 2016 with 2 hours ”round table” with key stake holders from industry, academia, hospitals, public and private organisations, 4 ministers and their permanent secretaries and staff – and members of Vækstteam. 4 Meetings with all members of Vækstteam – chaired by Kåre Schultz. Launch March 2017.

Staff from from ministries

- Ministry of Health SUM,
- Ministry of Higher Education and Science UFM,
- Ministry of Industry, Business and Financial Affairs EM,
- Ministry of Foreign Affairs UM
- Ministry of Finance FM

Growth Team work process

2-3 members of Growth Team work together and meet to discuss and draft report. Same structure for all chapters, and focus on recommendations.

Staff from ministries and input from key stake holders (LIF, Lægemiddelindustriforeningen, the organisation for Medicinal Companies in Denmark, Medicoindustrien, the organisation for medical technology, DI, Dansk Industri, Lægeforeningen etc.).

The drafts presented by authors at Growth team meetings and discussed thoroughly and adjusted.

- ***If you can make high level people work – it works.***

The Danish life science industry

Export 100 bio DDK = 13 bio €.

Novo Nordisk, Lundbeck, LEO Pharma etc.

Coloplast, AMBU, Radiometer– personal aids, ICT, eHEALTH.

Biotek – with growth potential.

History of the Danish life science industry

Novo Nordisk – The Danish Nobel Laureat August Krogh got the insulin recipe from Banting & Best in Canada i the 1920'ies, created Nordic Insulin, with revenue to research. Competitors established NOVO. United as Novo Nordisk and Novo Nordisk Foundation 1989.

LEO Pharma – Prof. KA Jensen got the penicillin SOP in London from Sir Alexander Flemming during the second world war.

Radiometer - blood gas analysis developed by Prof. Astrup, RH and Engineer Schrøder during the polio epidemic, 1950'ies.

Ambu – Engineer Holger Hesse and Prof. Henning Ruben – 1956 the world's first self inflating resuscitator, the ambu bag.

Coloplast was created by Nurse Elise Sørensen in 1954. Her sister had a colostomy.

No new big companies in recent years in Denmark.

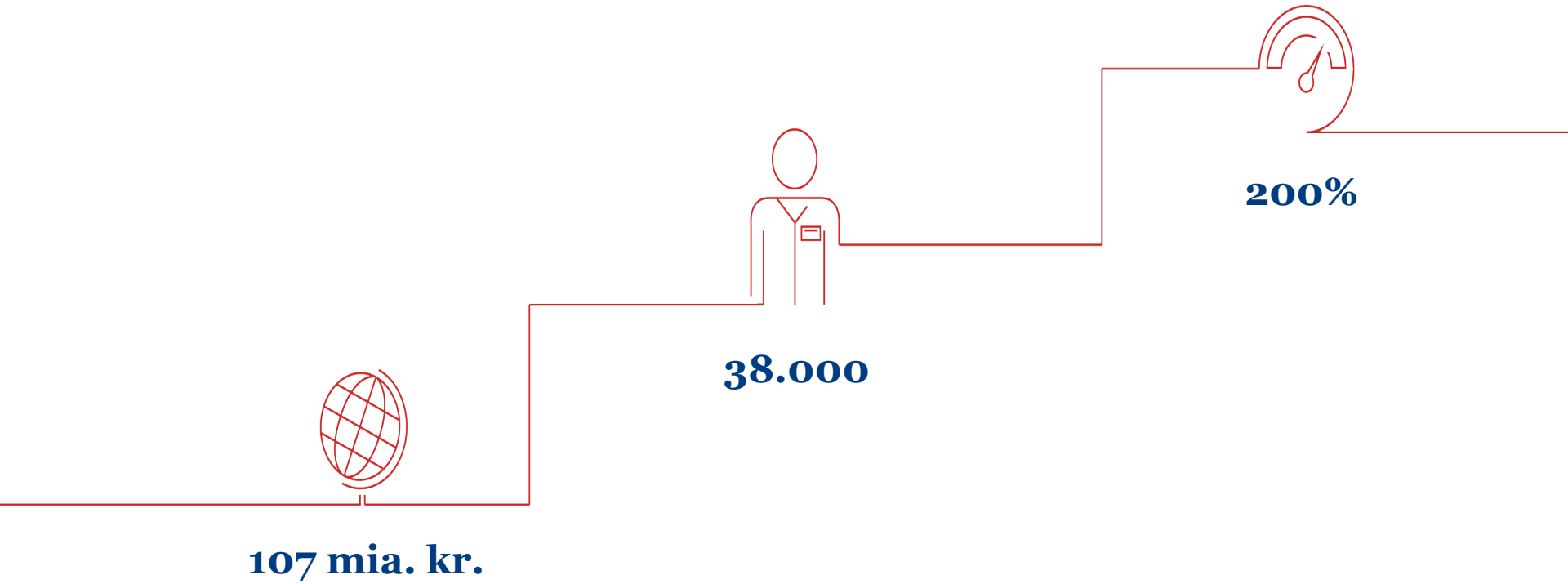
History, continued

The Carlsberg Laboratory was created by Brewer I.C. Jacobsen, Carlsberg in 1875. The brewer donated his fortune and the brewery to The Royal Danish Academy of Sciences and Letters. (We still own it).

The yeast research was inspired by Louis Pasteur and was important for Chr. Hansen, Novozymes, and the present Biotek industry.

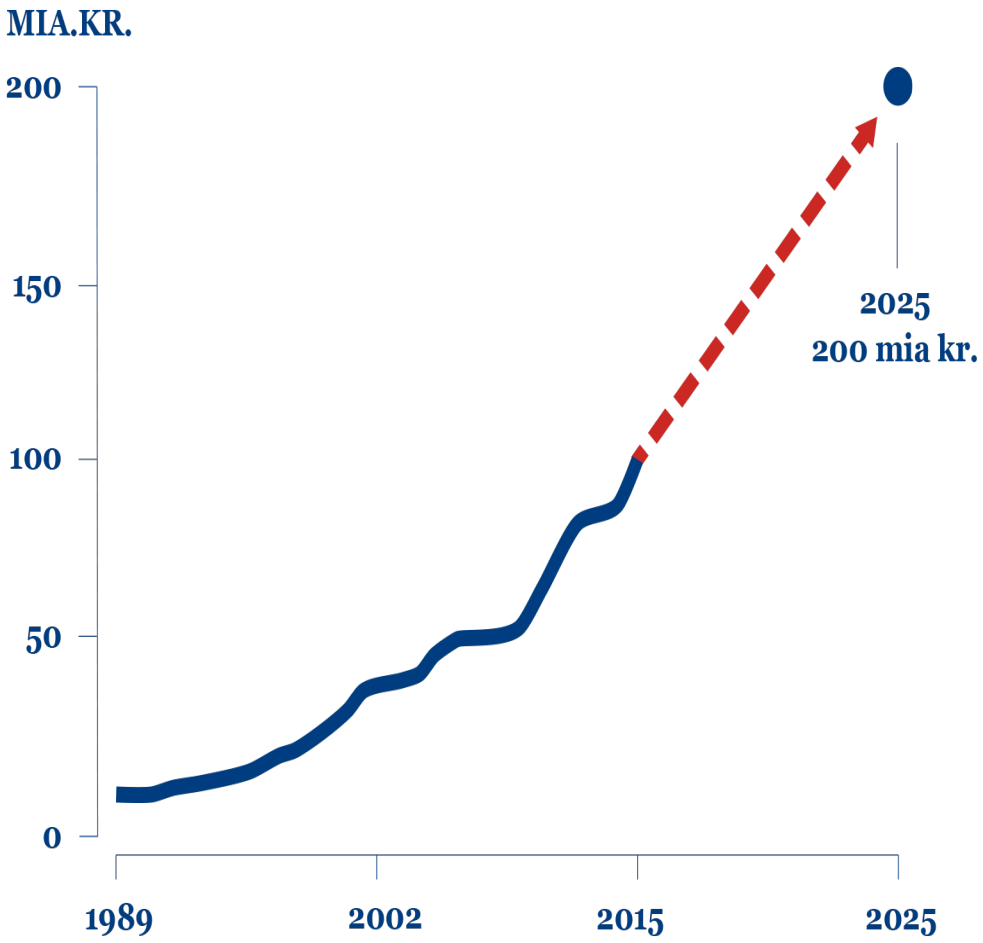
Take home message: Good products are based on science !

Life science



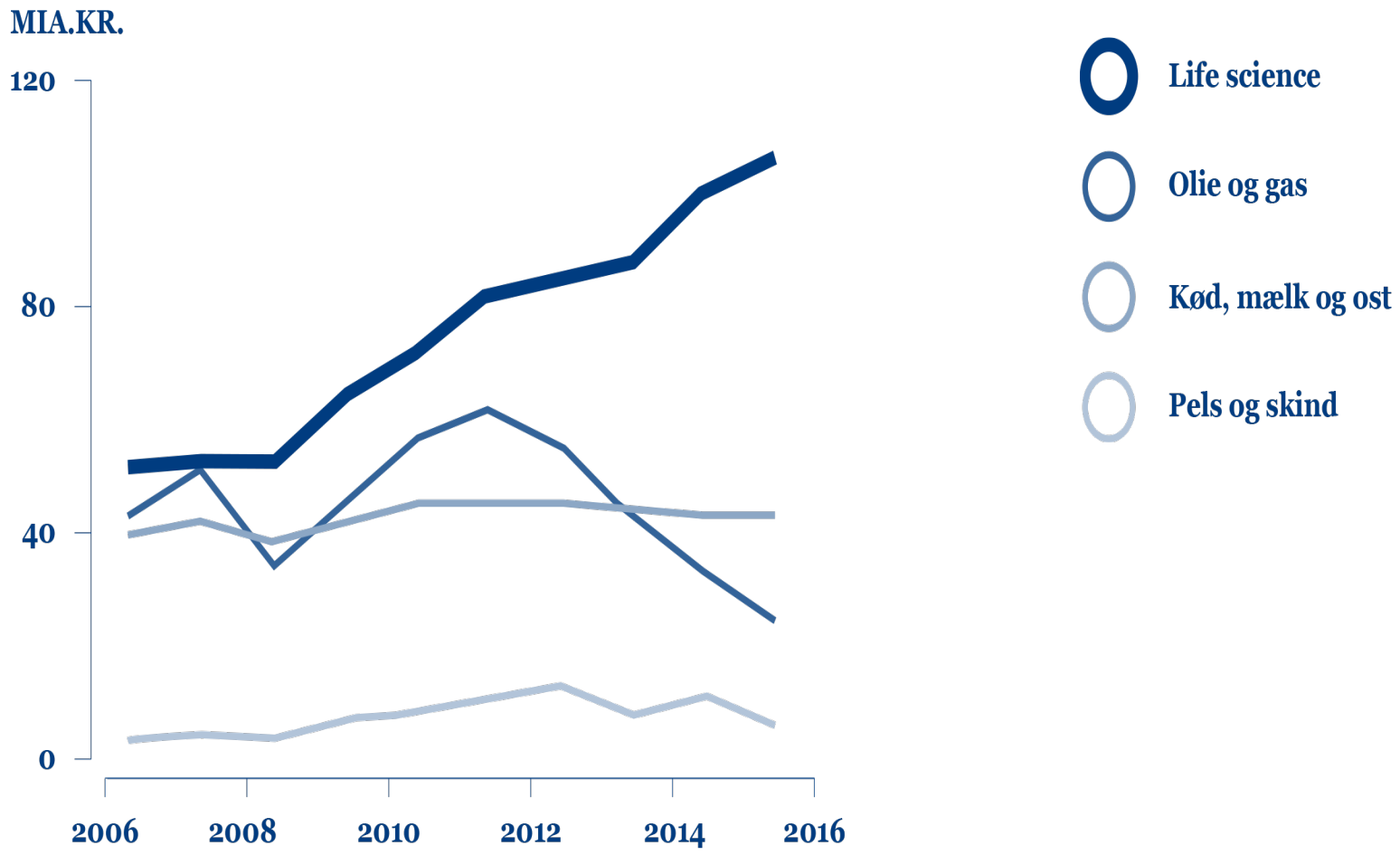
Life science

Life science vareeksport



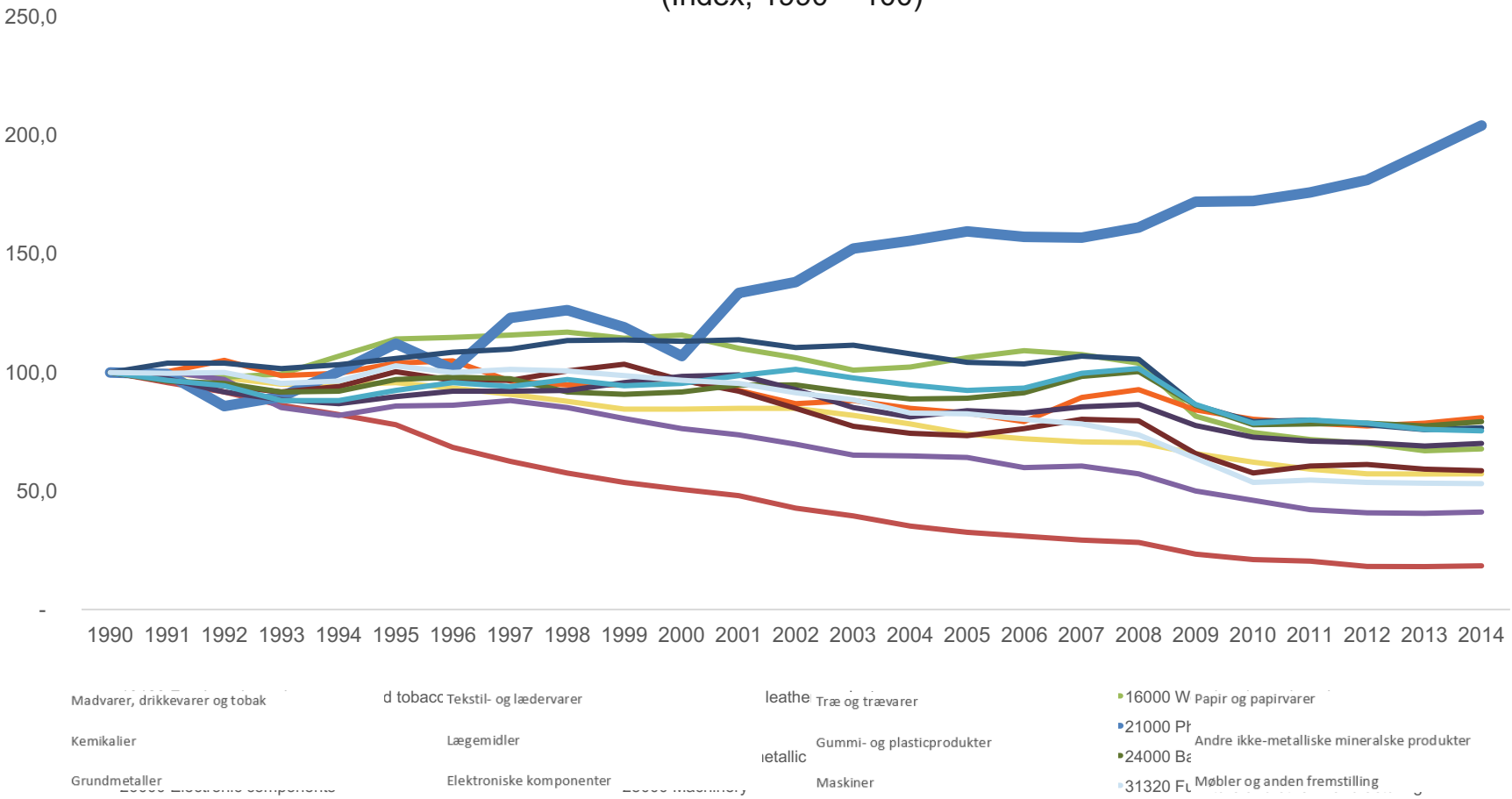
Life science

Life science vareeksport



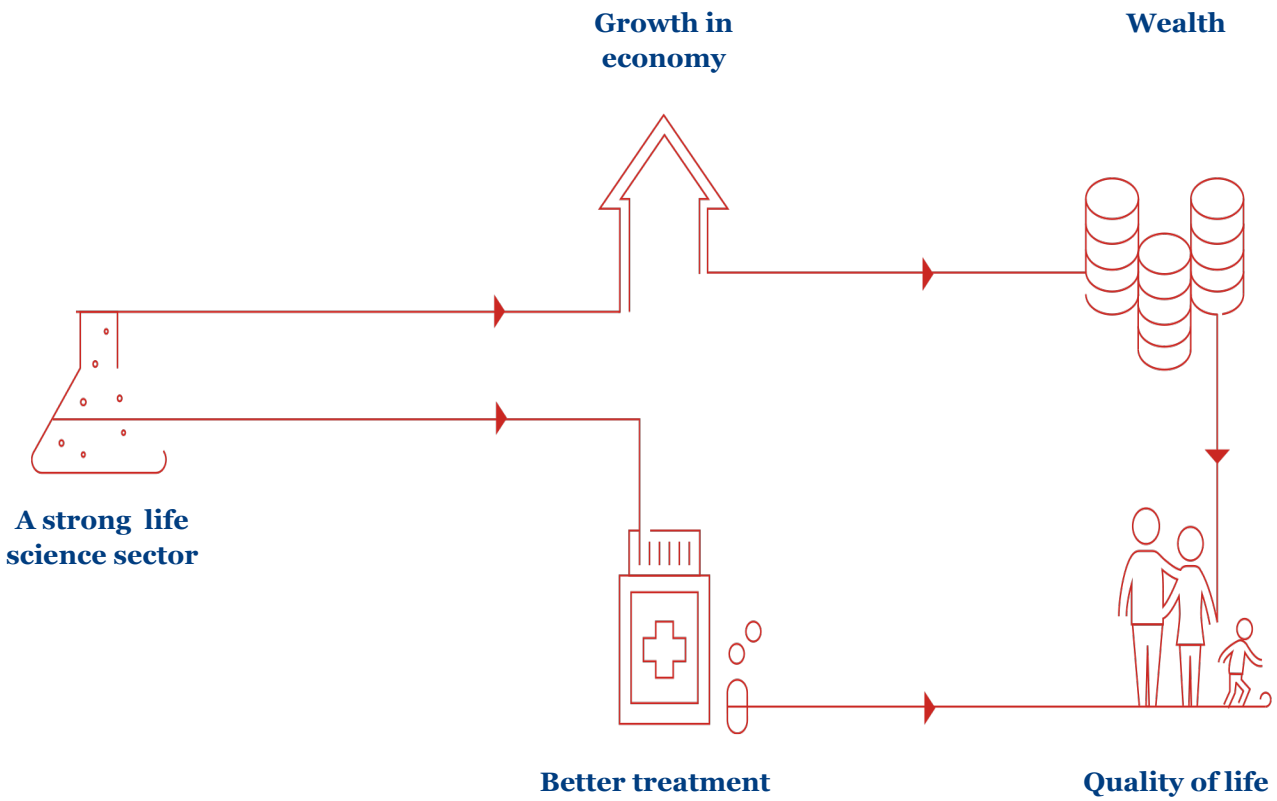
Life science

- Udviklingen i beskæftigelsen i dansk industri 1990-2014
- (Index, 1990 = 100)

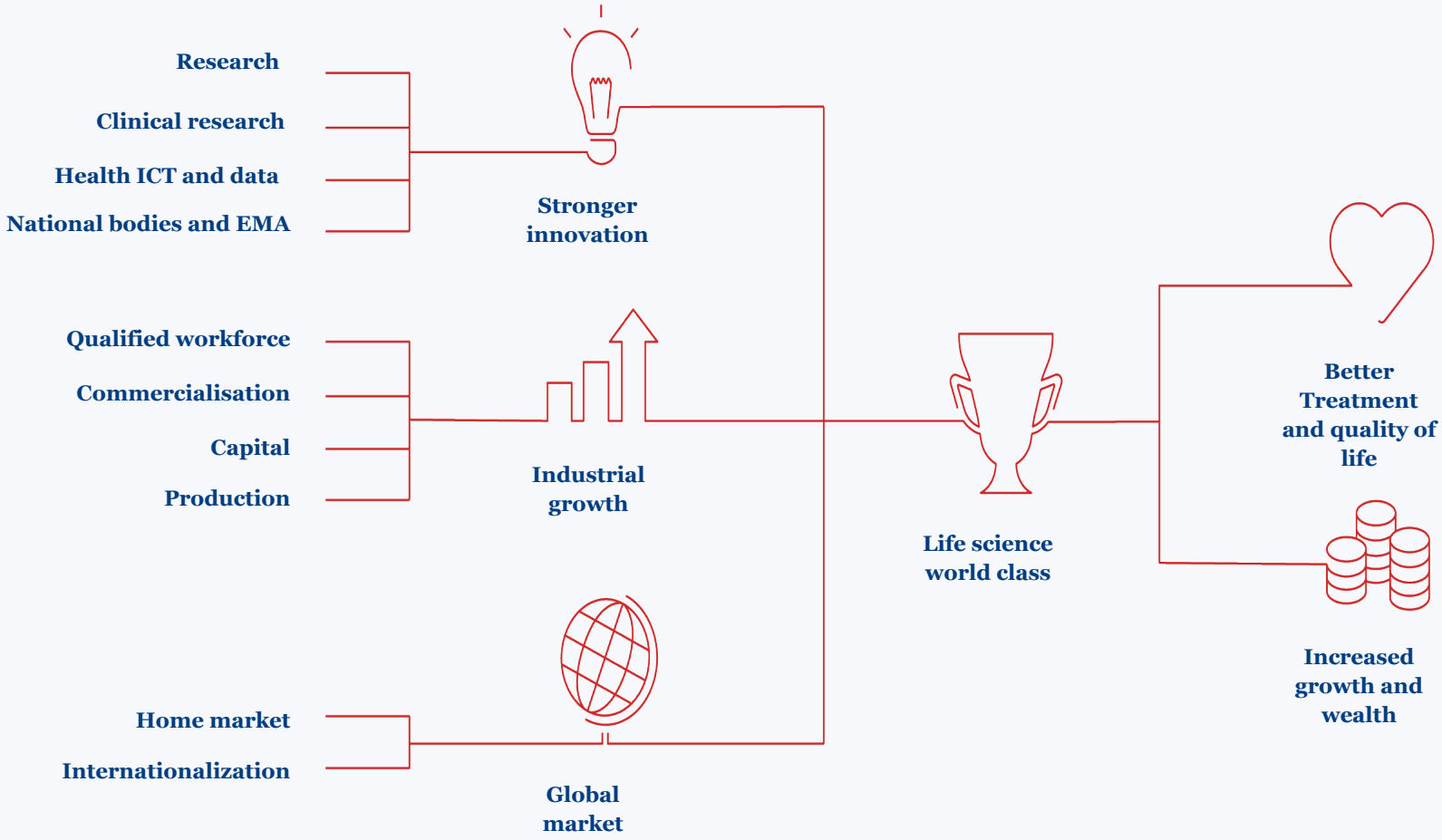


Kilde: Danmarks Statistik

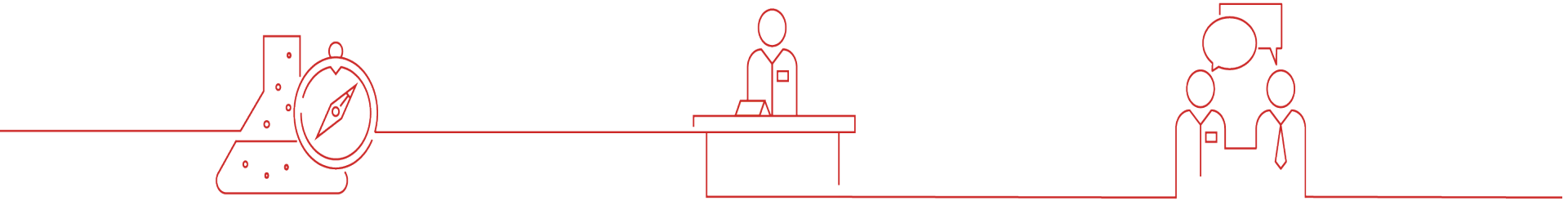
Value for Denmark



From vision to results



From report to action

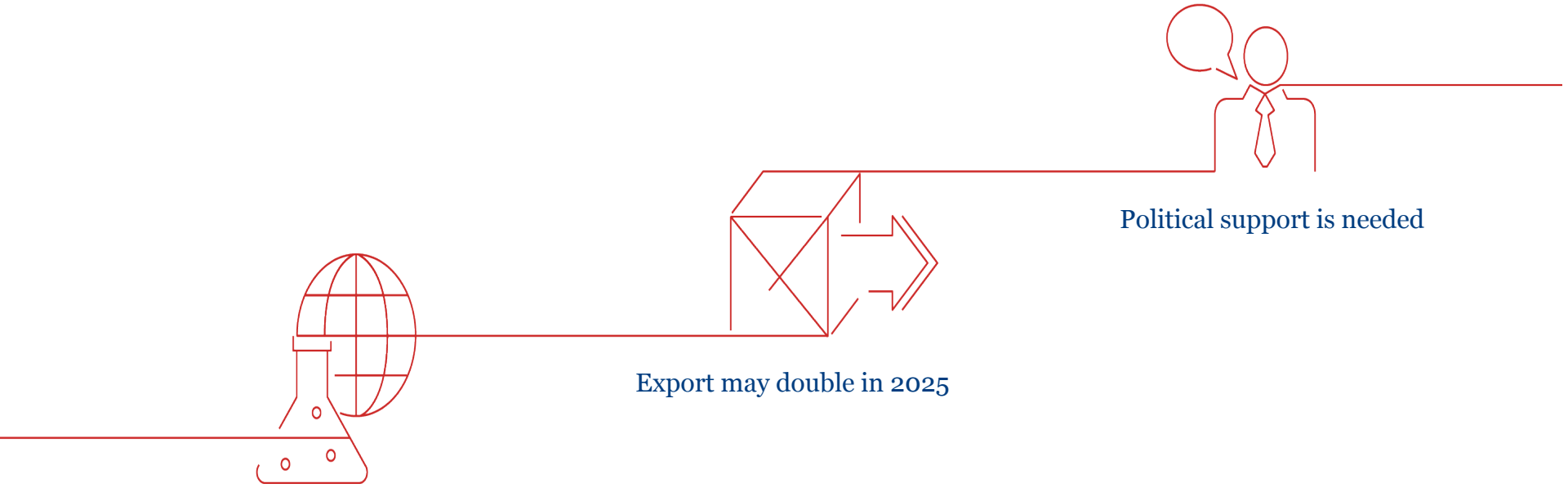


National life science strategi

Permanent life science kontor

Fortsat dialog

Main messages



Political support is needed

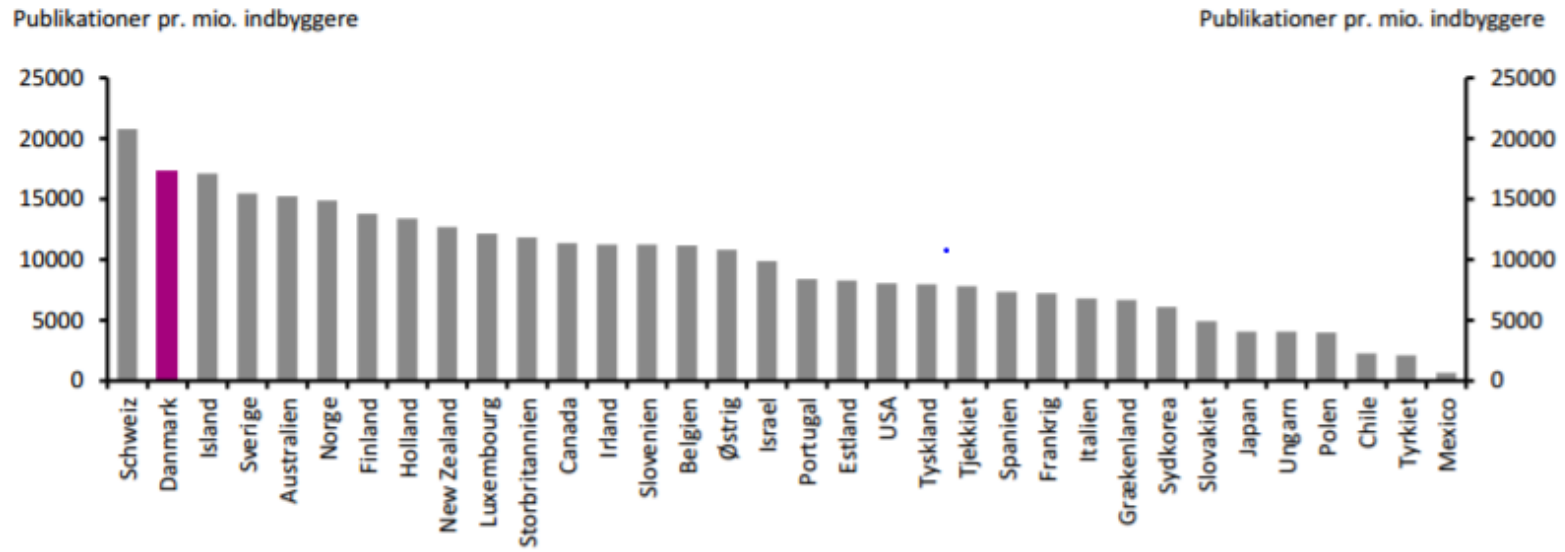
Export may double in 2025

Vision – World Class Danish life science

Research output

Figur 2.3

Videnskabelige publikationer per mio. indbyggere, OECD, 2012-2015



Note: Udtræk per 12-10-2016.

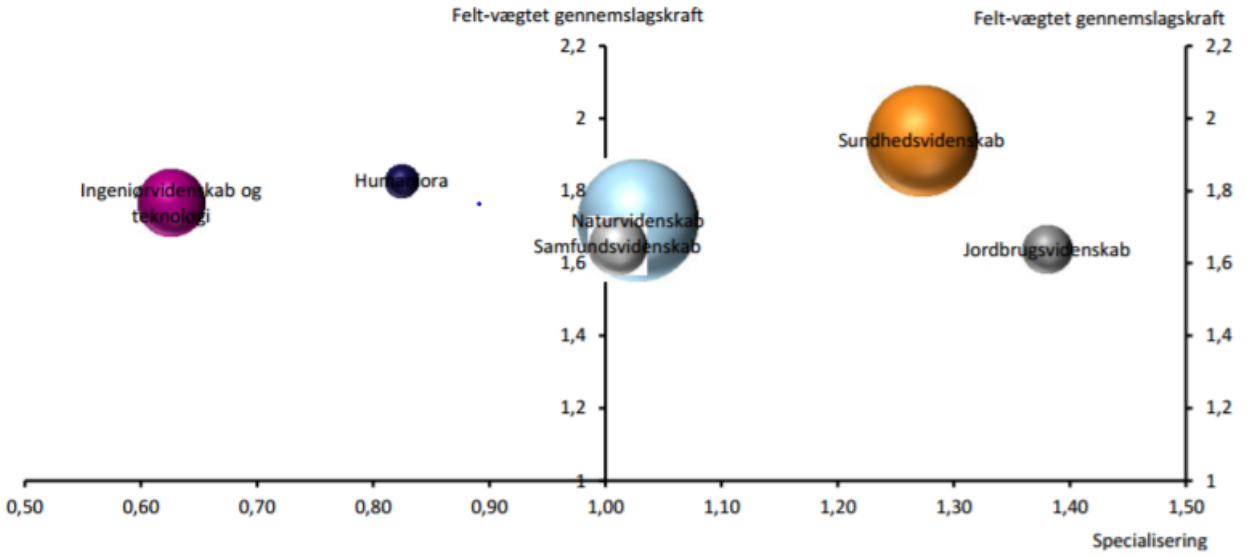
Kilde: Scival, Elsevier B. V. (2016). Scival baserer sig på Scopus-data.

The Nordic countries are high up on the rank lists of publications per capita, and health research is an important driver.

Health research weight

Figur 2.9

Felt-vægtet gennemslagskraft og specialisering for hovedområderne i Danmark, 2012-2015



Note: Udtræksdato fra Scival 21-11-16.

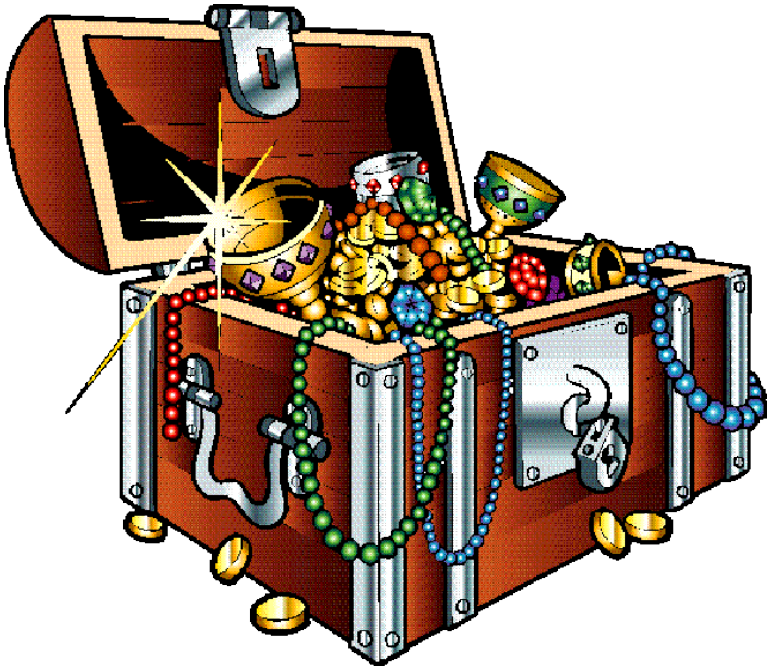
Kilde: Scival, Elsevier B. V. (2016). Scival baserer sig på Scopus-data.

From "Forskningsbarometeret", Ministry of Higher Education & Research, Denmark 2016

The Danish Government and regions has launched a national strategy for personalized medicine in 2016.

Together with the universities and funders.

Danish registries



- Total population registry
- High data quality
- Cover Denmark
- Coherent, combinable
- Longitudinal
- The first global cancer registry from the 1943

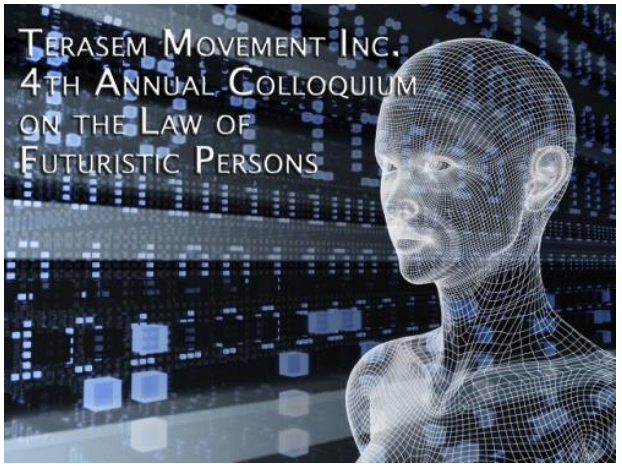
Danish National Biobank and Computerome

15 million biological specimens at Statens Serum Institut with distributed biobanks linked in a database.

National biobanks and registry with coordination center.

Computerome 800 square meter at DTU Risø.

Thank you very much for your attention.
Research for patients, knowledge, education and industry.



Vision 2020

Disruption for patients and society – if useful

- Research and education with convergence between medicine, technology and scie
- Growth team recommendations implemented => 100 mia.kr.
- Personalized medicine, big data, robots & ICT, deep learning.