The new Geography of Science

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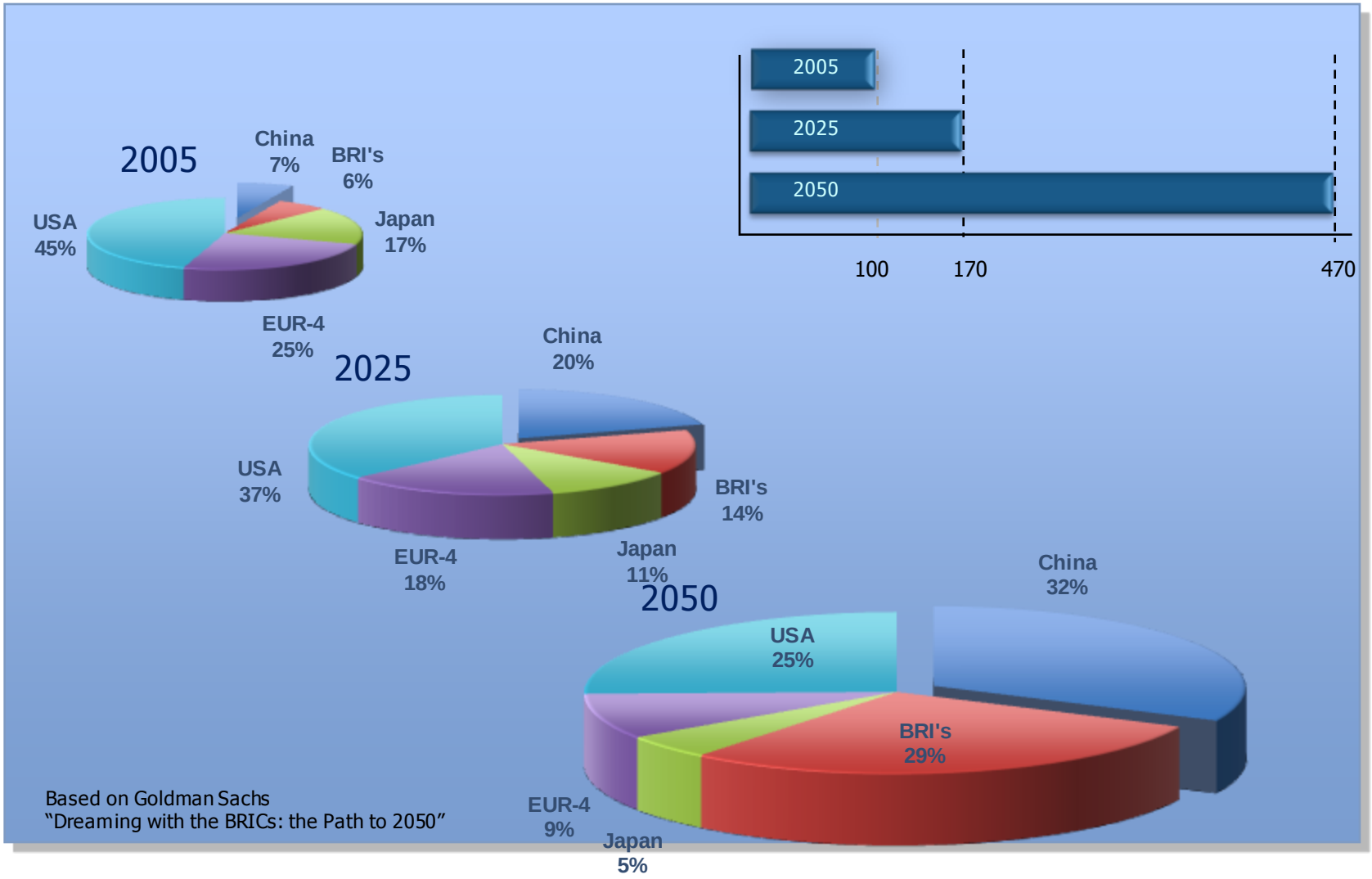
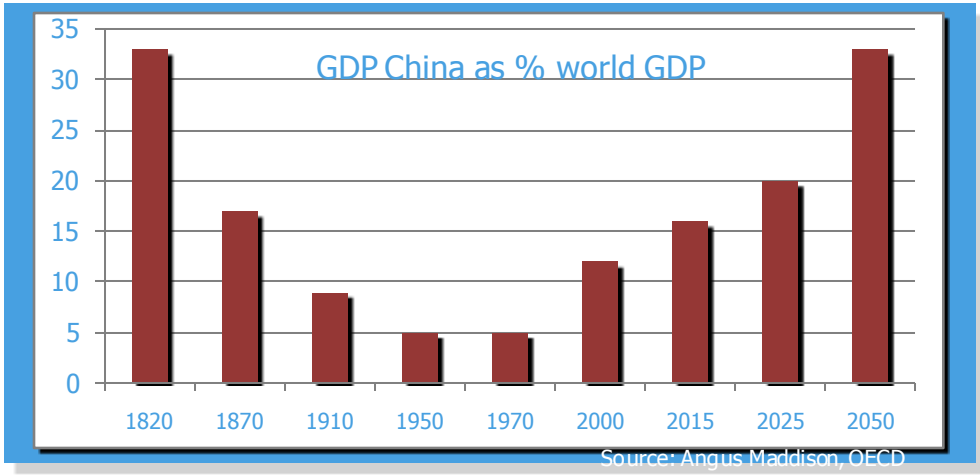
Structure of Talk

- The Asian context - *the new geography of science*
- China's ambitions in Science - *the sky is the limit*
- State of play - *do the numbers add up?*
- Role of Regions - *a thousand flowers bloom*
- Culture and Creativity - *can Chinese do research?*
- Trends, pro's and con's - *can we really predict?*
- Models for Cooperation - *can we work together?*
- Policy recommendations - *time for action*

The Asian context - 1



What we see / what they think



What they think

China's
RE-emergence on the
world stage

The Asian context - 2

- Two poles: China/Japan/Korea and India
- Giant domestic markets (potentially)
- People and Skills
- Computer power, (accessible) prime tool of Science
- Emergence of new sciences
- Ethics of Research
- Active Government policies

India and China – 2.5 bln. people
China: urban middle class emerging
India: 75% population under 25 yrs.

India: 2.5 mln. graduates per year
6000 PhD's per year
China: 8 mln. graduates per year
25.000 PhD's per year

•Huge investments in R&D (infrastructure)

•Results driven approach to ethics
•Ethical risks
•Human trials

•All sciences depend on computer power
•Bio / nano / ict relatively new fields with tremendous potential

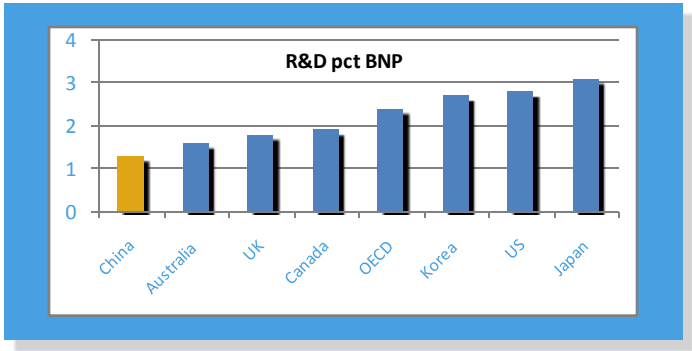
China's ambitions in Science

Policy Goals

- By 2010 R&D-expenditure will be set at 2% (360 bln. RMB)
- By 2020 R&D-expenditure will be set at 2,5% (900 bln. RMB)
- By 2020 reliance on foreign technology will fall below 30%
- By 2020 the number of Chinese generated patents will be annually among the top 5 in the world
- By 2020 the number of citations in the international research journals will be annually among the top 5 in the world

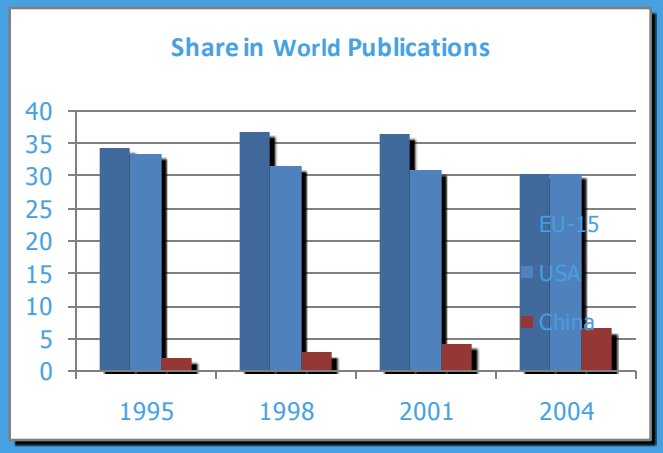
Ambitious Programs

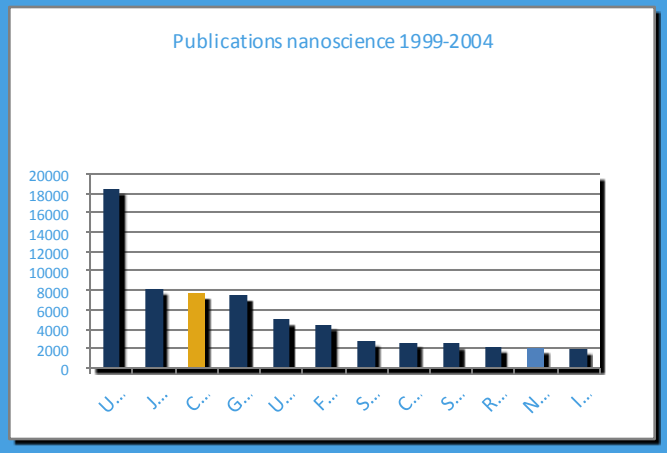
- 16 special research projects (core electronic devices, wide band mobile wireless communications, breed new transgenic biological varieties, prevention of infectious diseases, manned space flights, etc.)
- 8 top technology areas (biotech, IT, new materials, adv. manufacturing, adv. energy, marine technologies, lasers and aerospace.
- 8 science challenges (deep structure of matter, mathematics, earth systems science, cognitive science)
- 4 major research programs (protein research, nanoscience, growth and reproduction and quantum modulation research



State of Play

- Home grown enterprises: low spending on R&D; 0,5% of sales; little sign of high-tech start up culture;
- Less then 0,1% of Chinese companies own the technology they produce;





- More than 400 out of the world's top 500 companies have invested in China;
- Over 700 R&D laboratories have been set up in China since 1993 (Motorola was the first in 1993)
- Economist Intelligence Survey: 39% of the surveyed companies will spend most of their R&D in China in the coming 3 years.

Role of Regions

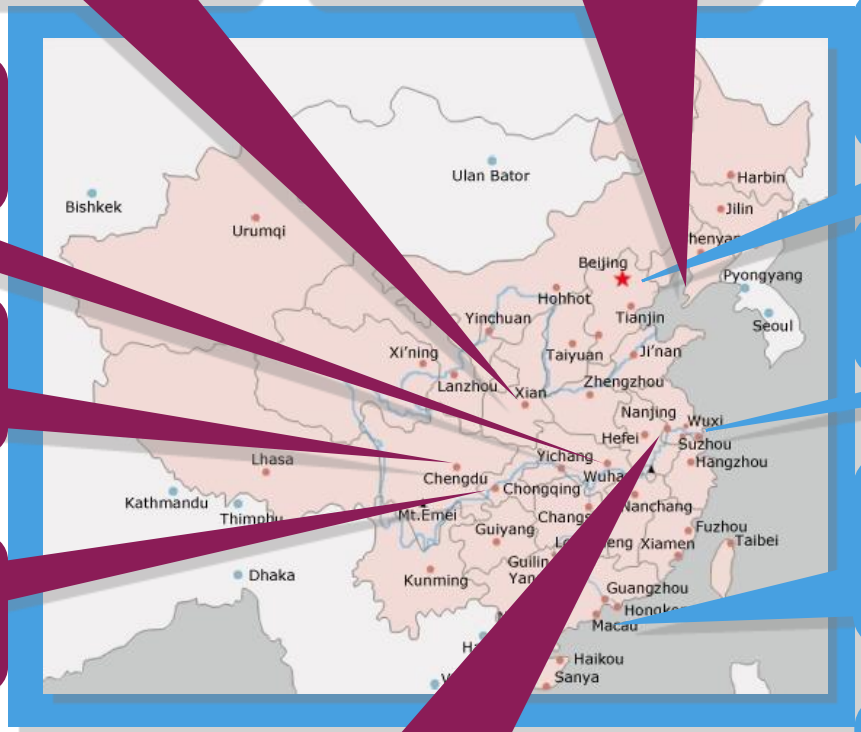
Xi'an
•Software parks
•10 TU's – 30.000 engineers per year
•Aerospace

Dalian
•Software outsourcing
•80.000 IT professionals

Wuhan
•Optical electronics
•P4 – Lab facilities
•23 universities

Chengdu
•Agriculture Science and Technology
•Biomaterials
•Medical Schools (Huaxi)

Chongqing
•30 mln. people
•60.000 research workers



BoHai Rim / BinHai New Area
(Beijing / Tianjin)

Yangtze River Delta
(Shanghai plus 10 other cities)

Pearl River Delta
(Guangzhou / Shenzhen /
Hong Kong)

Nanjing
•100 Higher education institutions
•Wide industry base

"Blue" Regions:
•3 % land mass
•15 % population
•45 % GDP
•70 % int. Trade & Investment

Culture and Creativity

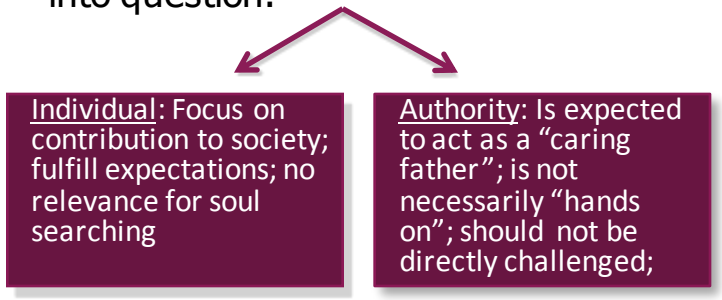
Lucien Pye: "No other political culture relies so much on the pleasure of suspending disbelief".

Approach

- "Scientific development": Facts will lead to solutions; great reliance on the belief that society can be engineered; technology focused;
- Fact finding relies on information gathering: Elaborate systems and tied disciplines on gathering information and on reporting are in place everywhere;
- Information: Needs to be managed and carefully channeled through;

Culture

- Confucius: Harmony through revering relationships between members of family, school, village, clan, province, empire; respect for father, teacher, authority; authority should not be put into question.



Trends: Pro's and Con's

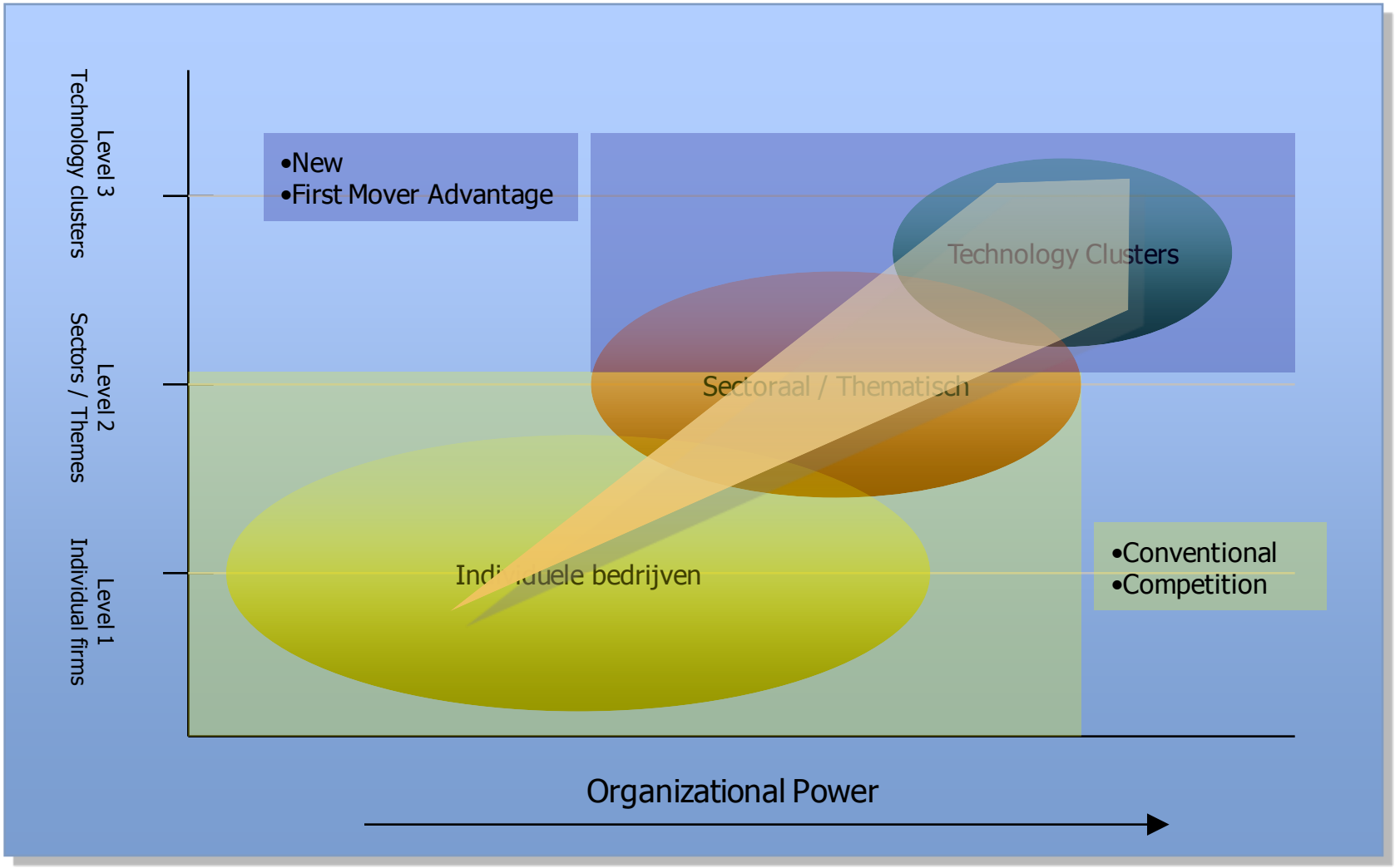
Pro's

- Manpower: Sheer endless capacity to mobilize manpower; China has the world's largest scientific workforce;
- Financial resources: strong government (financial) support in targeted programs
- Awareness importance enterprise sector: innovation and home grown Chinese enterprises; high level of off-shoring;
- Improvement regulatory framework: intellectual property; corporate law;

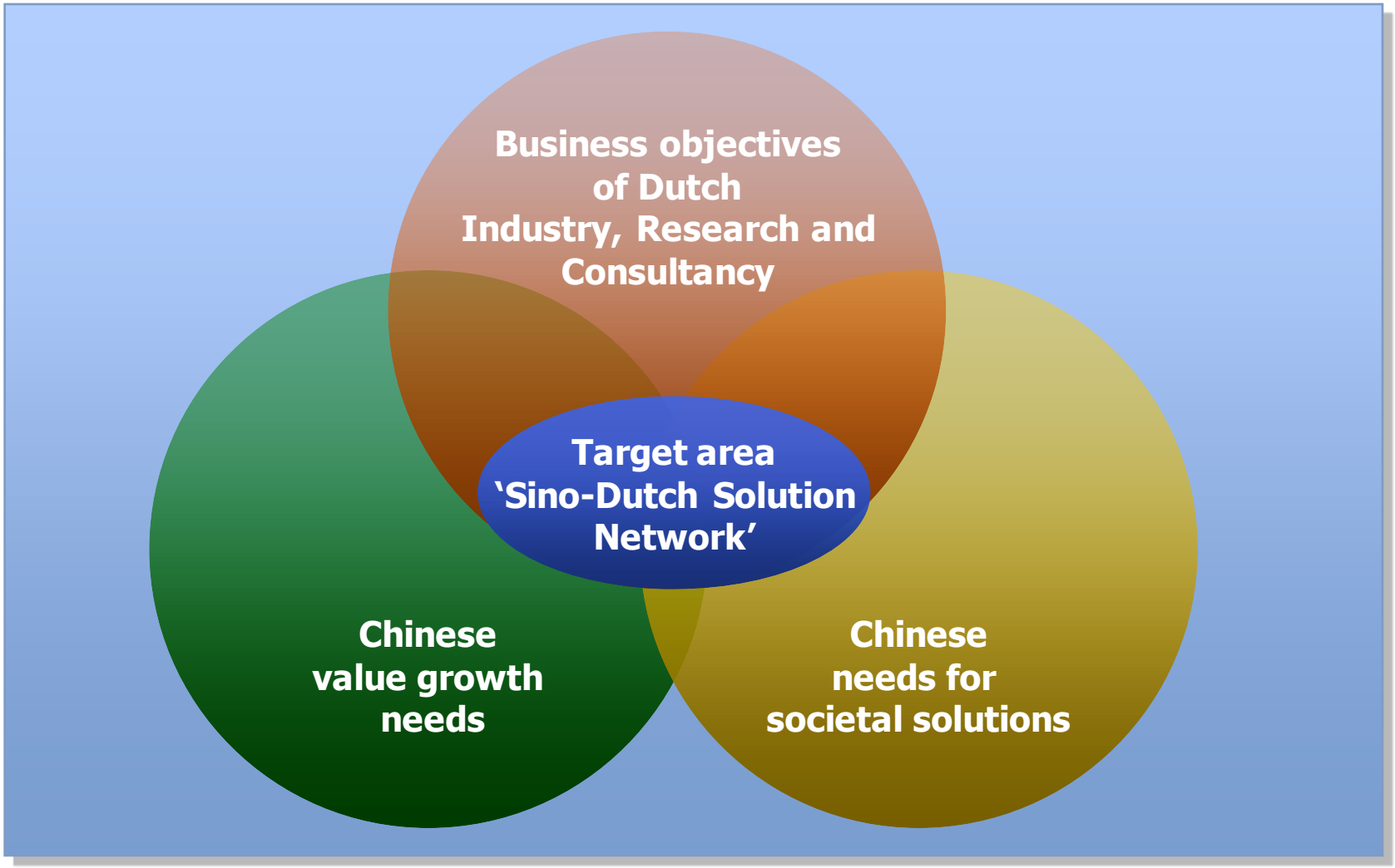
Con's

- Lack of system thinking: Solutions are the produce of vertical thinking; every problem can be solved by its own little machine; are all the little machines together a viable system?
- Hardware – software wedge: can the creation of a full fletched science infrastructure be matched by an adequate research culture?
- Valorization deficit: will sufficient Chinese enterprises be capable of absorbing academic research;
- Education: will the Chinese educational system sufficiently encourage individual creativity;

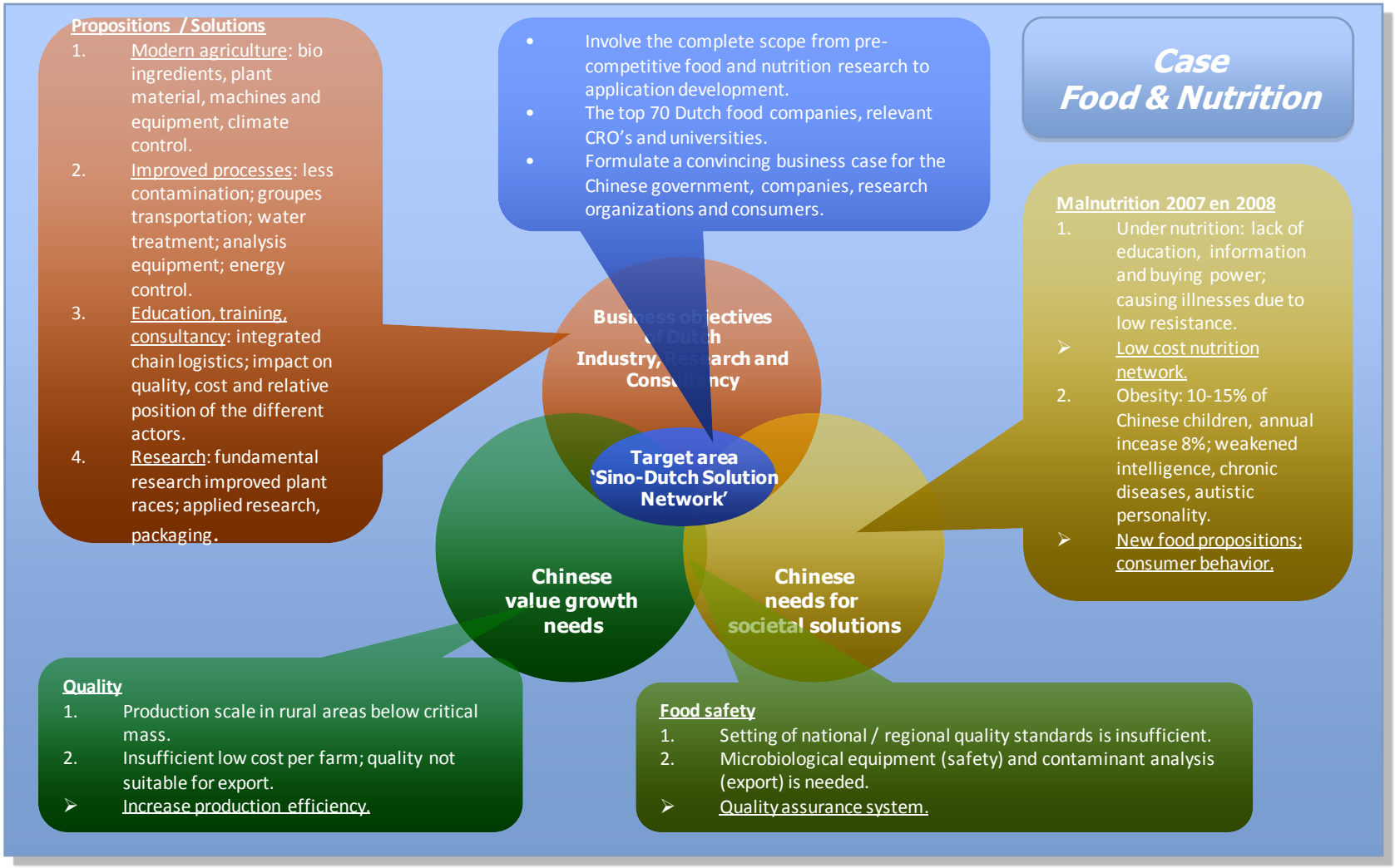
Models for Cooperation - 1



Models for Cooperation - 2



Models for Cooperation - 3



Five policy recommendations

- Invest in getting your data right – *we should recognize that our knowledge of China's scientific efforts is still limited; Scientific councilor's system (TWA-systeem) should be seriously expanded in order to map out China's knowledge infrastructure.*
- Join forces – *Universities could work more closely together in order to promote "Dutch Research and Education" as a world wide known triple A brand.*
- Prepare interesting value propositions – *cluster approach; bring together universities, knowledge/research institutions, companies in value propositions; food and nutrition, sustainable energy, creative industries*
- Engage China in an open innovation environment thinking – *turn this into a mutual benefit; assess to bring in patent knowledge; open borders for Chinese and Dutch start ups.*
- Encourage bilateral cooperation in research and education – *enable universities to engage in bilateral cooperation; envisage the creation of Dutch campuses in Chinese universities; attract Chinese talent.*

One more policy recommendation

- Wake up call! Time to brace the Dutch knowledge infrastructure for the global competition in production of top-science, in delivery of top-education and in acquisition of top-talents. Top positions require top-efforts.