

Open innovation – the link between universities and industry

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Agenda

- First look at universities with the University of Cambridge as an example
- Then look at industrial R&D with Shell Global Solutions as an example
- Finally, indentify areas of possible cooperation

1. The university of Cambridge

University of Cambridge - Background

- The University of Cambridge is the fourth oldest university, established in 1209
- Cambridge has contributed vastly to scientific development. Newton, Darwin and Rutherford were there. The DNA structure was discovered there. Highest number of Nobel prizes in the world
- 11 000 undergraduates, 4 500 graduates, 3 800 academic staff and 2 700 support staff

Strategic change

- In 1991, the first full time Vice Chancellor was appointed, followed in 1996 by Sir Alec Broers, who was formerly head of IBM R&D
- Against much resistance, collaboration with industry started in order to stay at the edge. Now most high-tech companies have an activity in Cambridge
- This collaboration was enhanced as corporations farm out basic research

Support for starters

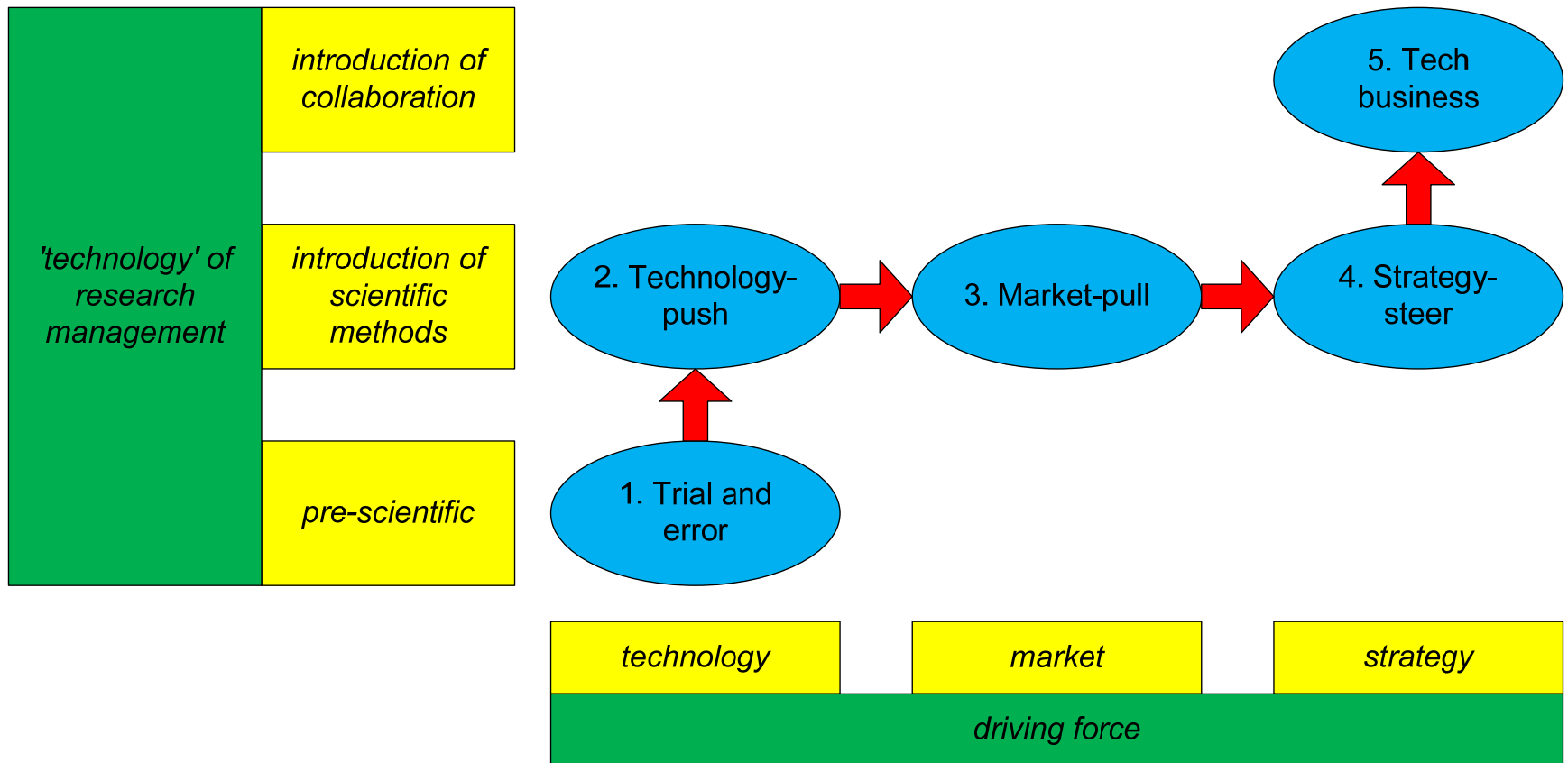
- First Science Park by Trinity College in 1970, now with 71 companies and 5000 employees
- First business incubator by St. John's College in 1987. This centre now houses 65 companies with 500 employees.
- In 1990 the Judge Management School was started and in 2003 a subsidiary, the Centre for Entrepreneurial Learning. This gives 30 courses/yr
- Cambridge Technopole Group = network of support organisations
- Cambridge Enterprises

The Cambridge Phenomenon

- In 1960: few commercial activities around the university
- Now 3000 high tech firms with direct employment of 60 000
- Development largely due to private initiative and initiatives of Colleges
- After 1996 university seeks cooperation with industry
- After 1997: government funds for commercialisation
- Business School in 1990, Centre for Entrepreneurship in 2003
- Many groups of business angels and professional service firms and other private initiative

2. Industrial R&D

Five stages of industrial R&D



Regime 1: Trial and error

- pre-scientific search for the creation of new products and production processes by the great Nineteenth century inventors such as James Watt, Thomas Edison, Daniel Bell and many others
- Although these inventors worked with the scientific insights of the time, their achievements were mainly based on a trial and error approach rather than systematic scientific research
- The development work was not carried out in dedicated laboratories but in separate rooms within the plant or just simply between the factory's machinery

Regime 2: Technology-push

- Companies started hiring scientists who would be working in university-like environments
- They were given a free hand in the pursuit of knowledge because the main 'belief' of leading enterprises was that success depended on technological excellence and leadership
- Such leadership was believed to result in innovative products that would make the company grow and compensate the costs of R&D many times over (and it did!)

Regime 3: Market-pull

- The intrinsic limitation of the Technology-Push regime came to light when the markets became more mature and the customers more demanding
- The trigger for change was created by the high inflation in the 1970s
- Companies started to ask questions about the effectiveness of the R&D effort and the results were not comforting
- Systematic management was introduced → executing properly defined research projects
- Good project management became the tool to keep research cost under control

Regime 4: Strategy-steer

- R&D becomes part of the strategic management of the firm or its business units
- Research is no longer an independent activity, but part of the overall strategic effort of the company
- The aim of R&D is to enhance the competitive power of the enterprise and its business units, supporting offensive as well as defensive strategies

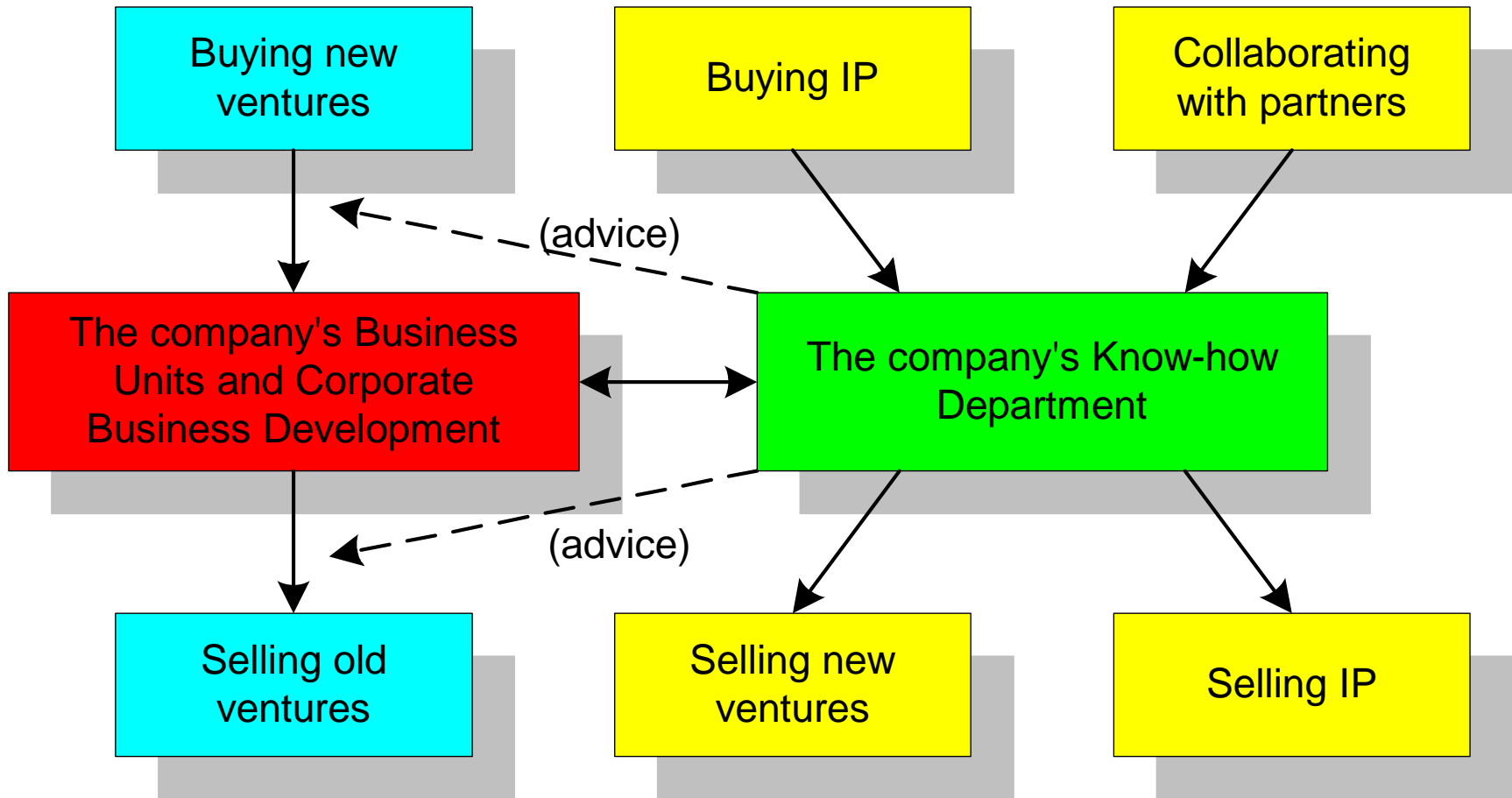
Regime 5: Tech-business

- R&D becomes a profit centre
- It can work for internal clients as well as externals
- Basic research is farmed out
- The company will only carry out those activities in which it has a leading edge; the rest can be outsourced
- Emphasis shifted from technology management to innovation management and research became part of a value chain that clearly created value

Shell Global Solutions

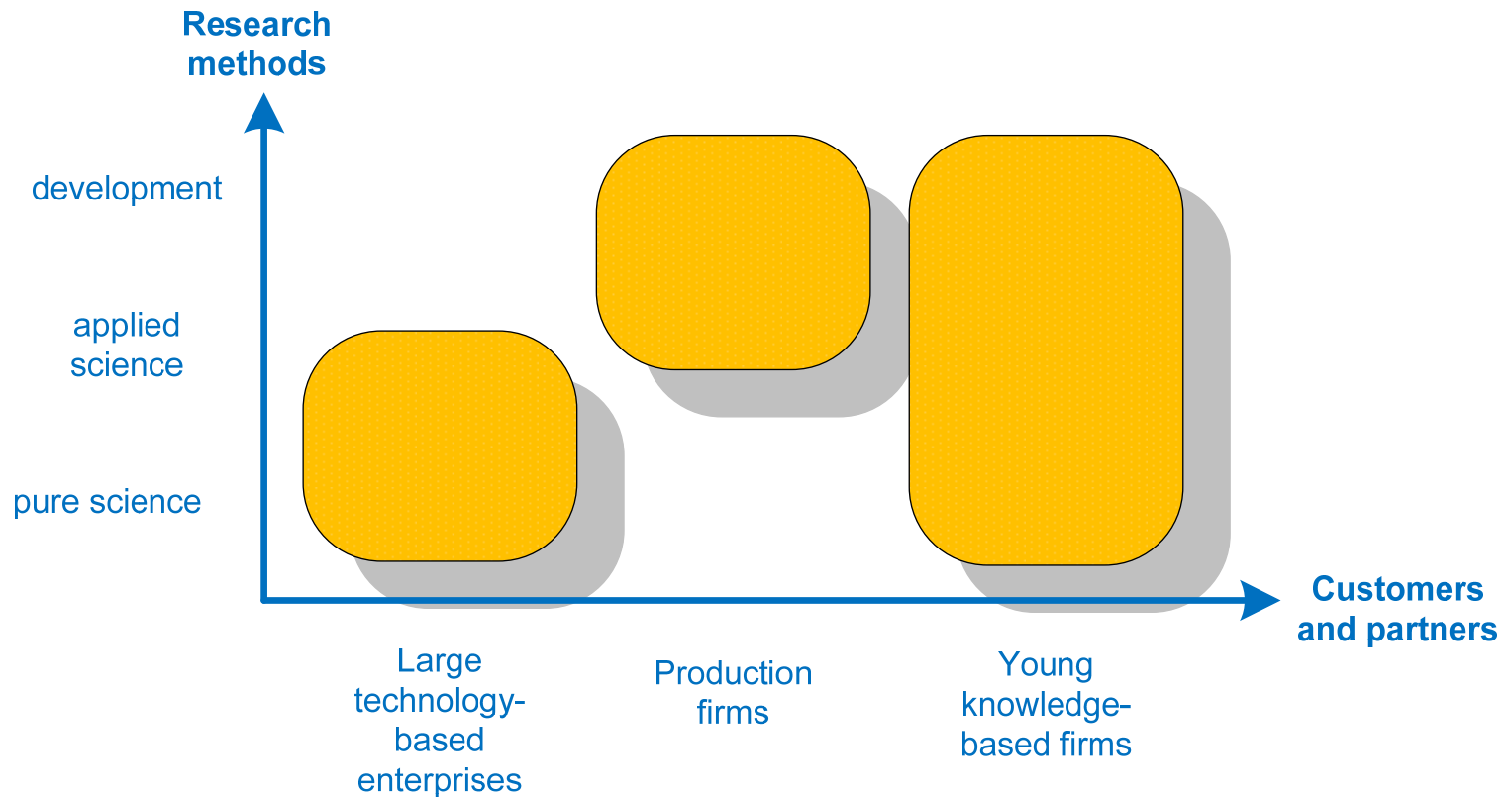
- This is a 100% subsidiary that works for Shell as well as any other firm
- This way, the share of the know-how market can be larger than that of the actual market (e.g. LNG)
- Shell no longer carries out fundamental research
- This research is farmed out via Chief Scientists
- Applied research and engineering are carried out by Shell Global Solutions or farmed out
- Shell Global Solutions buys and sells know-how on behalf of the Businesses

Open innovation in industry

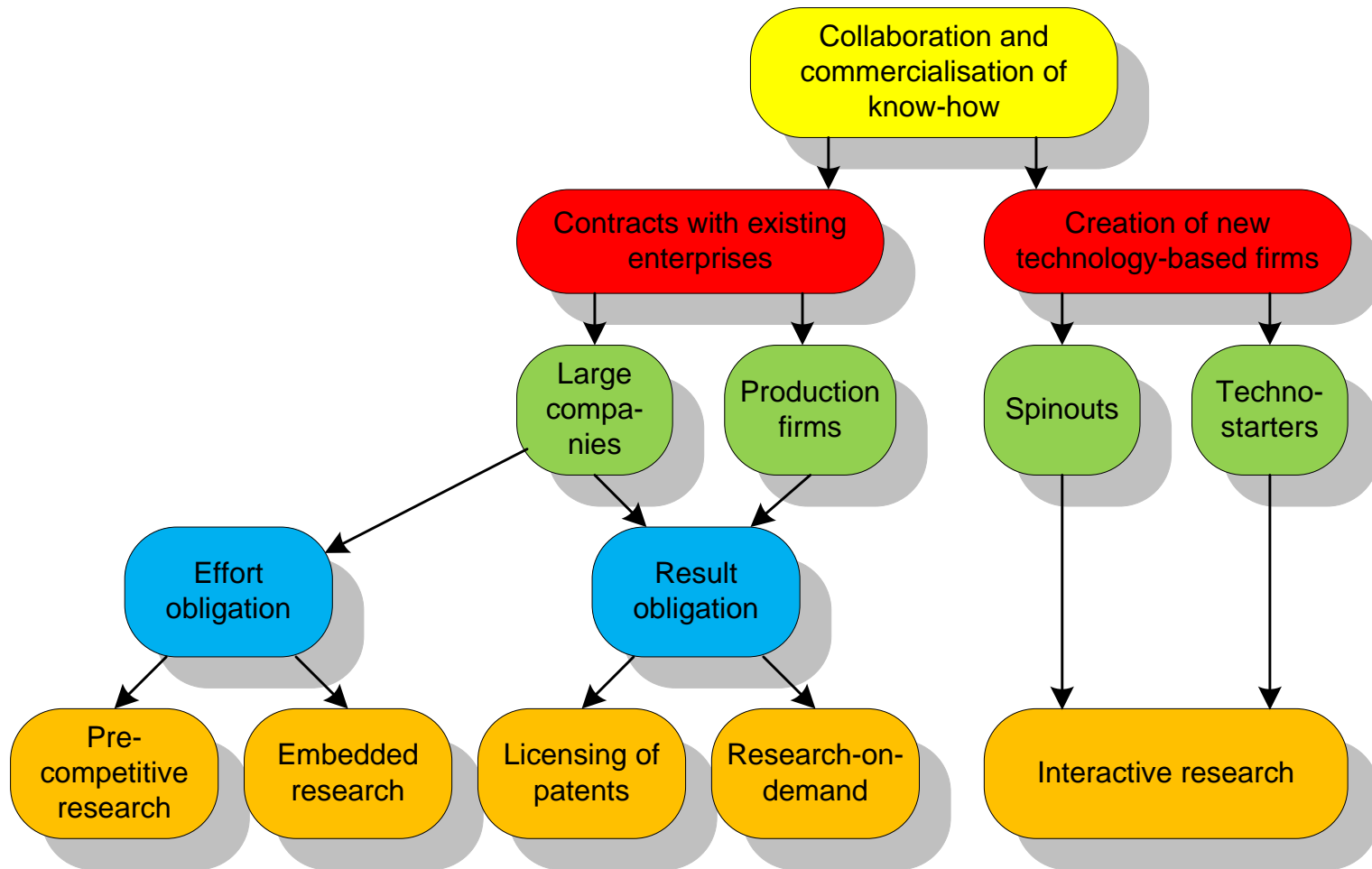


3. Collaboration

The market: customers, collaborators and their needs



Know how commercialisation



In short

- Different kinds of customers demand different services from universities
- For universities, cooperation in fundamental research is most attractive, but this is restricted to the happy few
- Universities have become partners in networks rather than stand alone organisations of the past
- They now take an active role in the transfer of their knowledge and in cooperation with industry
- This is one aspect of the university to come, the *Third Generation University*