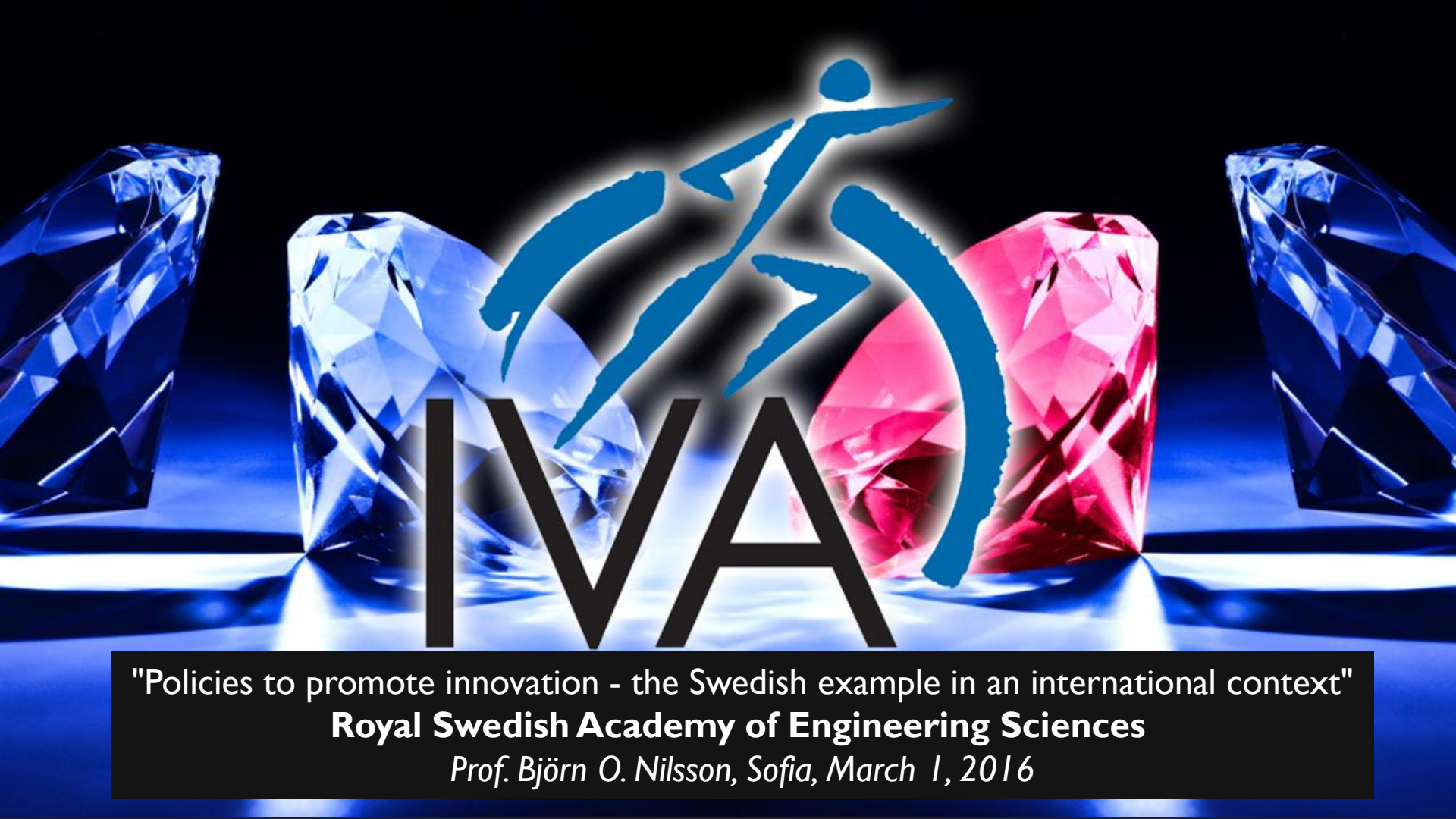


"Policies to promote innovation - the Swedish example in an international context"

Royal Swedish Academy of Engineering Sciences

Prof. Björn O. Nilsson, Sofia, March 1, 2016

Visit in Bulgaria
AGENDA March 1, 2016

1. Royal Swedish Academy of Engineering Sciences (IVA)

2. The changing world: *Innovation is the word*

3. Competiveness of Sweden
   - *IVA PROJECT: Attraction for sustainable growth*

4. Concluding remarks

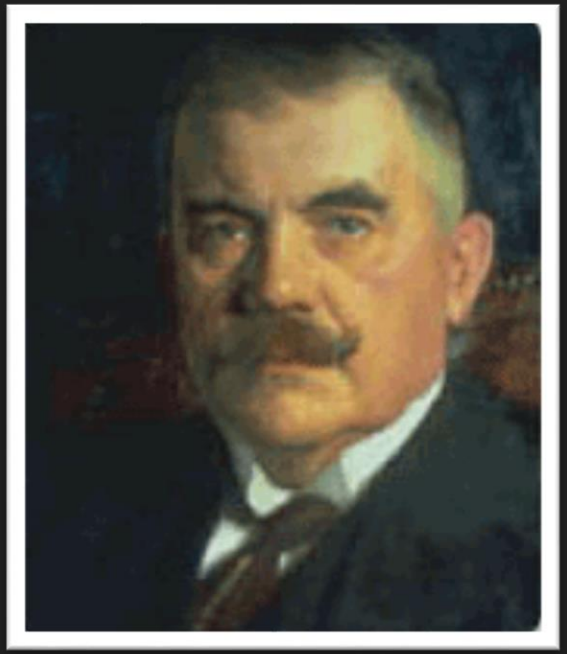
5. Q, A, C & D
   - *Questions, Answers, Comments and Discussion*

1. The Royal Swedish Academy of Engineering Sciences (IVA)

Worlds first engineering science academy

Founded in 1919

IVA is headquartered in central Stockholm



Axel F Enström was the first President of IVA

IVA's mission

Three "corner stones" (1., 2., and 3.)

"To promote (1.) the engineering and economic sciences and (2.) the advancement of business and industry for the (3.) benefit of society"

IVA statutes, § 1

Royal Swedish Academy of Engineering Sciences (IVA)

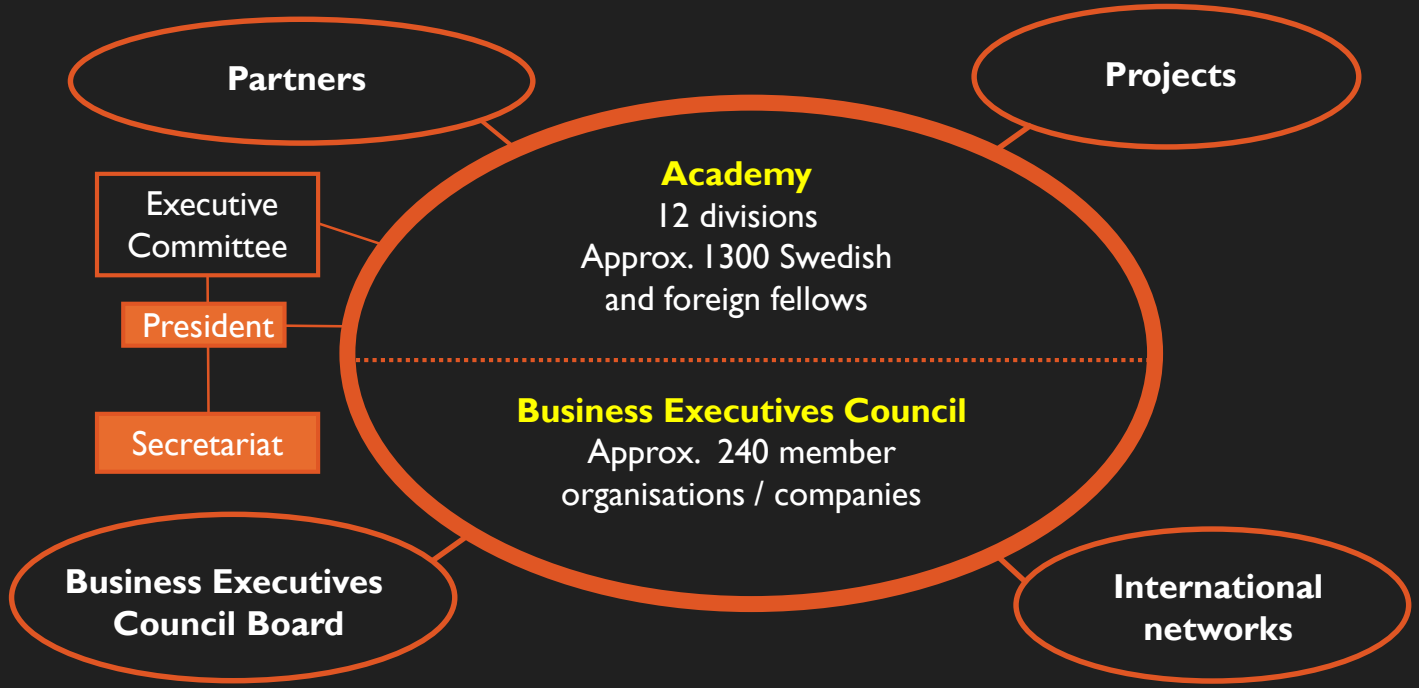
Patron, Chairman and President

Patron
H.M. King Carl XVI Gustaf

Chairman
Leif Johansson

President
Björn O. Nilsson

IVA – an independent knowledge bank



IVA Business Executives Council 2016

240 member organisations / companies

1AKONSULT **ABAPHRAE** ABMAXSIEVERT **ABNYAGRANDHÔTEL** ABSKF **ABBAB** ACADEMEDIAAB **ACOBIAFLUXAB** ADDTECHAB **ADVENTSOFTWARE** ADVOKATFIRMANNOVAAB **AFA FÖRSÄKRING** AFFIBODY AB **AKADEMISKA HUS AB** AKZO NOBEL FUNCTIONAL CHEMICALS AB **AKZONOBEL PULP AND PERFORMANCE CHEMICALS** ALFA LAVAL CORPORATE **ALMI FÖRETAGSPARTNER AB** ALMI FÖRETAGSPARTNER STOCKHOLM SÖRMLAND AB **ALTOR EQUITY PARTNERS AB** AMROP **ANDRA AP-FONDEN** ARTHUR D LITTLE AB **ASKUS CONSULTING AB** ASSA ABLOY AB **ASTRAZENECA AB** ATLAS COPCO AB **ATTENDO AB** AVANTURE AB **AXEL JOHNSON AB** AXHOLMEN AB **BEIJER ALMA AB** BILLERUDKORSNÄS AB **BIM KEMI AB** BIOVICA INTERNATIONAL AB **BITEAM AB** BOLIDEN AB **BOMBARDIER TRANSPORTATION SWEDEN AB** BONA AB **BOSTON CONSULTING GROUP NORDIC AB** BRUNSWICK GROUP **BURE EQUITY AB (PUBL)** BUSINESS CHALLENGE **BUSINESS REGION GÖTEBORG AB** BUSINESS SWEDEN **CAMBREX KARLSKOGA AB** CARL BENNET AB **CEMENTA AB** CHRISTIAN BERNER INVEST AB **CITOC AB** CODA NORDIC AB **CYBERCOM GROUP AB** DANIR AB **DANSKE BANK SVERIGE** DATAFÖRENINGEN I SVERIGE **DILIGENTIA AB** DINA MEDICINER **DYBECK INVEST** E.ON SVERIGE AB **ECCA NORDIC AB** ECOFIN INVEST AB **ELECTROLUX, AB** ENERGIMYNDIGHETEN **ENGSTRÖM REDERI AB, DAG** ENHANCER CONSULTING AB **ERICSSON AB** ERNSTRÖMGRUPPEN AB **ESTBROTEN** AB EVLI BANK ABP **EXPORTKREDITNÄMNDEN** FJÄRDE AP-FONDEN **FOI - TOTALFÖRSVARETS FORSKNINGSINSTITUT** FORMAS **GE HEALTHCARE LIFE SCIENCES** GENERAL ELECTRIC **GIESECKE & DEVRIENT 3S AB** GKN AEROSPACE SWEDEN AB **GOOGOL** GRUFMAN & PARTNERS AB **GUNNEBO AB** GÄVLE ENERGI AB **H&M, HENNES & MAURITZ AB** HEALTHCAP/ ODLANDER, FREDRIKSON & CO AB **HIQ INTERNATIONAL AB** HOGIA AB **HOLMEN AB** HUAWEI TECHNOLOGIES SWEDEN AB **HUMBLESTORM AB** HUMLEGÅRDEN FASTIGHETER AB **IBM SVENSKA AB** IK INVESTMENT PARTNERS **IMPLEMENT MP AB** INDUSTRIFONDEN, STIFTELSEN **INDUSTRIVÄRDEN, AB** INDUTRADE AB **INNOVATION360 GROUP** INNOVATIONSBRONAB **INNVENTIAAB** INSPECTASWEDENAB **INTRUMJUSTITIAAB** INVESTMENTABLATOUR **INVESTORAB** ISPITE **ISEASWEDENKB** JCEGROUPAB **JERNHUSENAB** JKL AB **JM AB** KAIROS FUTURE AB **KARNELL** KK-STIFTELSEN **KNOWIT BUSINESS GROWTH AB** KONSTRUKTIV AB **KREAB GAVIN ANDERSON** KRISTINA AHLSTRÖM JURIDIK AB **L E LUNDBERGFÖRETAGEN AB** LANGECOM **LANTMÄNNEN EK FÖR** LINDSKOG MALMSTRÖM ADVOKATBYRÅ **LKAB** LULEÅ NÄRINGSLIV AB **MALMÖ YRKESHÖGSKOLA** MANNHEIMER SWARTLING ADVOKATBYRÅ AB **MCKINSEY & COMPANY KB** MELLBY GÅRD AB **MISTRA, STIFTELSEN FÖR MILJÖSTRATEGISK FORSKNING** MODIGMINOZ AB **MONTELL & PARTNERS** MORGAN STANLEY AB **MSAB** MSB, MYNDIGHETEN FÖR SAMHÄLLSSKYDD OCH BEREDSKAP **MTC, STIFTELSEN MARKNADSTEKNISKT CENTRUM** MYCRONIC AB **NC ADVISORY AB** NCC AB **NEUMAN & NYDAHL HB** NJT KONSULT AB **NORCONSULT AB** NORDEA BANK AB **NORRLANDSFONDEN NOVARE HUMAN CAPITAL** NYNAS AB **ORIFLAME COSMETICS SA** PATENT- OCH REGISTRERINGSVERKET (PRV) **PEAB AB** PETERSON & SÖNER BYGGNADS AB, F O **PFIZER AB** PMH AFFÄRSUTVECKLING AB **POSTNORD AB** PRAKTIKERTJÄNST AB **PREEM AB** PRIVEQ ADVISORY AB **PROVIDER VENTURE PARTNERS AB** RADELA AB **RAMBÖLL SVERIGE AB** RATOS AB **RECIPHARM AB (PUBL)** REDERI AB GOTLAND **REN FUEL AB** RISE, RESEARCH INSTITUTES OF SWEDEN AB **ROSCHIER ADVOKATBYRÅ** ROTHSCHILD NORDIC AB **ROYAL BANK OF SCOTLAND, RBS** RUTER DAM **SAAB AB (PUBL)** SAMARKAND2015, AB **SANDVIK AB** SAS INSTITUTE AB **SCANIA CV AB** SEB AB **SEGULAH ADVISOR AB** SEMCON AB **SENZIME AB** SERENDIPITY INNOVATIONS AB **SETTERWALLS ADVOKATBYRÅ STOCKHOLM AB** SIEMENS AB **SIP NUCLEAR CONSULTING AB** SIS, SWEDISH STANDARDS INSTITUTE **SKANSKA SVERIGE AB** SP SVERIGES TEKNISKA FORSKNINGSINSTITUT **SPECTROGON AB** SSAB AB **STENA METALL** STIFTELSEN CHALMERS INDUSTRITEKNIK **STIFTELSEN FÖR STRATEGISK FORSKNING, SSF** STOCKHOLMS AFFÄRSÄNGLAR AB **STORA ENSO AB** STRONGHOLD INVEST AB **STUDSVIK AB** SVEASKOG AB **SWECO AB** SWEDAC, STYRELSEN FÖR ACKREDITERING OCH TEKNISK KONTROLL **SWEDBANK AB** SWEDFUND INTERNATIONAL AB **SVENNERSTÅL & PARTNERS AB** SVENSK ENERGI **SVENSK EXPORTKREDIT, AB** SVENSK KÄRNBRÄNSLEHANTERING AB (SKB) **SVENSKA CELLULOSA AKTIEBOLAGET SCA** SVENSKA HANDELSBANKEN AB **SVENSKA KRAFTNÄT** SVENSKA LANTCHIPS AB **SVENSKA PETROLEUM EXPLORATION AB** SVENSKA RISKKAPITALFÖRENINGEN **SVENSKT FLYGINTRESSE AB** SWEREA AB **SYNCRON INTERNATIONAL AB** SYSAV **SYSTEMBOLAGET AB** SÖDRA CELL AB **TALENT EYE AB** TEKNIKFÖRETAGEN **TELE2 AB** TELIASONERA AB **TETRA LAVAL GROUP** TIETO CORPORATION **TILLVÄXTVERKET** TRAFIKVERKET **TREDJE AP-FONDEN** TRITON ADVISERS (NORDIC) AB **TVAA AB** TYRÉNS AB **UBS** UNDERTAKSKILLARNA I GÖTEBORG AB **UU INNOVATION** WALLENIUS LINES AB **WALLIN & KRÖNSTRÖM AB** WASATORNET, FÖRVALTNINGS AB **VATOR CAPITAL AB** VATTENFALL AB **VERYDAY AB** WHETSTONE SOLUTIONS **VINNOVA** VOLVO AB **ÅF AB** ÅFORSK, ÅNGPANNEFÖRENINGENS FORSKNINGSSTIFTELSE

”Consensus driven science-based advice”

IVA’s strategic areas

- Increased competitiveness for Sweden
- Sustainable development

IVA's projects

IVA organises projects in a variety of areas. The projects involve numerous decision makers and experts, and typically run for 2 years.

Project portfolio March 2016

Pre projects
(to become *Ongoing projects*)

- Digitilisation

Ongoing projects
(normally < 2 years)

- Electricity Crossroads
- Attraction for Sustainable Growth
- Resource Efficiencient Business Models
- Technology Leap
- Digital learning (NTA)
- Research Policy for Sweden
- Good Cities for the Future
- Forestry Innovation

Longer term projects
(> 3 years)

- Mentor4Research
- Energy Book
- Prins Daniel´s Fellowship
- Wallenberg Academy Fellows
- Royal Technology Mission

International co-operation

Euro-CASE
The European Council of Academies of Applied Sciences, Technologies and Engineering

CAETS
International Council of Academies of Engineering and Technological Sciences

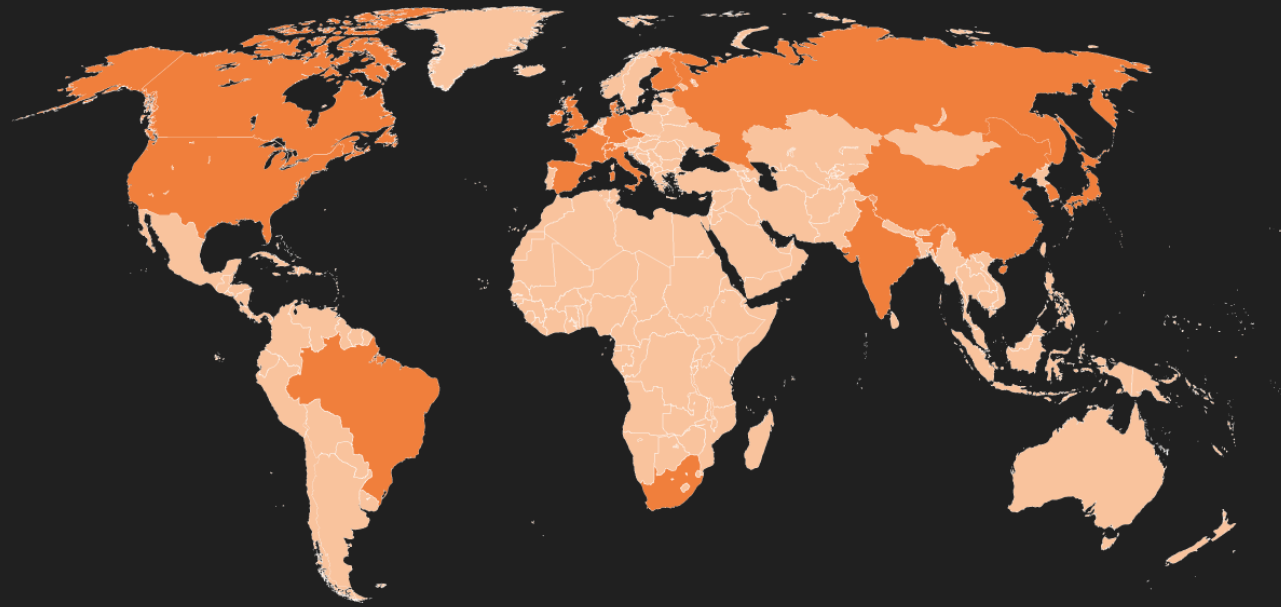
Euro-CASE

The European Council of Academies of Applied Sciences, Technologies and Engineering

Euro-CASE 22 member academies

The 23rd (!) Royal Technology Mission went to Japan

Japan February 15-20, 2016 – when to Bulgaria?



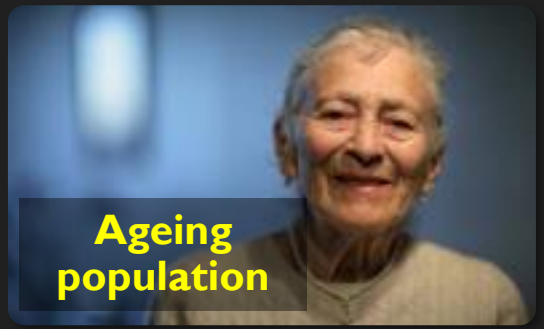
United States (1984), **Japan** (1985), **West Germany** (1986), **Italy** (1987), **England** (1989), **Japan** (1990), **Switzerland/France** (1992), **Denmark** (1994), **South Korea** (1994), **South Africa** (1996), **Brazil** (1998), **Canada** (1999), **Ireland** (2001), **Italy** (2003), **England** (2004), **India** (2005), **Russia** (2007), **Spain** (2009), **China** (2010), **Czech Republic** (2012), **Brazil** (2013), **Finland** (2014), **Japan** (2016)

2. The changing world

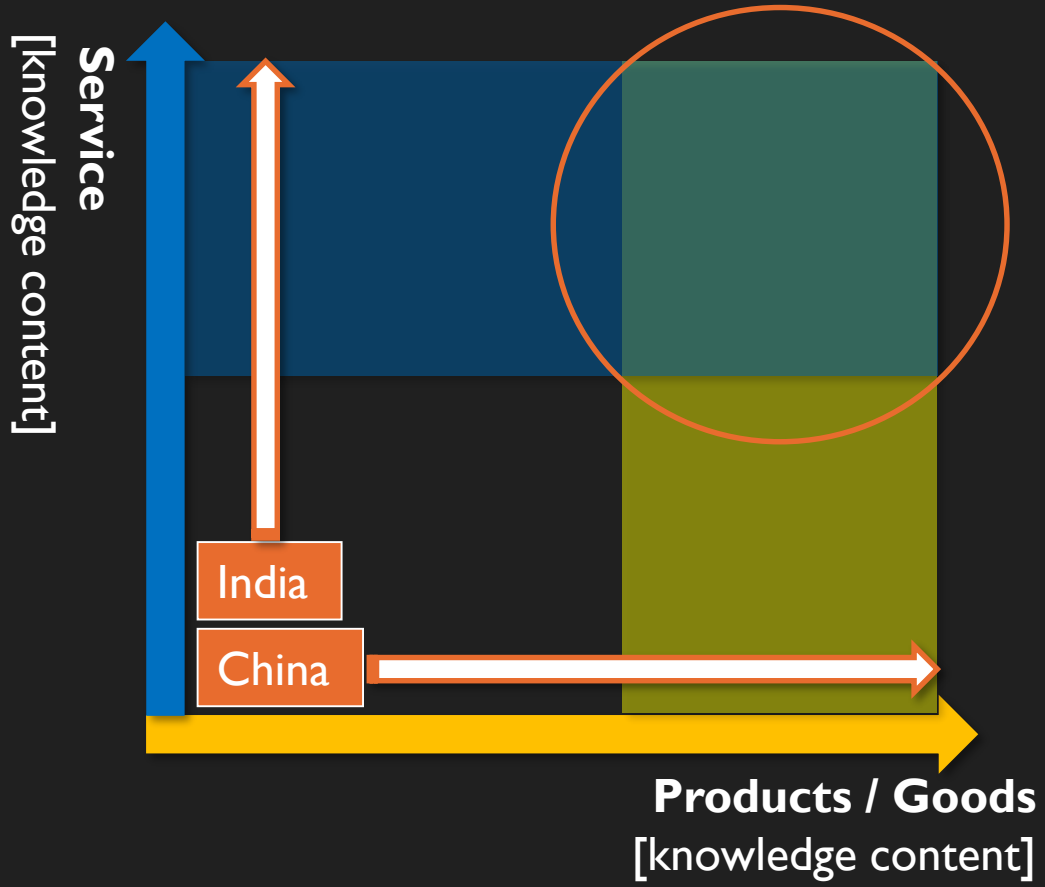
- ”Innovation is the word”

Knowledge to improve our society

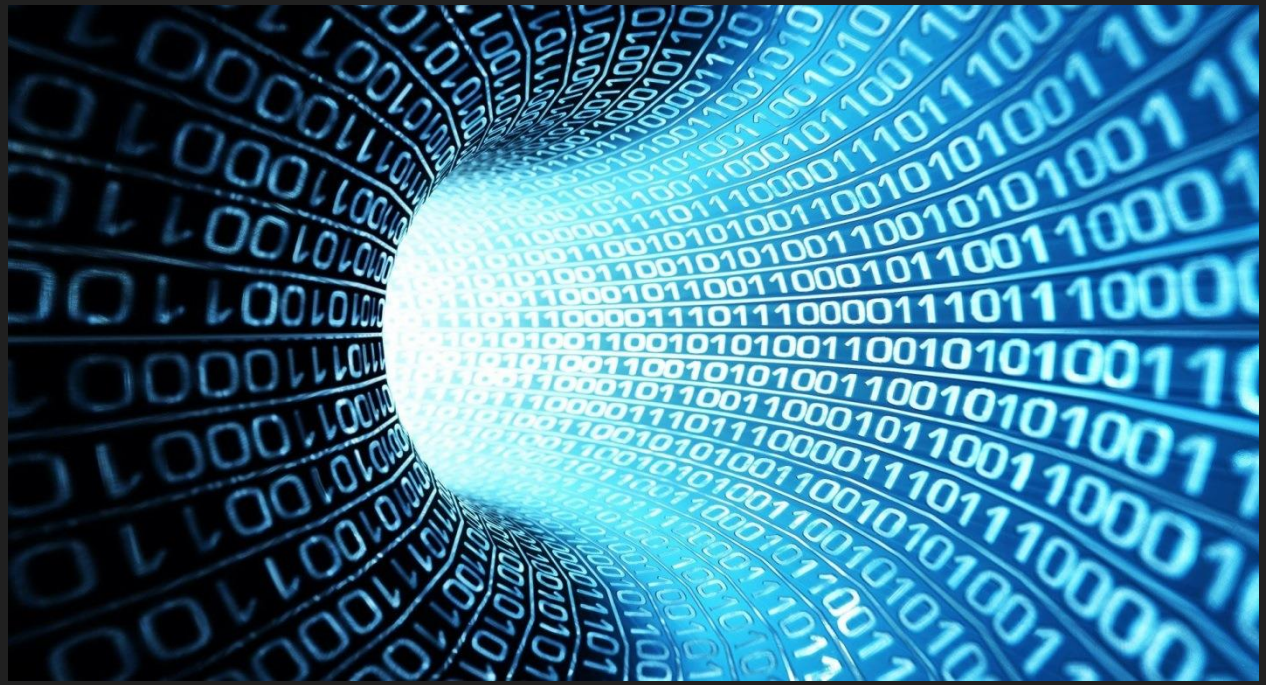
Grand Societal Challenges



Knowledge for competiveness



Digitilization is generating new business models



Mass production of goods

It made advanced *products* available and affordable

Mass production of services

Digitilization makes advanced *services* available and affordable

Mass production of services

Protests against Uber all over the world

On demand economy

Globalization of services

On demand global markets

- Uber; the worlds largest taxi company
- Airbnb; the worlds largest hotel company
- SpoonRocket; restaurant food
- Instacart; refills your refridgirator
- Medicast; a doctor within 2 hours
- Axiom; legal services
- Eden McCallum; consultancy

- *On demand* labour (”freelancers”)
  - Frelancer.com; work force of 9,3 (!) million individuals registrered

So, how can we navigate in a rapidly changing world?

Enjoy the ride!

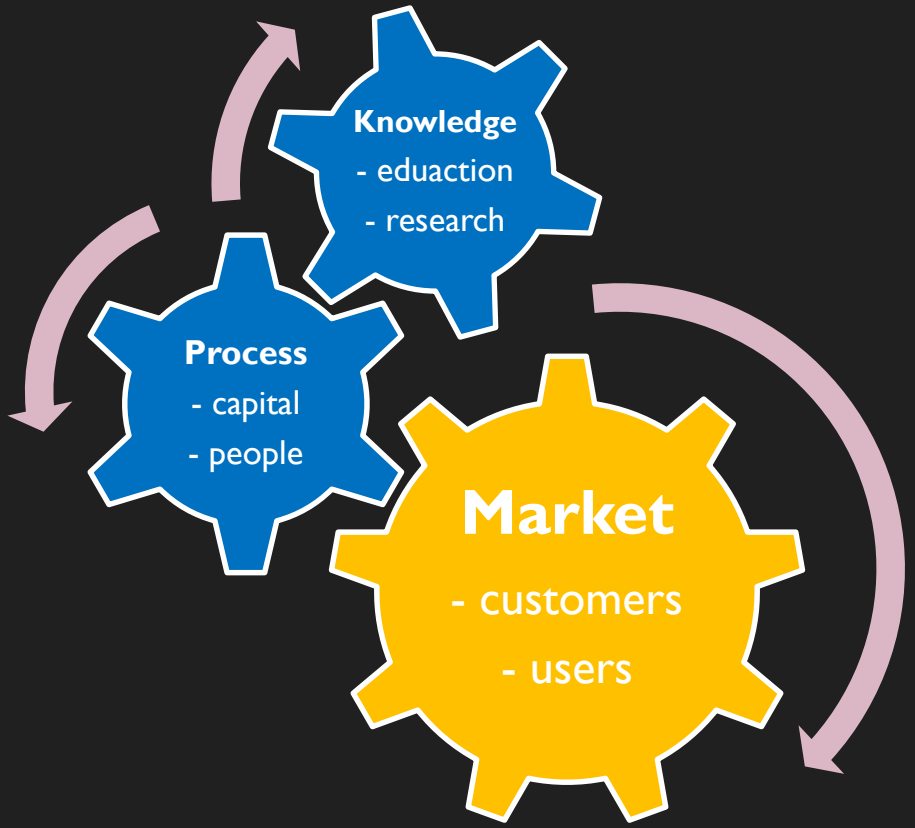
Innovation

When knowledge come to use, often on a market

A new product as goods	 Mobile phone	Product innovation
A new product as a service	 Internet bank	Service innovation
A new way of forming an organisation	TOYOTA Lean Management	Organizational innovation
A new market or a way to reach new markets	UBER Uber	Business model innovation
New competencies resources or materials	 Maxfas - Material replacing gold	Input innovation

Innovation is simple in theory

Harder in practise



And, how can innovation be promoted in society?

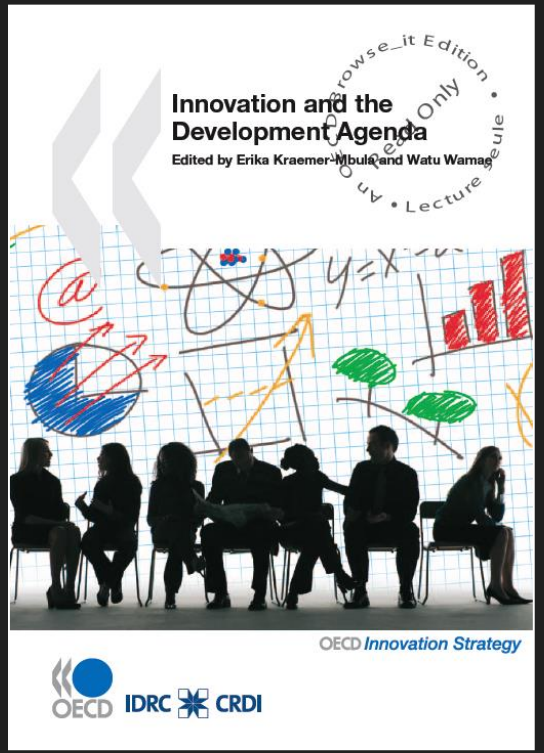
What is the role of government?

OECD

Innovation and the Development Agenda

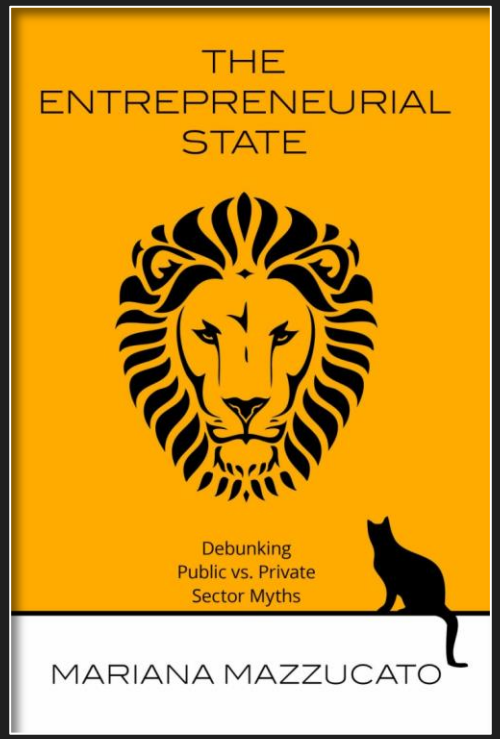
Governments should

- Focus on creating good conditions for innovation.
- Stimulate demand side but don't pick winners through grants.



Prof. Mariana Mazzucato, Univ. of Sussex

”The state is the real engine of innovation”



The state is the real engine of innovation

Book review

A brilliant exploration of new ideas in business argues that government is behind the boldest risks and biggest breakthroughs, writes Martin Wolf

The Entrepreneurial State

Debunking Public vs Private Sector Myths

By Mariana Mazzucato

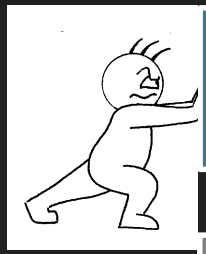
(Anthem Press, £14.99, $18.95)

TED

Ideas worth spreading

Role of universitites in the innovation process

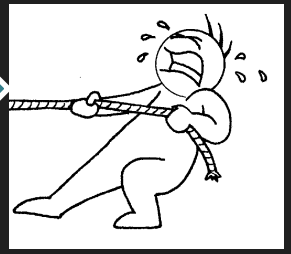
The linear ”push” model for innovation is not sufficient



Basic Research

Applied Research

Product Development



PUSH

Ideas from academic discovery research

Academy

Business

PULL

Ideas from defined market needs

3. Competiveness in Sweden

- Attraction for sustainable growth

Sweden – The Viking age 1000 years ago

Traders, not (only) savagers and conquerers

Sweden – an innovation leader today

Global Innovation Index	
Global Creativity Index	
Global Democracy Index	
OECD Better Life Index	
Digital Evolution Index	

Sweden: ”The country with the largest number of large cap companies *per capita*” (source: OECD)

Swedish economy is based on innovation & entrepreneurship

Export is more than 50% of GDP

Forestry/Paper

Mining/Metal

Service/Trade

Cars/Trucks

Airforce/Defence

Pharma/Biotech

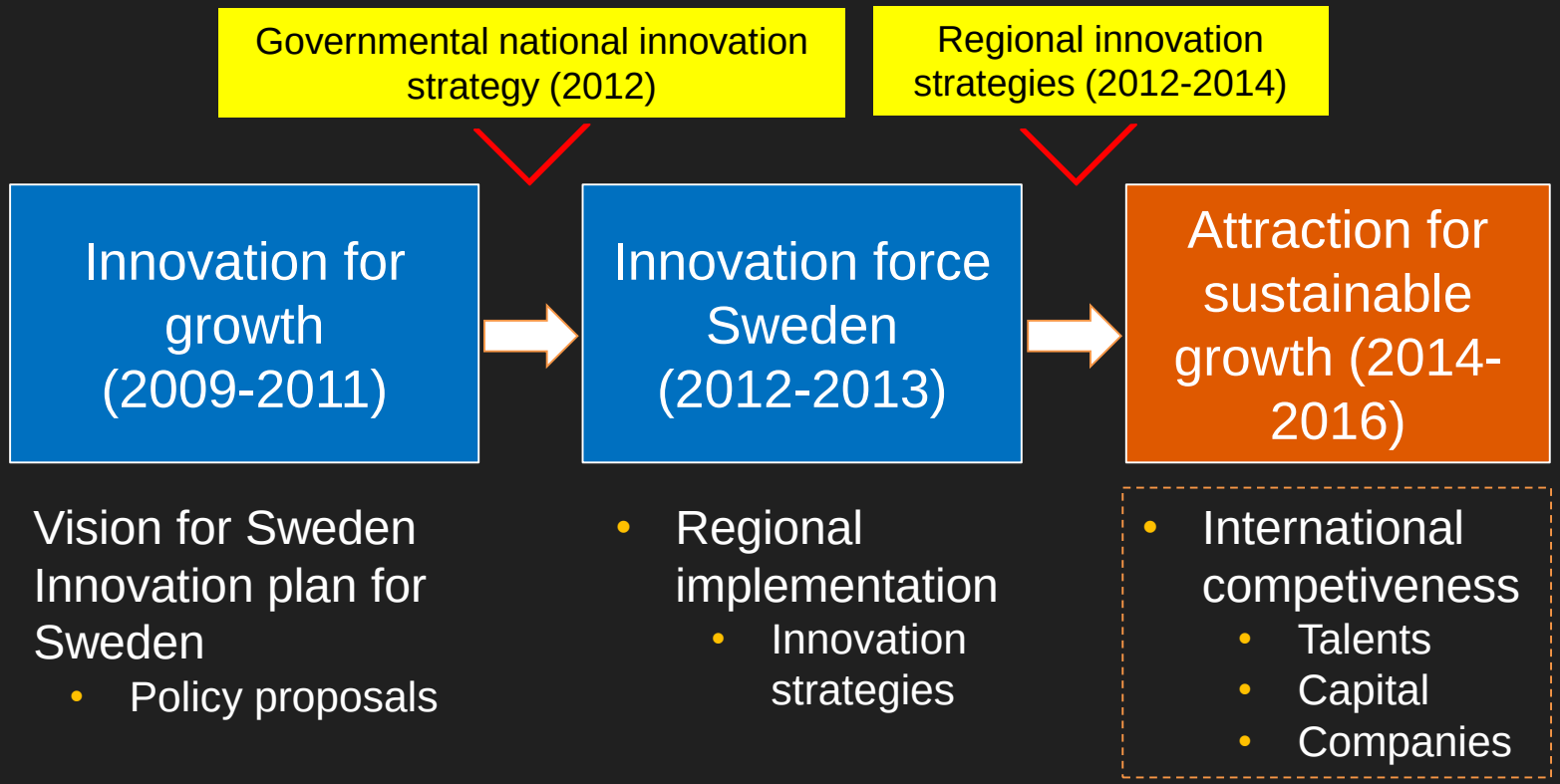
ICT

CleanTech


Åke Senning
Heart & lung machine
Jonas Wenström
Three phase electricity
Baltzar von Platen
Refrigerator
Gustaf Dalén
AGA light houses
Alfred Nobel
Dynamite
Axel Wennergren
Electrolux
Ruben Rausing
Liquid food packaging
Gustaf DeLaval
Separator
L M Ericsson
Telephone (Ericsson AB)
J P Johansson
Adjustable Wrench
Rune Elmquist
Pacemaker
Sven Wingquist
Ball bearings (SKF)
Erik Bratt
Saab35 ”Draken” FighterJet
Carl Munters
Refrigerator

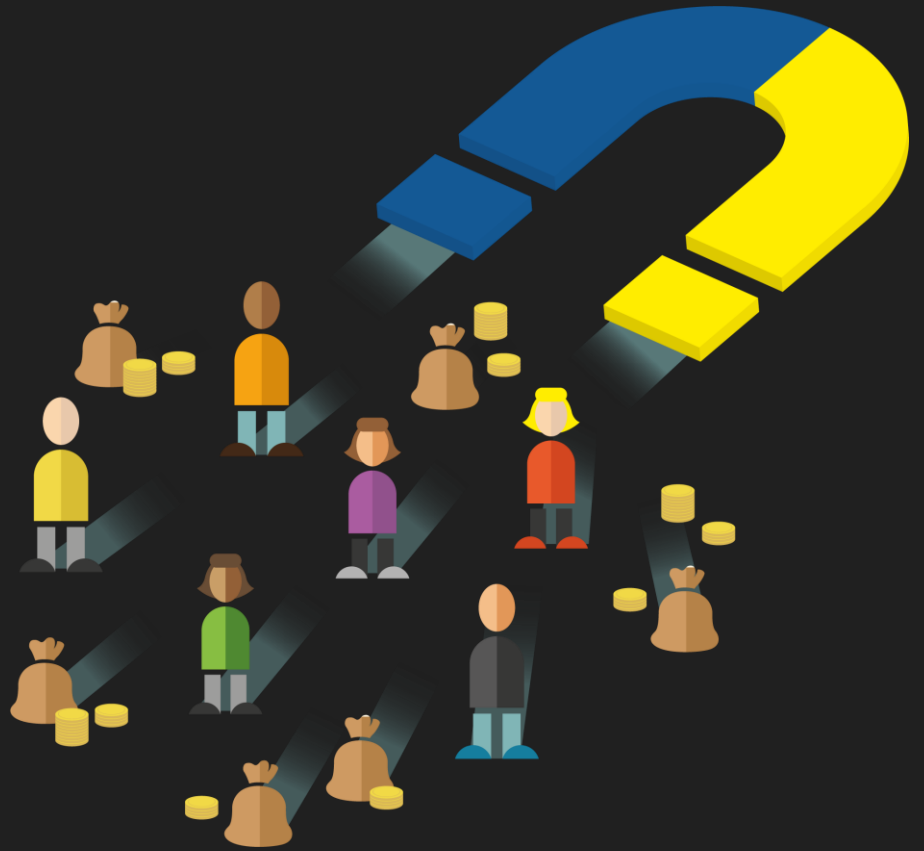
Innovation projects at IVA

Policy proposals as independent science based advice



How attractive is Sweden today?

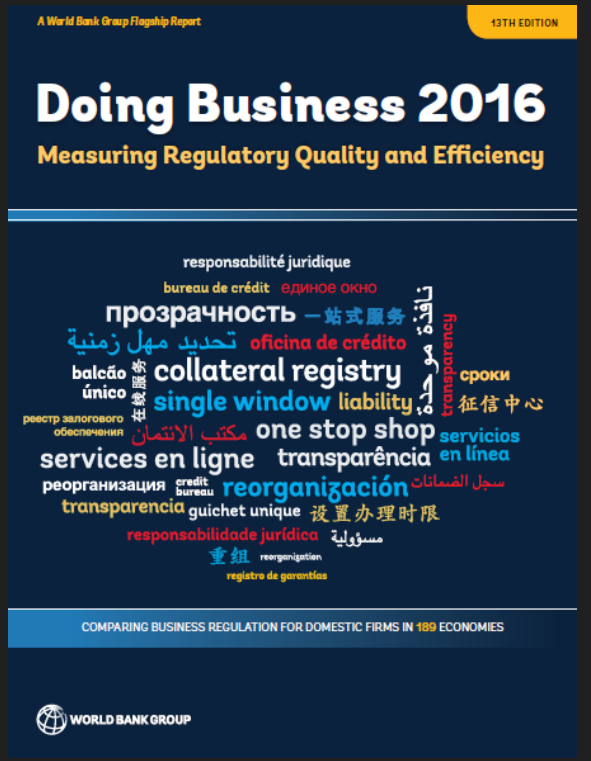
- Capital
- Companies
- Talents



Doing Business 2016 (World Bank Group)

How is the realtive business climate in a country / region? (348 pages!)

- *Ease of Doing Business Index* is based on parameters to describe the regulatory system, the efficacy of the bureaucracy and the nature of business governance
  - Regulations to start a business, construction permits, getting electricity, registering property, getting property, protecting minority investors, paying taxes, trade across borders, enforcing contracts, resolving insolvency
- "….may not seem important to the lay observer, but they have huge long-run implications for an economy's health, performance and growth"



Doing Business 2016 (World Bank Group)

Ease of Doing Business Index 2016

- Ease of Doing Business Index 2016? (189 countries)
  - Singapore (Place 1)
  - USA (place 7)
  - Sweden (place 8)
  - Bulgaria (place 38)
  - China (place 84)
  - India (place 130)

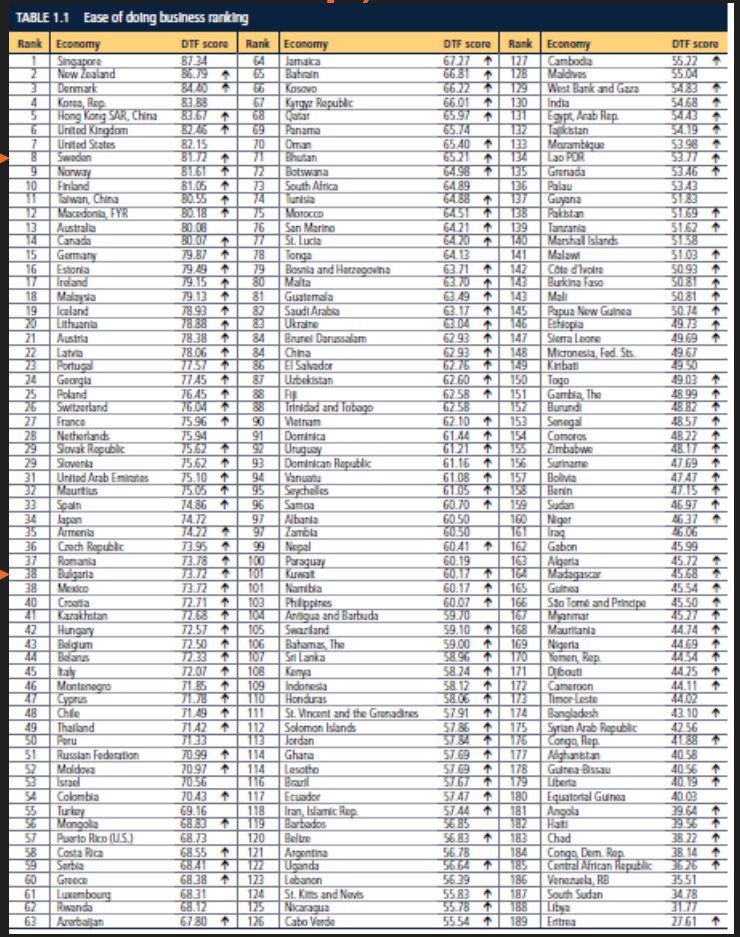
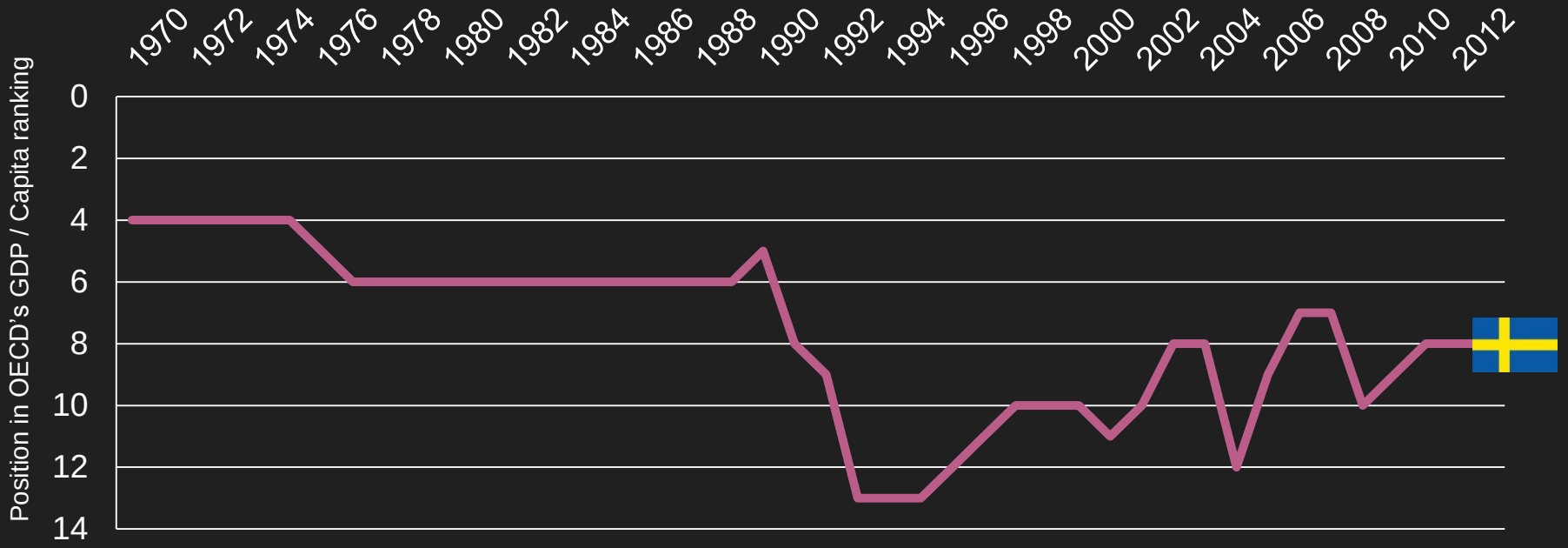


TABLE 1.1 Ease of doing business ranking

Rank	Economy	DTF score	Rank	Economy	DTF score	Rank	Economy	DTF score
1	Singapore	87.34	64	Jamaica	67.27	127	Cambodia	55.22
2	New Zealand	86.79	65	Bahrain	66.81	128	Maldives	55.04
3	Denmark	84.40	66	Kosovo	66.22	129	West Bank and Gaza	54.83
4	Korea, Rep.	83.88	67	Kyrgyz Republic	66.01	130	India	54.68
5	Hong Kong SAR, China	83.67	68	Qatar	65.97	131	Egypt, Arab Rep.	54.43
6	United Kingdom	82.46	69	Panama	65.74	132	Tajikistan	54.19
7	United States	82.15	70	Oman	65.40	133	Mozambique	53.98
8	Sweden	81.72	71	Bhutan	65.21	134	Lao PDR	53.77
9	Norway	81.61	72	Botswana	64.98	135	Grenada	53.46
10	Finland	81.05	73	South Africa	64.89	136	Palau	53.43
11	Taiwan, China	80.55	74	Tunisia	64.88	137	Guyana	51.83
12	Macedonia, FYR	80.18	75	Morocco	64.51	138	Pakistan	51.69
13	Australia	80.08	76	San Marino	64.21	139	Tanzania	51.62
14	Canada	80.07	77	St. Lucia	64.20	140	Marshall Islands	51.58
15	Germany	79.87	78	Tonga	64.13	141	Malawi	51.03
16	Estonia	79.49	79	Bosnia and Herzegovina	63.71	142	Côte d'Ivoire	50.93
17	Ireland	79.15	80	Malta	63.70	143	Burkina Faso	50.81
18	Malaysia	79.13	81	Guatemala	63.49	143	Mali	50.81
19	Iceland	78.93	82	Saudi Arabia	63.17	145	Papua New Guinea	50.74
20	Lithuania	78.88	83	Ukraine	63.04	146	Ethiopia	49.73
21	Austria	78.38	84	Brunei Darussalam	62.93	147	Sierra Leone	49.69
22	Latvia	78.06	84	China	62.93	148	Micronesia, Fed. Sts.	49.67
23	Portugal	77.57	86	El Salvador	62.76	149	Kiribati	49.50
24	Georgia	77.45	87	Uzbekistan	62.60	150	Togo	49.03
25	Poland	76.45	88	Fiji	62.58	151	Gambia, The	48.99
26	Switzerland	76.04	88	Trinidad and Tobago	62.58	152	Burundi	48.82
27	France	75.96	90	Vietnam	62.10	153	Senegal	48.57
28	Netherlands	75.94	91	Dominica	61.44	154	Comoros	48.22
29	Slovak Republic	75.62	92	Uruguay	61.21	155	Zimbabwe	48.17
29	Slovenia	75.62	93	Dominican Republic	61.16	156	Suriname	47.69
31	United Arab Emirates	75.10	94	Vanuatu	61.08	157	Bolivia	47.47
32	Mauritius	75.05	95	Seychelles	61.05	158	Benin	47.15
33	Spain	74.86	96	Samoa	60.70	159	Sudan	46.97
34	Japan	74.72	97	Albania	60.50	160	Niger	46.37
35	Armenia	74.22	97	Zambia	60.50	161	Iraq	46.06
36	Czech Republic	73.95	99	Nepal	60.41	162	Gabon	45.99
37	Romania	73.78	100	Paraguay	60.19	163	Algeria	45.72
38	Bulgaria	73.72	101	Kuwait	60.17	164	Madagascar	45.68
38	Mexico	73.72	101	Namibia	60.17	165	Guinea	45.54
40	Croatia	72.71	103	Philippines	60.07	166	São Tomé and Principe	45.50
41	Kazakhstan	72.68	104	Antigua and Barbuda	59.70	167	Myanmar	45.27
42	Hungary	72.57	105	Swaziland	59.10	168	Mauritania	44.74
43	Belgium	72.50	106	Bahamas, The	59.00	169	Nigeria	44.69
44	Belarus	72.33	107	Sri Lanka	58.96	170	Yemen, Rep.	44.54
45	Italy	72.07	108	Kenya	58.24	171	Djibouti	44.25
46	Montenegro	71.85	109	Indonesia	58.12	172	Cameroon	44.11
47	Cyprus	71.78	110	Honduras	58.06	173	Timor-Leste	44.02
48	Chile	71.49	111	St. Vincent and the Grenadines	57.91	174	Bangladesh	43.10
49	Thailand	71.42	112	Solomon Islands	57.86	175	Syrian Arab Republic	42.56
50	Peru	71.33	113	Jordan	57.84	176	Congo, Rep.	41.88
51	Russian Federation	70.99	114	Ghana	57.69	177	Afghanistan	40.58
52	Moldova	70.97	114	Lesotho	57.69	178	Guinea-Bissau	40.56
53	Israel	70.56	116	Brazil	57.67	179	Liberia	40.19
54	Colombia	70.43	117	Ecuador	57.47	180	Equatorial Guinea	40.03
55	Turkey	69.16	118	Iran, Islamic Rep.	57.44	181	Angola	39.64
56	Mongolia	68.83	119	Barbados	56.85	182	Haiti	39.56
57	Puerto Rico (U.S.)	68.73	120	Belize	56.83	183	Chad	38.22
58	Costa Rica	68.55	121	Argentina	56.78	184	Congo, Dem. Rep.	38.14
59	Serbia	68.41	122	Uganda	56.64	185	Central African Republic	36.26
60	Greece	68.38	123	Lebanon	56.39	186	Venezuela, RB	35.51
61	Luxembourg	68.31	124	St. Kitts and Nevis	55.83	187	South Sudan	34.78
62	Rwanda	68.12	125	Nicaragua	55.78	188	Libya	31.77
63	Azerbaijan	67.80	126	Cabo Verde	55.54	189	Eritrea	27.61

A rich country

In GDP / capita



Source: OECD

>50% of Swedish GDP is based on export

Sweden's most important export countries are in Europe

[*Keys to greater attractiveness and competiveness*, IVA, November 2015]

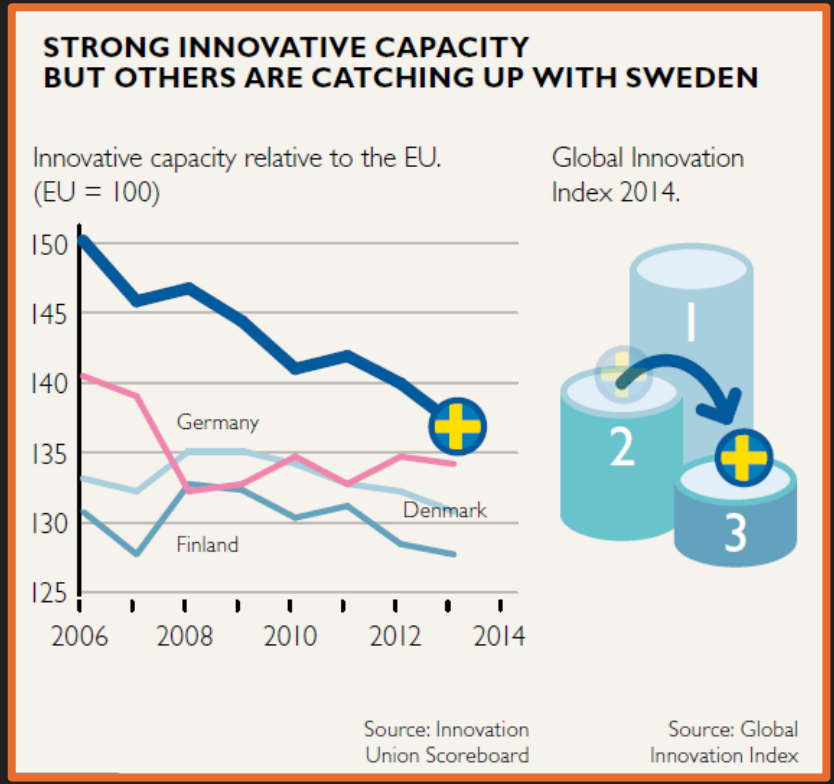
Sweden has a strong brand

Place #10 in the world

[*Keys to greater attractiveness and competiveness*, IVA, November 2015]

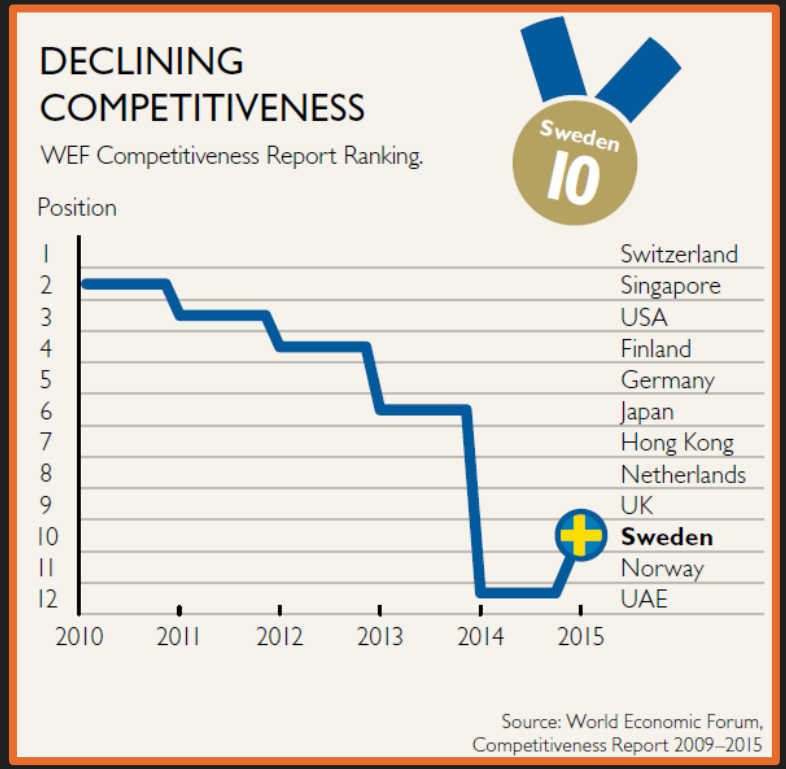
Swedish has a strong innovative capacity

But other nations are catching up



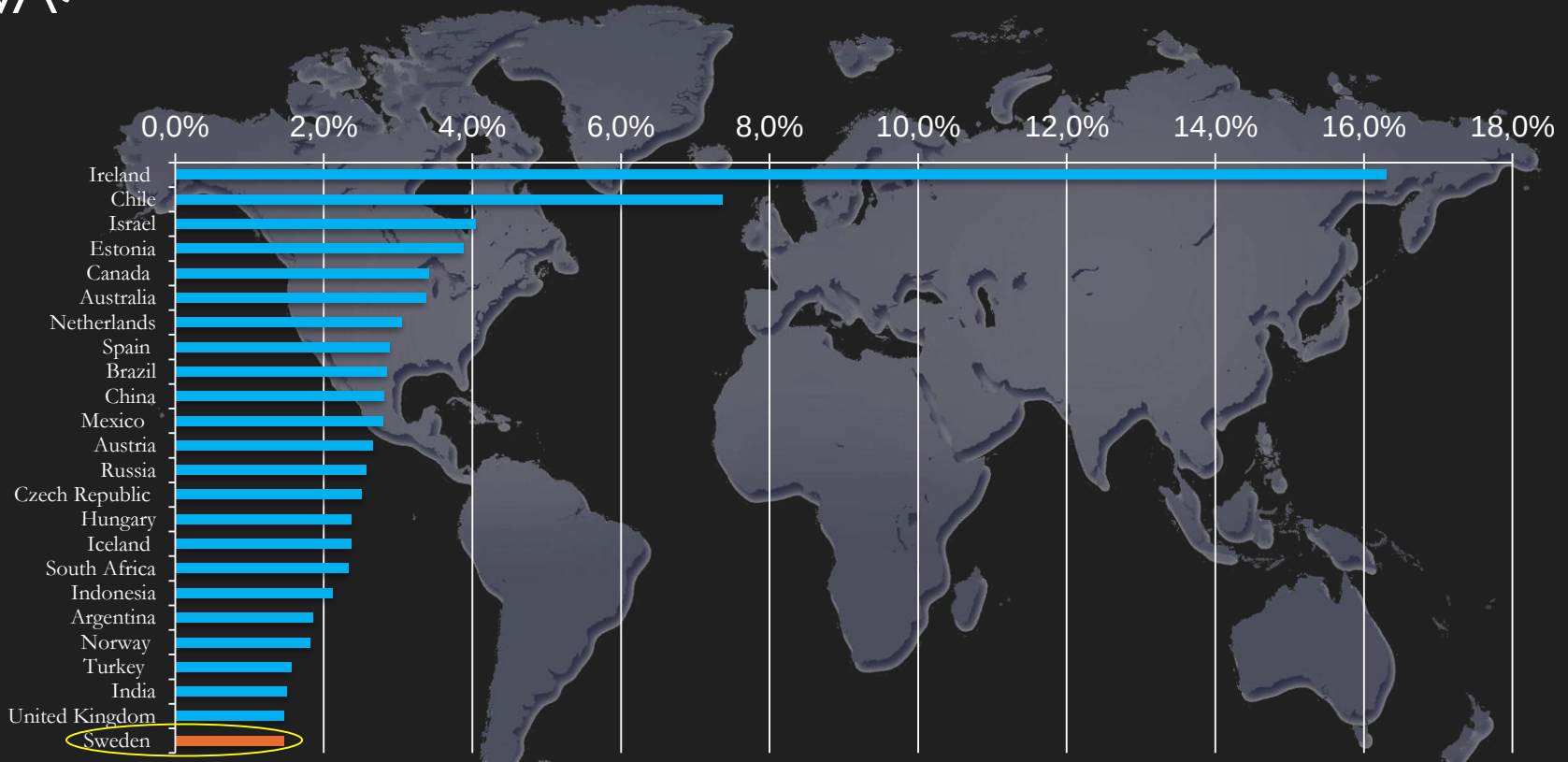
[*Keys to greater attractiveness and competiveness*, IVA, November 2015]

Declining competiveness
World Economic Forum report rankings



[Keys to greater attractiveness and competiveness, IVA, November 2015]

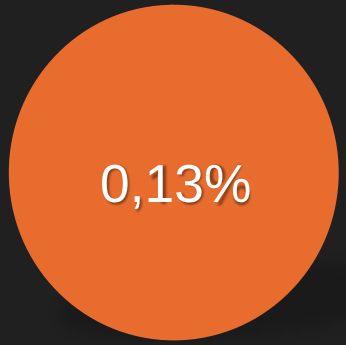
Foreign direct investments



Source: OECD, FDI flows as percentage of GDP 2013

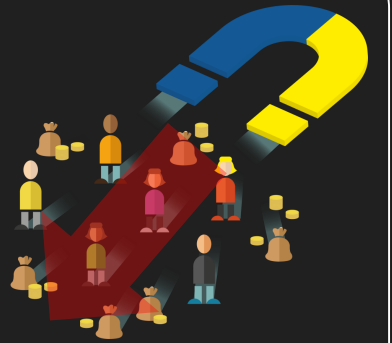
[Keys to greater attractiveness and competiveness, IVA, November 2015]

Summary of innovation challenges for Sweden



An export dependent very small country

Leader today.
A follower tomorrow?



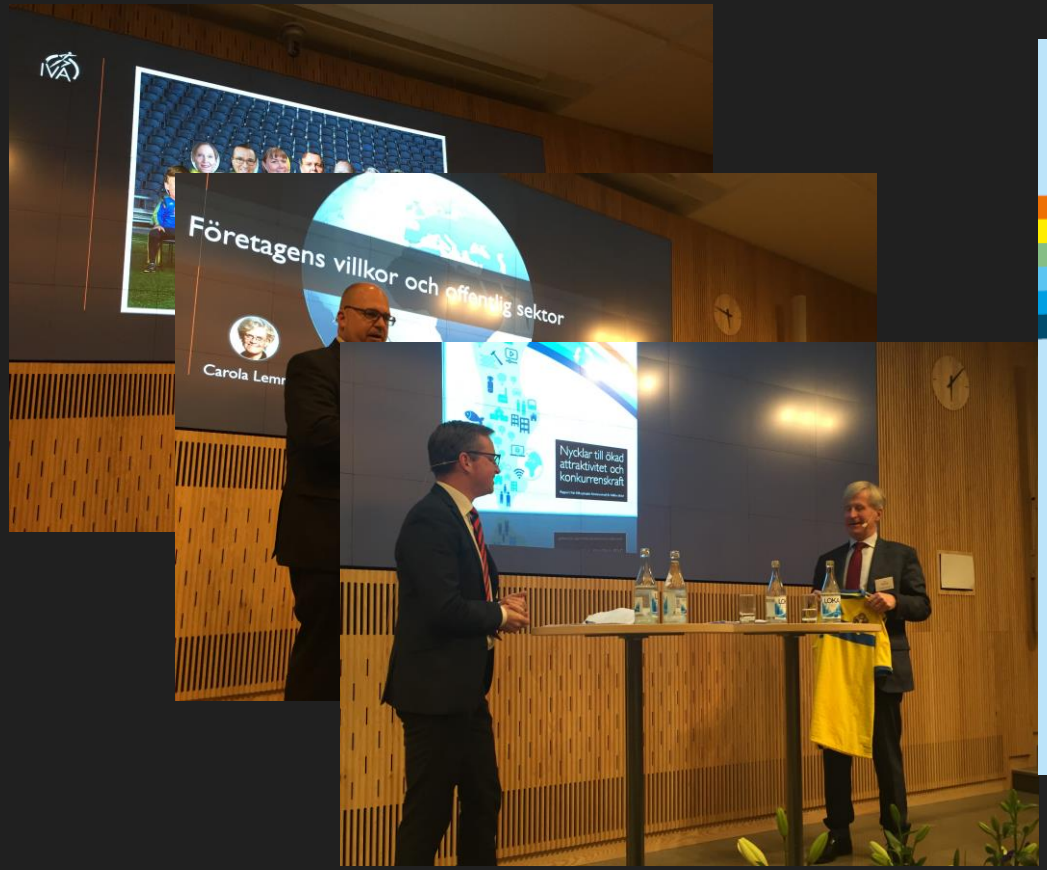
Weak international attractiveness

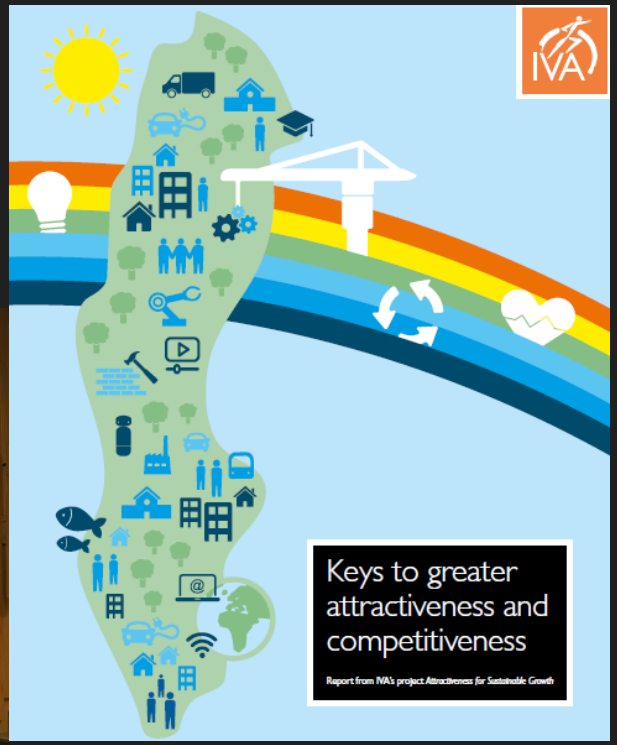
It's time to take actions!

[*Keys to greater attractiveness and competiveness*, IVA, November 2015]

Attraction for sustainable growth

Final report November 4, 2015





Attraction for sustainable growth

An eight points agenda

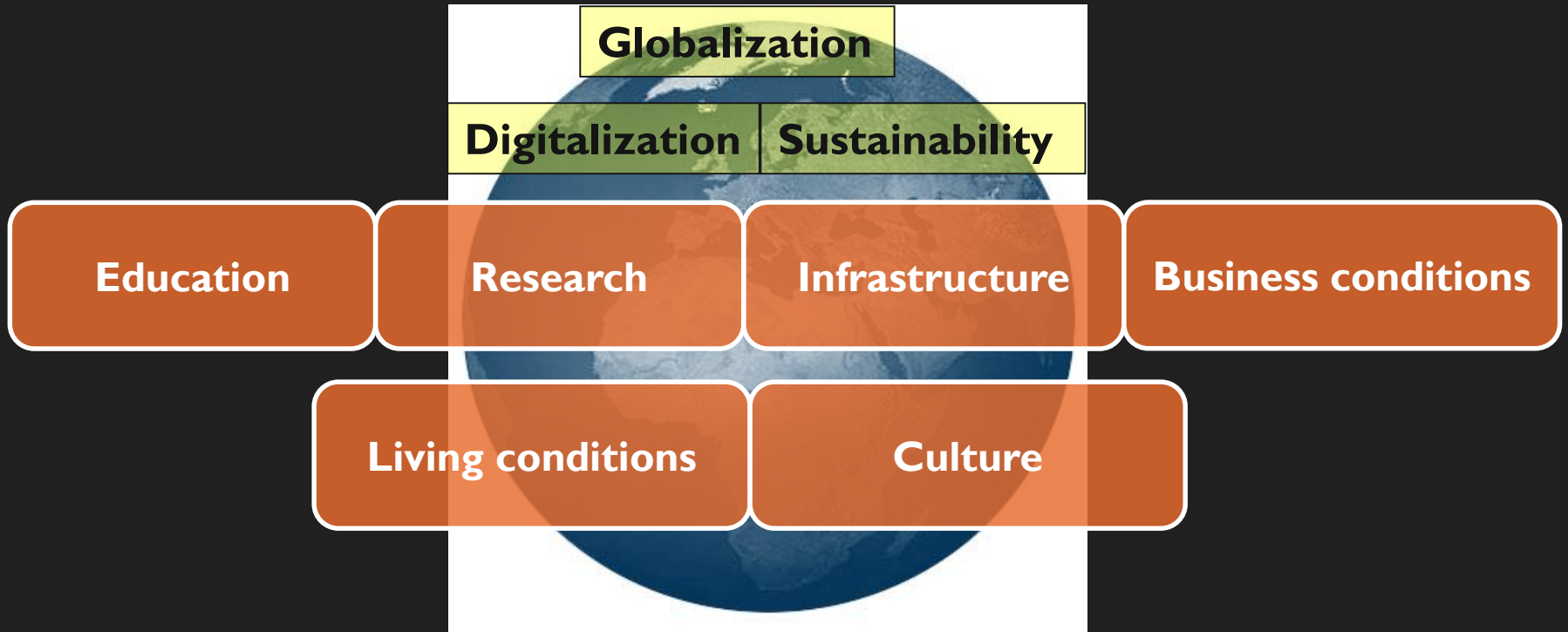
1. Secure internationally competitive conditions for our business sector.
2. Adapt a tax system providing sufficient revenue for welfare without negatively affecting the desire of individuals and businesses to take on new challenges.
3. Equip individuals for change and lifelong learning.
4. Give teachers a real chance to improve instruction in schools – the classroom is the place where quality is determined.
5. Set clear goals for international competitiveness for Swedish universities.
6. Pay back the infrastructure debt with interest.
7. Break down old obstacles to solve the Swedish housing crisis.
8. Pick up the pace of development of an innovation-friendly public sector.

4. Concluding remarks

Conclusions

”Crush course for governments in policy making to promote innovation”

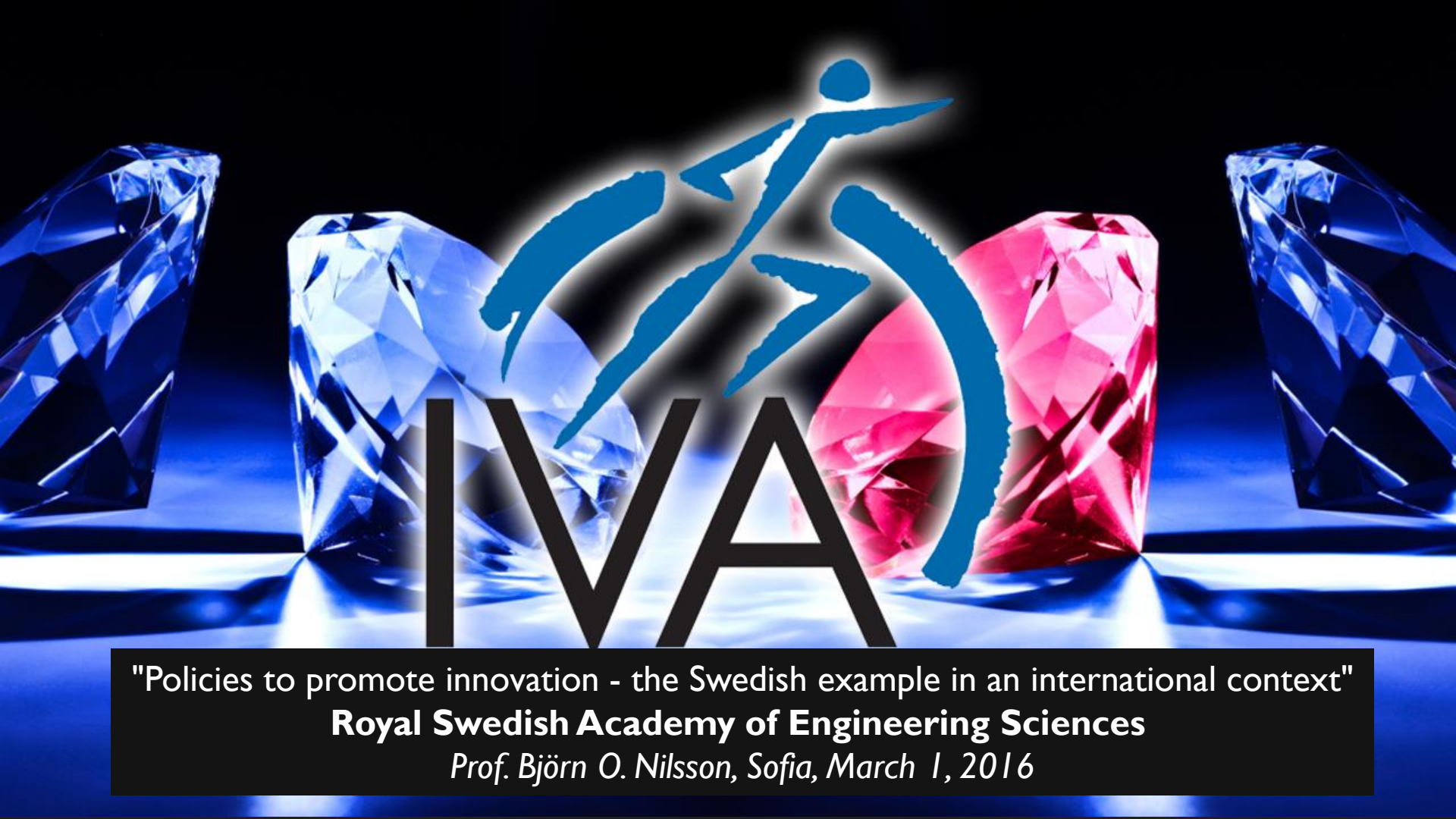
Key areas to promote innovation and entrepreneurhip



Innovation must come from a viable idea

A bad invention will never succeed on the market and become an innovation

5. *Questions, Answers, Comments and Discussion*



"Policies to promote innovation - the Swedish example in an international context"

Royal Swedish Academy of Engineering Sciences

Prof. Björn O. Nilsson, Sofia, March 1, 2016