International Workshop on The Comprehensive Review of the S&T Basic Plans in Japan

Comments for Concluding Plenary Session

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Taking stock

- Clear positive message from Basic Plans
  - Steady increase "high level" outputs in period of 1st and 2nd Plans
  - Dramatically expanded R&D investment
  - Continued reform of national S&T systems
- Landmark evaluation study
  - Nothing comparable for a country this size
  - Huge effort – important insights emerging
- In spirit of continuous improvement look for further lessons for policy and evaluation

Methodological Aspects of Input-Output Approach

- Per capita or per unit figures for publications & patents rely on correct denominator
  - May be over-estimate of researchers numbers and university investment
  - In any case “research productivity” is multi-dimensional concept depending upon capital (equipment) intensity of field etc
  - Danger of perverse incentives to overproduce
- Confusion of inputs and outputs
  - Numbers of researchers fostered through R&D investment
  - Acquired amount of competitive research funds
- Time lag – today’s outputs from accumulation of previous inputs

Other measurement issues

- International shares and comparisons need to take account of broadening East Asian capabilities
- Absolute amounts can miss important changes in other systems eg US skewing to defence and homeland security at expense of other fields
- Proper measure of competitive vs external funds

Implications

- Better approach in long run is to measure capacity and capabilities of the S&T system
  - Accumulation and maintenance of human resources, knowledge and infrastructure
- Input-output-outcome/impact relationships need clear understanding of model that links them
  - This model itself being transformed by reforms

S&T Personnel

- Achievement in numbers is positive but …
- If desire is to achieve flexibility, mobility, openness and diversity, is casualisation of the workforce the right solution?
  - Present policy acts not on the rigid layers but on those underneath them
  - Competition among universities can also drive mobility – natural labour market
  - Presentation made clear that main barriers lie in employment, salary, working conditions and practices
- Matching training to need
  - By scientific specialisation
  - By broader capabilities to manage and apply research
- Mobility is key for
  - Knowledge transfer academia-industry-government
  - Interdisciplinarity
  - Participation in global scientific networks
- Need for whole system approach
  - Primary education to mid/late career retraining in situation of ageing population

Industry-academia-government cooperation

- Tendency for policy to address more formal aspects and to measure the measurable
- In practice linkages have 4 dimensions:
  - Flow of trained graduates (firms say most important)
  - Collaborative and contract research
  - Commercialisation of IPR
  - Informal networking and knowledge transfer
- First and last reach greatest number of companies but need more subtle policies to promote
  - US experience shows capacity building – people and culture/environment friendly to entrepreneurs
- Commercialisation can never be major income source
- Ultimate aim is ecology in which large firms act as base around which start-ups, universities, government labs, intermediaries etc are in well-defined mutually supportive roles

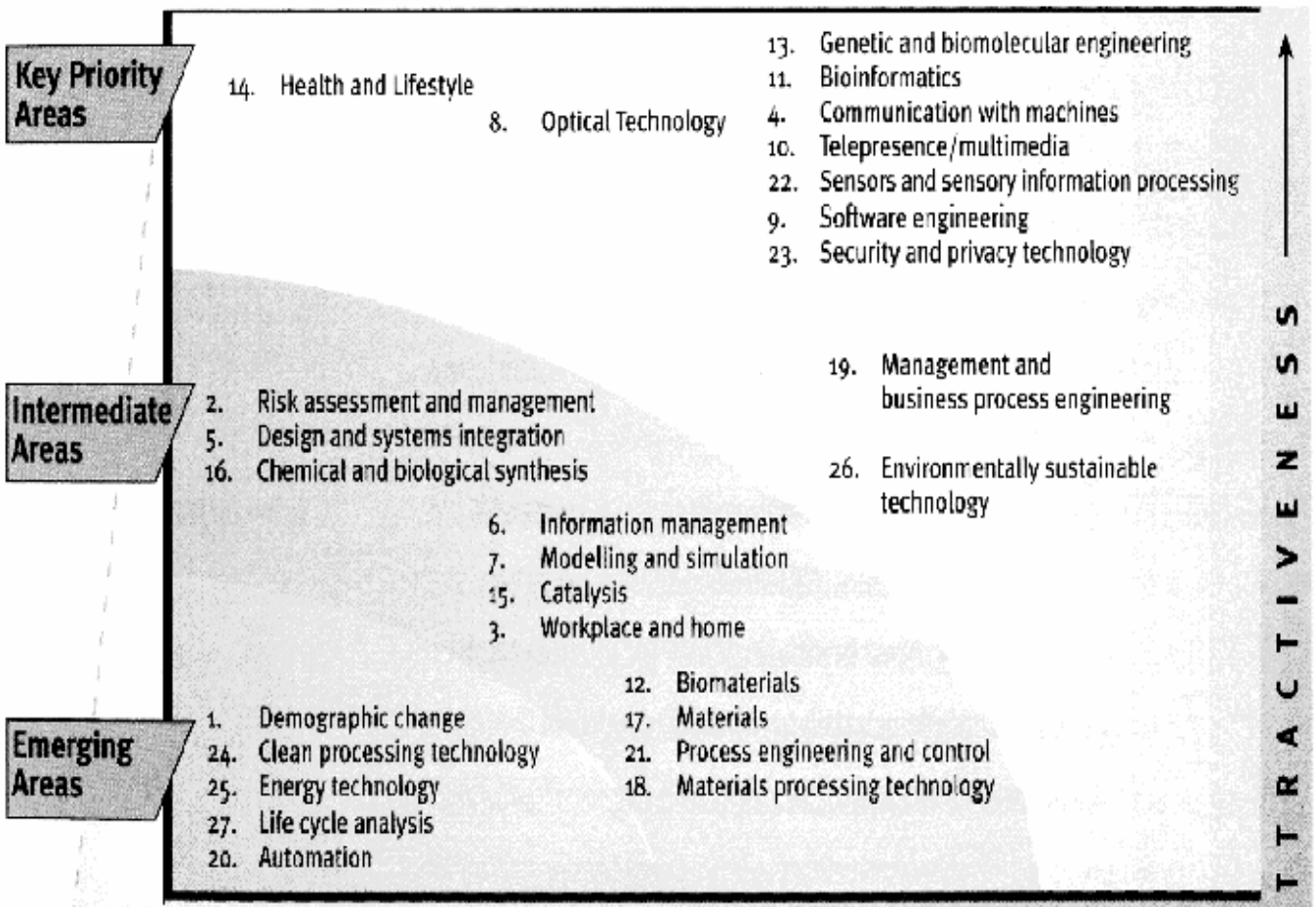
Regional innovation policy

- Substantial international variation in balance of power & resources between national and regional governments (and supra-national)
- Managing multi-level governance now a key aspect of innovation systems
- Regions also engage in international competition and benefit from international benchmarking
- Need for central government impetus
  - How can a region attract/make use of national facilities
  - Role of public and semi-public laboratories as bridges from research to SMEs
- What are success factors in cluster formation?
  - Knowledge versus sectoral or trading clusters
  - Need for clear vision of technology leaders
  - Effective networking functions
  - Supportive infrastructure for entrepreneurs

Prioritisation

- Note shift of resources to 4 priorities and increase in papers but not patents
- However, workshop shown both USA and EU more concentrated in these areas without explicit prioritisation policies
- How to prioritise?
- Vertical/Horizontal intersection proposed in table document
- Could move to explicit matrix approach cf 1st UK Foresight Programme
  - attractiveness/feasibility
  - however does not solve basic problems of prioritisation

Similar to 1st UK Foresight Programme Framework

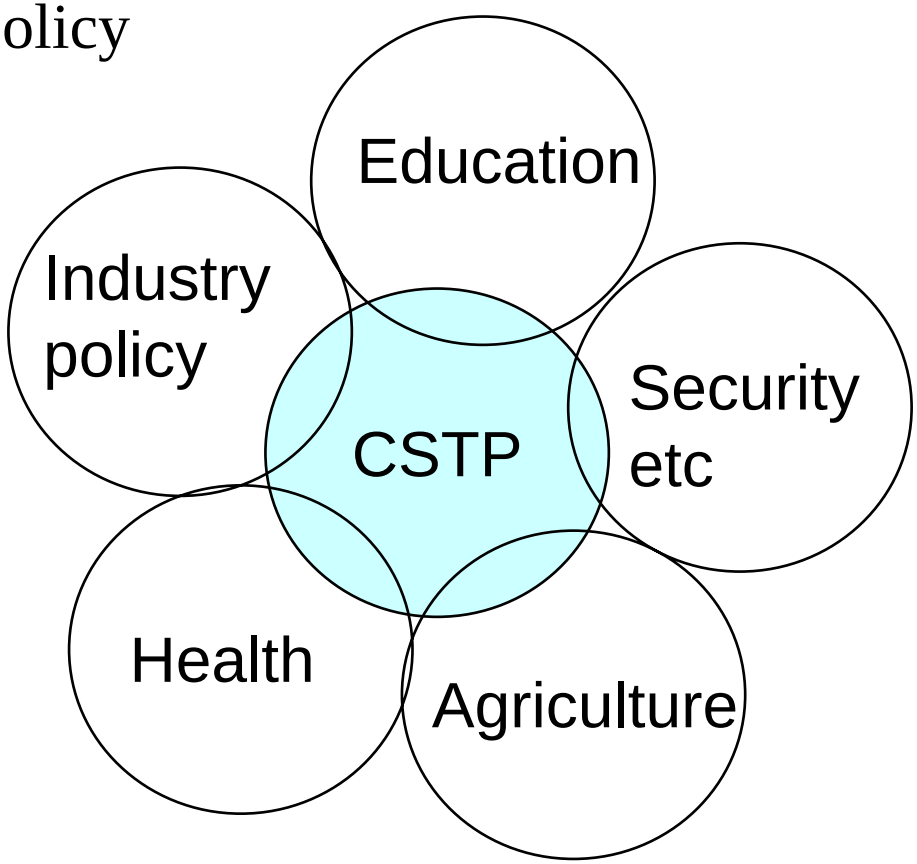


Risks of prioritisation

- Mis-identification
  - Which science falls under priority and which does not
  - Relabelling a possibility
- Inter-connection
  - Priority field may be heavily dependent upon field not explicitly prioritised eg mathematics
- Excessive or too general priorities
  - Stakeholder pressures mean resources dissipated
- Duplication
  - Tendency to follow international fashion rather than to consider in depth specific national needs leads to same list in all countries and regions

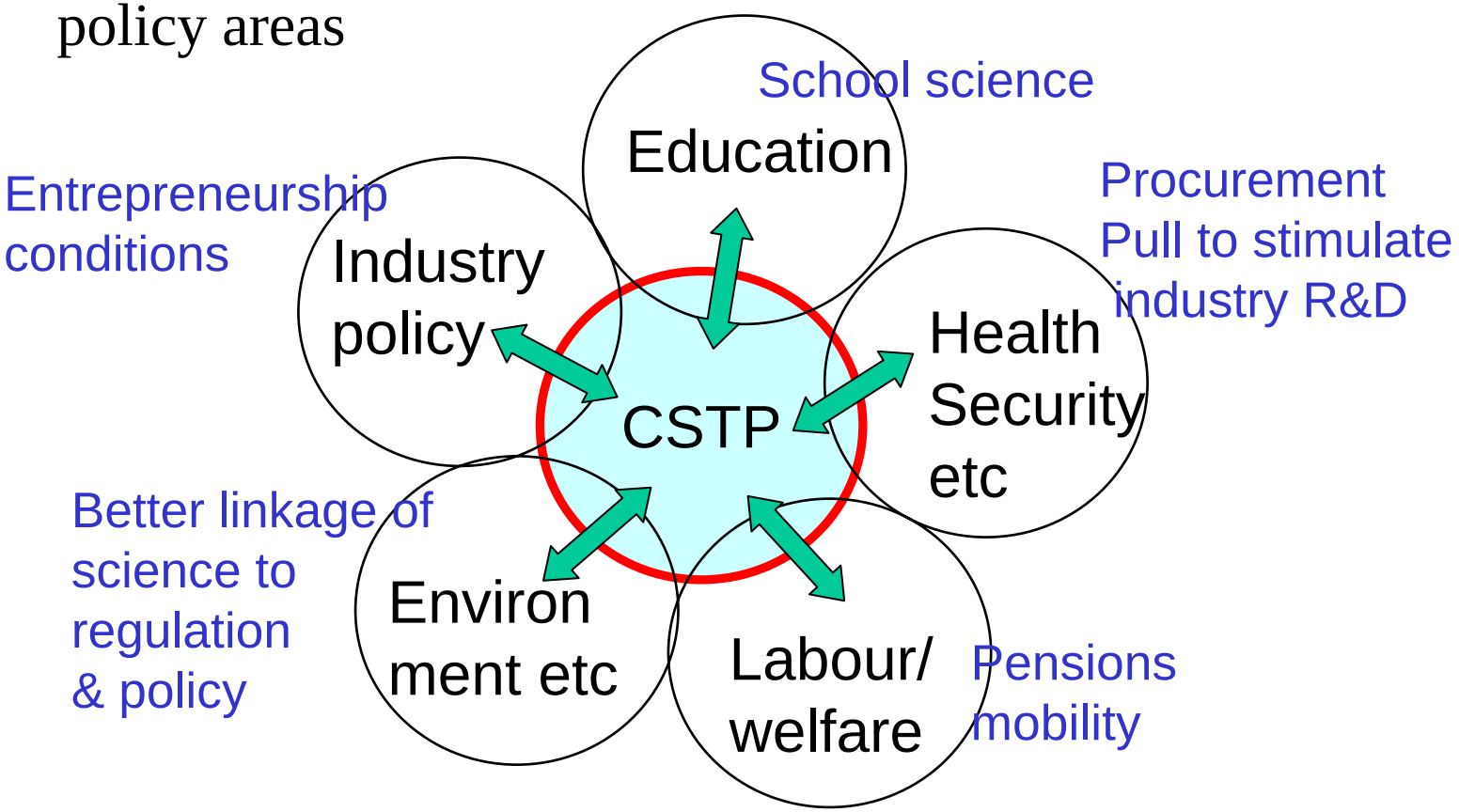
Conclusions – Policy coordination

Restructuring and Basic Plan Created Coordinated Science Policy



Conclusions – Policy coordination

Challenge for 3rd Plan to manage interface with other policy areas



University strategy

- Major barriers to continued progress now appear to lie inside institutions
- Approaching limit of reform possible through legislation
- Next phase will involve changes in organisational culture that can only come from within stimulated by changes to operating environment
- Create environment in which entrepreneurial universities have clear advantages so no moral hazard to be first to reform
- University strategic plan formation to be participative process with staff buy-in at all levels
- Build budgets and incentives around plan and reward against performance

Shifting emphasis

- Current policy emphasises resources and opportunities
- Need to shift emphasis to incentives and capabilities
- Incentives
  - Need to cascade from university and programme management to individual researchers at all levels
  - Eg success in research or commercialisation reflected in promotion, salary etc
  - Must be balanced incentives to ensure variety in system
- Capabilities
  - Management of S&T an integral part of scientific training
  - Professionalisation of interfaces (TLOs etc)

Conclusions

- Policy transfer is difficult because of embedded cultural and systemic features which may not be obvious
- S&T Policy needs to be set in framework of innovation policy and with clear interface to all other policy domains
- Research institutions must develop strategic capabilities and operate in cascaded incentive framework
- Second qualitative stage of Basic Plan evaluation very important to understand indicators
- International benchmarking provides one useful framework for evaluation but also a need for counterfactual
  - Exploration of effect of “no basic plan” hypothetical on Japan
  - Alternative approaches
- Ex ante evaluation of 3rd Basic Plan could revisit issues of rationale with emphasis on systemic approach