



Construction R&D investments in Denmark

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Photo: Kim Haugbølle

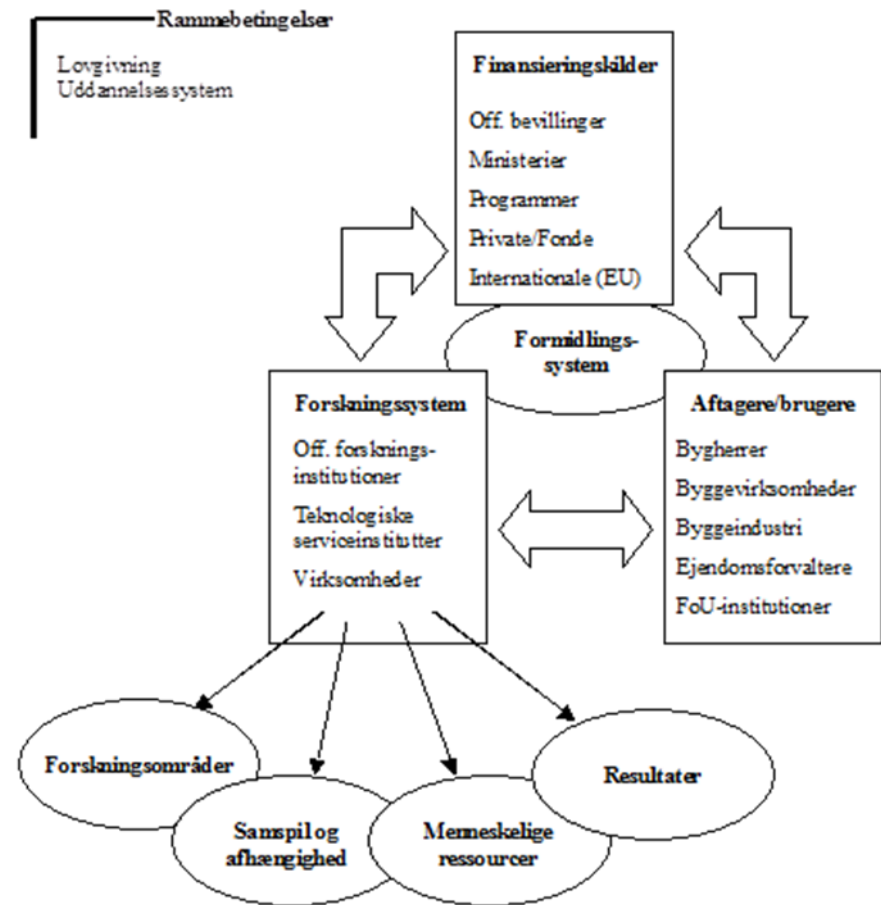
Background

- Policy reports
 - Resource area analysis of 1993 and 2000
 - Byggeriets Task Force in 2000
- Previous construction R&D studies
 - Indicative, but inconclusive due to small studies
- Construction R&D committee



Research design: Adapted Triple Helix

- Holistic approach: Resource area building/housing
 - Primary industries (raw materials like gravel etc.)
 - Manufacturing industries (building components like windows etc.)
 - Service industries (contractors, consultants etc.)
 - Supporting industries (technological service institutes etc.)



Organisational structure

- More than 200 knowledge institutions and brokers
- Five (six) core institutions
 - Danish Building Research Institute
 - Department of Building Technology, Aalborg University
 - BYG-DTU, Technical University of Denmark
 - The Royal Danish Academy of Fine Arts, School of Architecture
 - Aarhus School of Architecture
 - (Danish Technological Institute, Division Building Technology)

Public R&D



	AAU Building Technology	DTU BYG•DTU	KARCH	AAA	SBi	DTI Building Technology
Basic public funding	16.1 (66 %)	29 (66 %)	24 (89 %)	12.2 (70 %)	32.2 (54 %)	6.6 (12 %)
Private foundations	1.2 (5 %)	1 (2 %)	0.1 (0.3 %)	0.7 (4 %)	0.3 (0.5 %)	
Public programs	3.4 (14 %)	2 (4.5 %)	0.1 (0.3 %)	3.4 (19 %)	3.8 (6 %)	6.6 (12 %)
Public sources	3.4 (14 %)	7 (16 %)	2.8 (10 %)	1.3 (7 %)	20.2 (34 %)	
Private firms	0 (0 %)	2 (4.5 %)	0 (0 %)	0 (0 %)	2 (3 %)	39 (71 %)
International sources	0.2 (1 %)	3 (7 %)	0.1 (0.3 %)	0 (0 %)	0.9 (1.5 %)	2.8 (5 %)
R&D total	24.3 (100 %)	44 (100 %)	27 (100 %)	17.5 (100 %)	59.4 (100 %)	55 (100 %)



Public R&D in sum

- Some 275-325 million DKK in total public R&D
 - Some 175 million DKK (EUR) in five core public institutions
 - Some 100-150 million DKK at all other public research institutions
- Technological service institute
 - Some 55 million DKK at DTI (by definition private institution)
- Some 3 % of total public R&D expenditure



Private R&D

Source of financing	R&D income (mio. DKK)	Distribution
Public financing	128	7 %
Own financing	1,446	80 %
Other private companies	113	6 %
Other Danish financing	10	1 %
Foreign financing	101	6 %
Sum	1,799	100 %



Resource areas compared

Resource area	R&D expenditure (million DKK)	Turnover (million DKK)	R&D share of turnover
Medico/health	6,172	71,343	8.65%
IT/communication	5,046	281,974	1.79%
Other business	2,843	246,539	1.15%
Building/housing	1,799	329,028	0.55%
Energy/environment	902	177,683	0.51%
Transport	641	224,357	0.29%
Food	1,128	488,882	0.23%
Furniture/clothing	143	94,060	0.15%



Roadmap: Scale and focus

- Increase funding of 120 million DKK annually
 - Through a percentage of the budget of new building projects
- Establish innovation consortiums within strategic areas
- Convert basic funds
 - Through increased competition and new types of performance contracts
- Increase number of researchers and university research
 - Through a new research program with special focus on post-graduate studies



Roadmap: Learning in construction

- Establish a central knowledge (one-stop-shopping) to better coordinate dissemination of knowledge from institutions
- Improve dissemination to educational institutions
- Require mandatory dissemination plans for research projects
- Improve knowledge dissemination from the two national building defects funds
- Strengthen education and networks

Results?

- No innovation fund established
 - KIG (Koordinations- og InnovationsGruppen)
 - No additional funding provided
- Realdania research (277 million DKK in 2003-2010)
 - Six research centres (145 million DKK): Urban spaces, strategic urban research, housing, construction management, indoor environment, and facility management
- Innovation consortia – not direct result of roadmap
 - 1) Digitalisation (Det Digitale Byggeri) 2000-10
 - 2) Knowledge centre on energy savings 2008-11
 - 3) Sustainable industrialised construction (InnoByg) 2010-14

Results?

- Conversion of basic funds
 - Two 5 million DKK budget cuts (in 2003 and 2012) of national building research institute
 - Redistributed in calls on ad hoc themes – reduced gearing, short-termism
 - Overall 2 % efficiency cuts annually
- Increase number of researchers and university research
 - No program established
 - Lasting effect of Realdania funding?

Results?

- Organisational changes
 - University reform 1 Jan 2007 – mergers (SBI -> AAU)
 - Emergence of CLiBYG at CBS
 - DTU – separation of BYG and MAN – construction management disappeared as separate research field



Perspective

- A call for a business analysis including R&D update
- Making reliable estimates of construction R&D investments is not so straightforward

