Strategic Roadmap for National Innovation Development

AIN has identified that Thailand can improve its competitiveness with innovation, driving economic benefits for the whole country

Potential to Achieve More

- **Thailand's figures:**
  - $7,260 current (2009) GDP/Capita
  - 1.8% average annual growth rate of GDP/Capita in the last 5 years
  - 60th place (out of 132 countries) in Global Innovation Index Ranking
- **With more efficient Total Innovation Management, AIN can unlock Thailand's potential and achieve higher economic growth rates to be among other leading nations**
- **Potential impact on Thailand's economy at different growth rates:**

Growth Rates	1.7%	3.9%
2020's GDP[1] (US$ b)	632.3	799.4
2020's GDP/Capita (US$)	8,771	11,089

Note: 1. 2020's GDP is calculated based on forecasted CGP/Capita and Global Insight' forecasted population
2. Example of High-Innovation spending countries are Singapore and South Korea; while Low-Innovation spending countries include the countries like Spain and Italy
Source: R&D percentage of GDP and Real PPP adjusted GDP/capita from World Bank (2005 international dollars), Global Insight, Booz and Company Analysis

AIN has therefore asked International Consulting Corp. to investigate a number of issues about its strategic focus and execution

Strategies, Roles, and Future Direction

- Define appropriate roles and best practice strategies for national innovation promotion agency
- Short-term and Long-term strategic directions to promote Thailand's sustainable innovation-driven society

Target Industry Sectors

- Target industry sectors: Are they the right choices, now? Has recent activities spurred innovation in those sectors?
- What should be the focused sectors and key initiatives to best utilize resources and yield successful results in Thailand

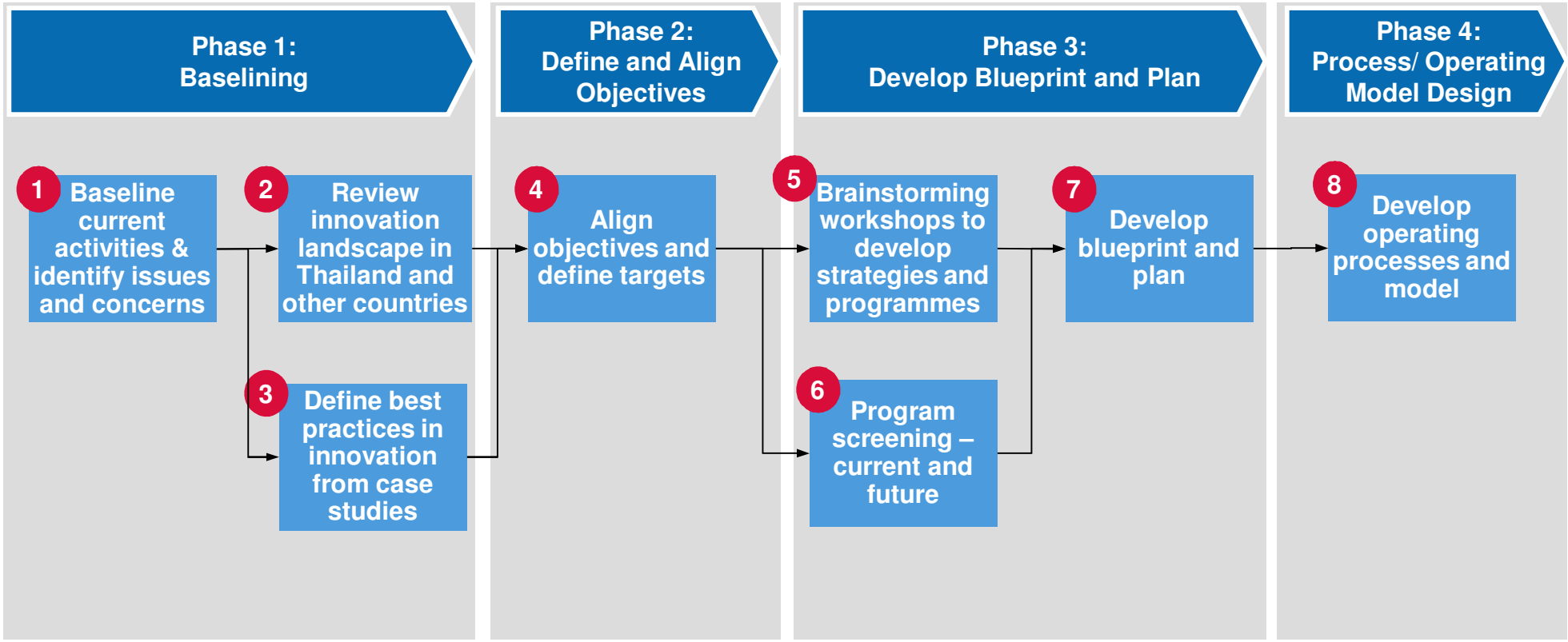
Coordination with Public and Private Sectors

- Limitations in authorities, roles, and responsibilities
- How to improve coordination among other government agencies and leverage private sectors' innovative initiations to promote Thailand's innovation driven society

Key Performance Indicators (KPI)

- How to measure success at the agency level?
- What are the key evaluation metrics? : AIN currently uses
  - Number of projects approved
  - Amount of investments stemmed from innovation grants

The project to improve AIN's effectiveness consists of 8 steps, and will conclude in April



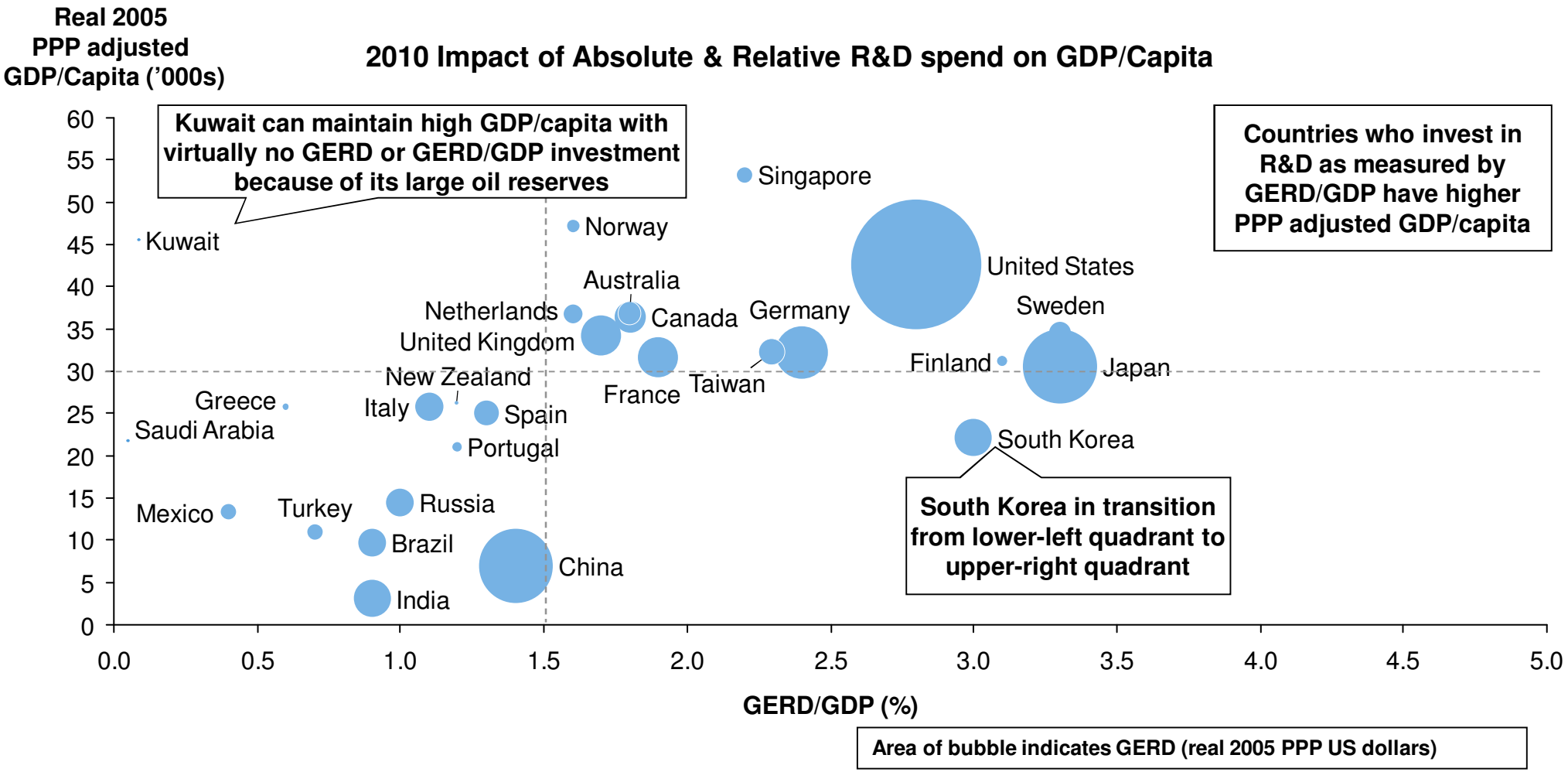
Overview of Global Innovation

National Benchmark Analysis

Analytical Approach

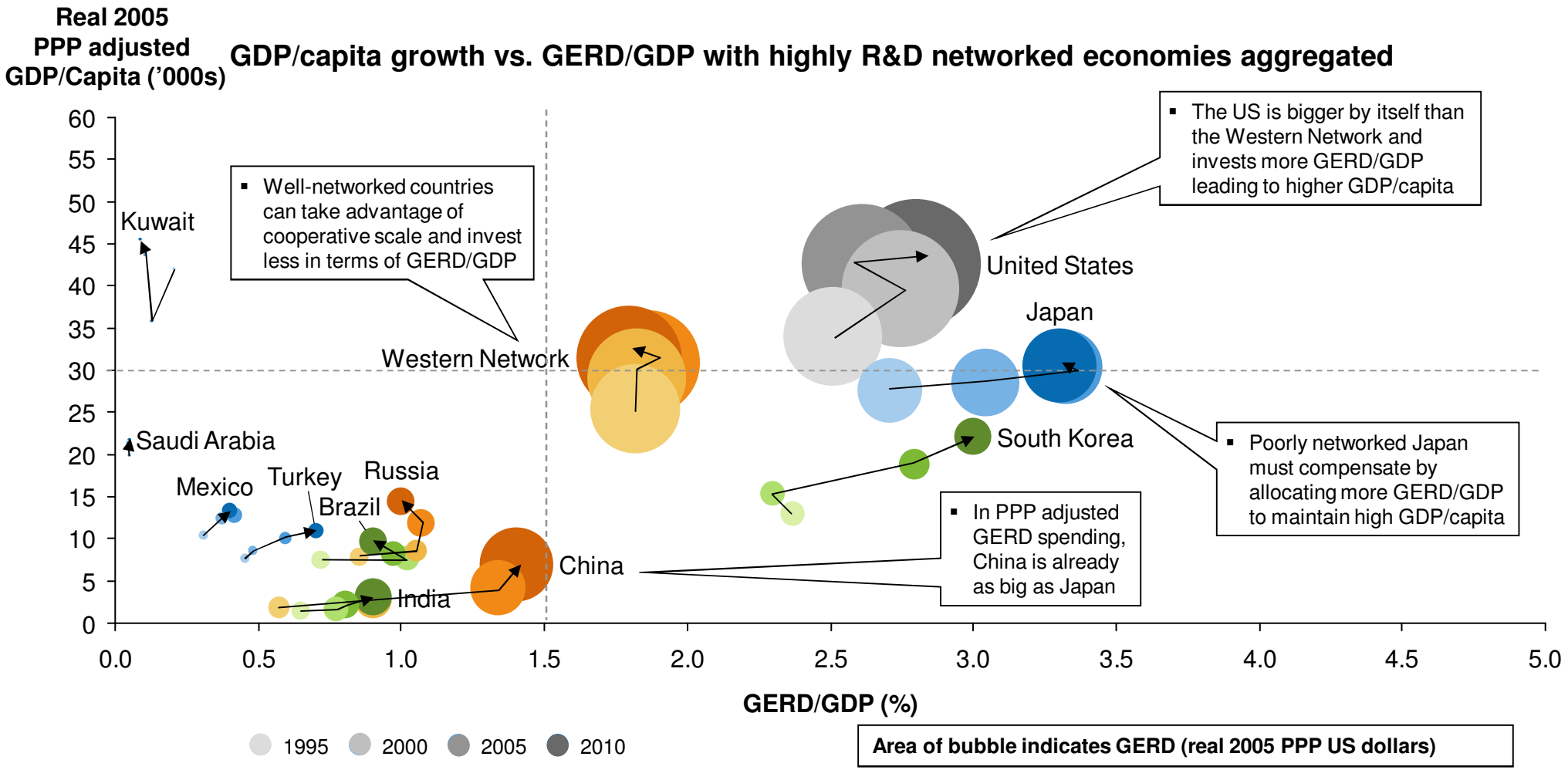
Agency Benchmark Analysis

In our past research, we have found that high R&D/GPD (and high R&D spend overall) goes hand-in-hand with high GDP/capita



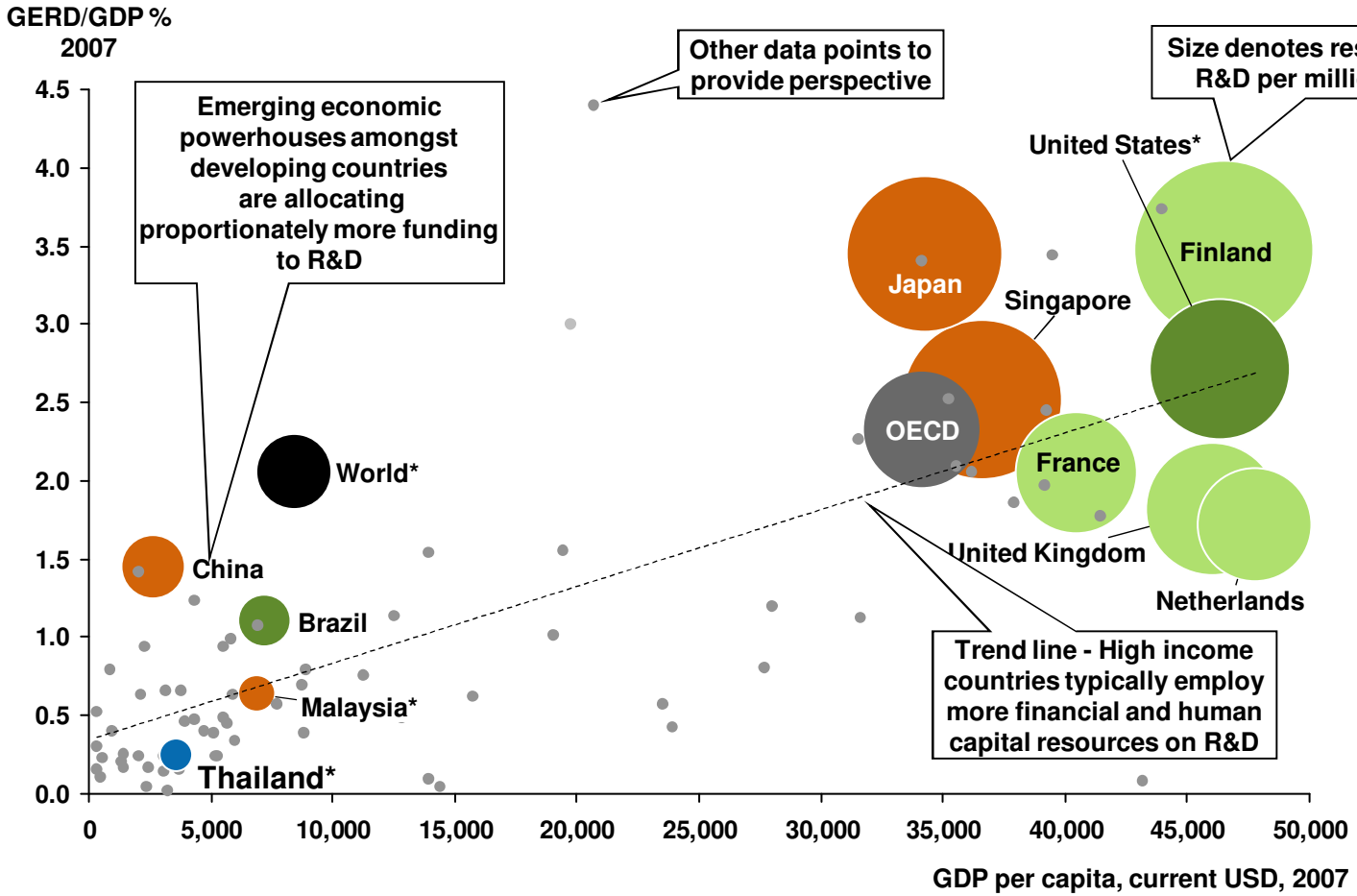
Source: Real 2005 PPP adjusted GDP per capita from Global Insight, see appendix for GERD/GDP source information, GERD calculated from GERD/GDP x Real 2005 PPP GDP from Global Insight.

Aggregating highly R&D networked economies strengthens the linkage between R&D/GDP, absolute R&D spend and GDP/capita



Source: Real 2005 PPP adjusted GDP per capita from Global Insight, see appendix for GERD/GDP source information, GERD calculated from GERD/GDP x Real 2005 PPP GDP from Global Insight.

As emerging economic giants China and Brazil are emulating high income countries by spending proportionately more on R&D



	Researchers in R&D^ per million people 2007
World*	1,300
OECD	3,009
Brazil	657
China	1,071
Finland	7,382
France	3,496
Japan	5,573
Malaysia*	372
Netherlands	3,021
Singapore	6,088
Thailand*	311
United Kingdom	4,181
United States*	4,663

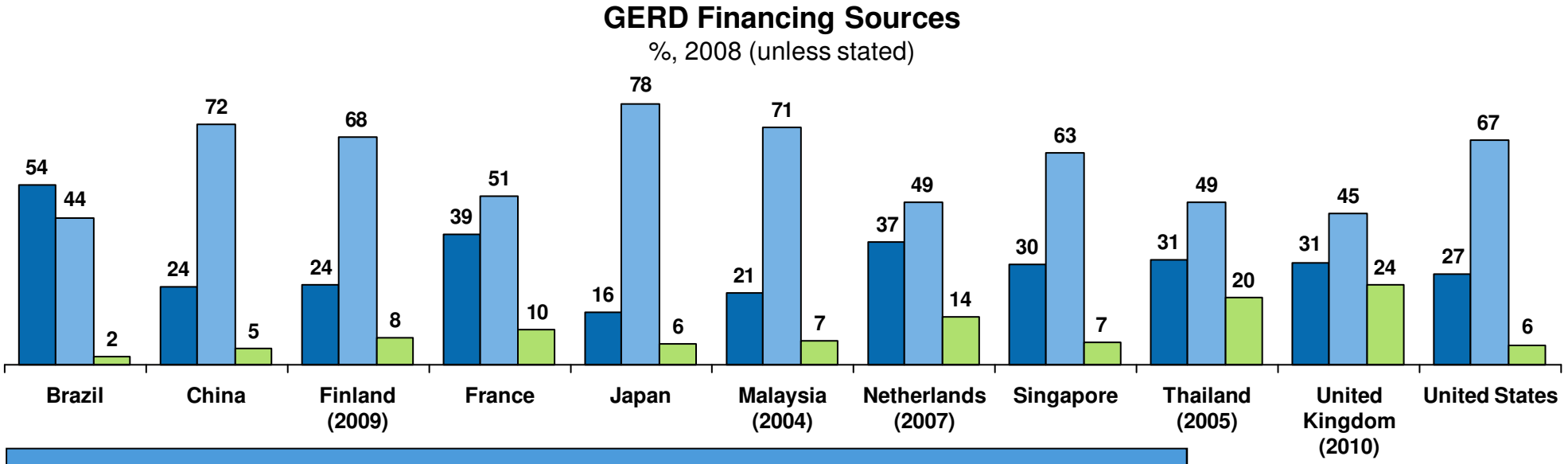
Thailand's spending on R&D is generally lower compared to other countries with similar income levels

Notes: * World researcher 2007 estimated, US researcher 2006 data, Malaysia GERD and researcher 2006 data, Thailand researcher and GERD 2005, 2006 data respectively

^ Researchers in R&D are professionals engaged in the conception or creation of new knowledge, products, processes, methods, or systems and in the management of the projects concerned. Postgraduate PhD students (ISCED97 level 6) engaged in R&D are included.

Source: UNESCO, World Bank

Generally businesses drive 60% to 80% of total R&D financing while Government typically provides around 30% of total funds...



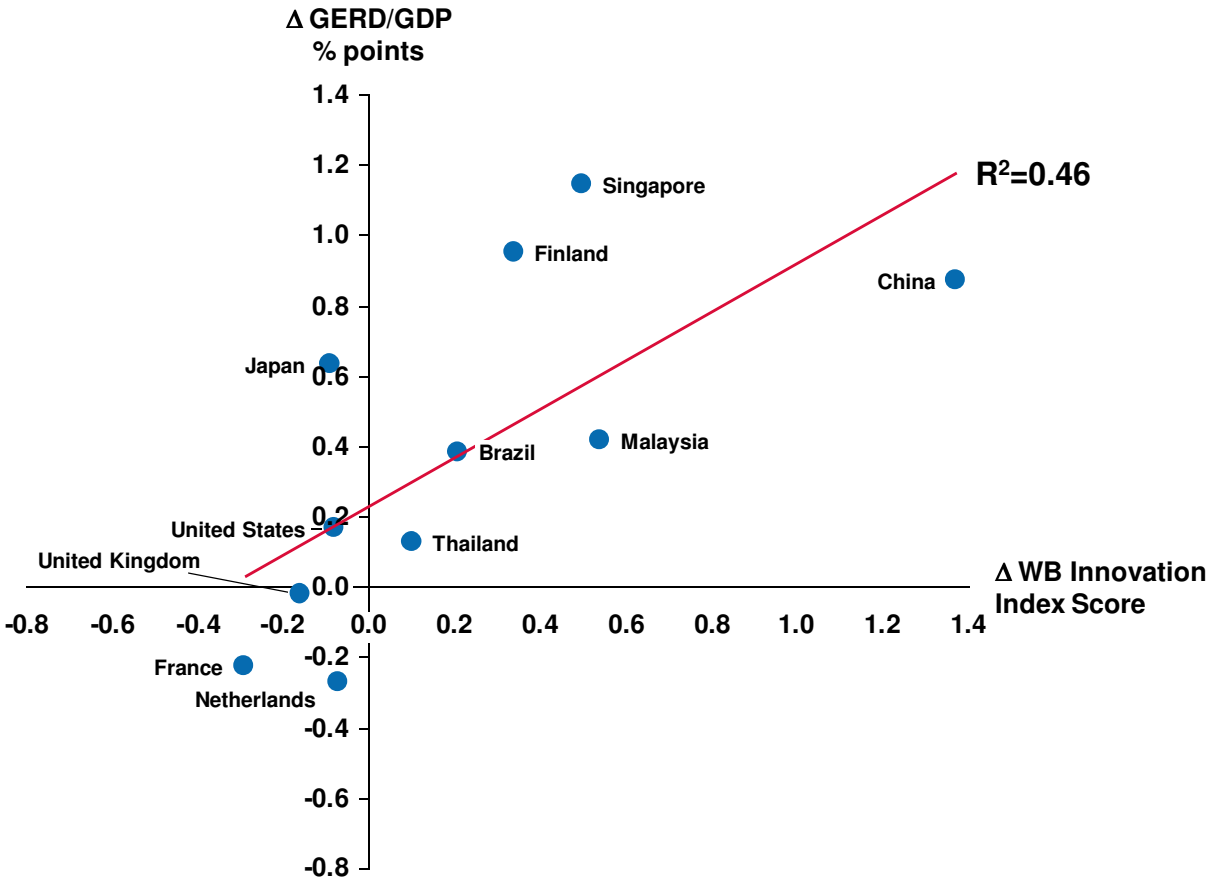
Insights

- In benchmark countries, Government and Businesses practically finances all the country's R&D
  - Government provides typically 30% of total R&D financing
  - Businesses typically provides generally between 60% to 80%
  - exceptional cases are Brazil, France and the Netherlands
- Other sources of R&D financing are Higher Education and other bodies
  - generally does not account for more than 10% to total financing
  - exceptions of the UK, Netherlands and Thailand where other sources provide 24%, 14% and 20% of the R&D financing

Notes: * Others = Higher Education Institutions, NGOs

Source: UNESCO, World Bank

The increase in R&D financing and overall enhancement of innovation outputs is generally correlated for benchmark countries



Notes: 1. The World Bank Innovation index is the simple average of the normalised scores on 3 key variables: Total Royalty Payments and Receipts; patent applications granted by the US Patent and Trademark Office; and Scientific and Technical Journals Articles.

2. Assessment based on data trends between 1996 and 2007

Source: UNESCO, World Bank

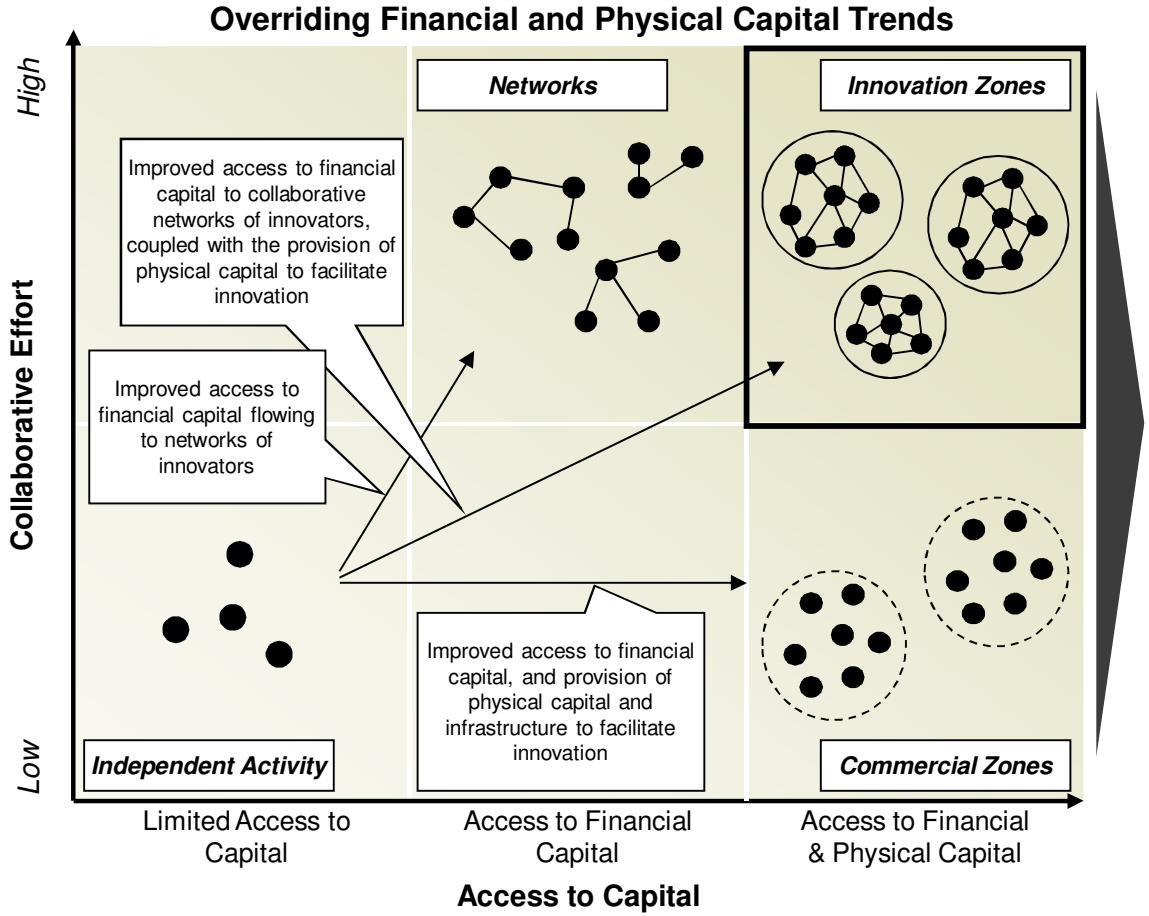
Observations

- Innovation typically improves over time (observation period is between 1996 and 2007) when more resources are provided to support R&D
- In terms of improvement, China experienced the greatest gain in innovation for every additional dollar spent on R&D
- There is clear evidence that reduction in R&D support can impact the level of innovation, as in the case of France, Netherlands and the United Kingdom
- An exceptional case is Japan and the United States
  - both countries increased R&D support but experienced marginal decrease in World Bank innovation scores
  - however, it should be noted that this could be due to measurement insensitivity given that both countries are already attaining close to maximum innovation scores

Financial and physical resources are most effective when used to build collaborative initiatives that increase innovation activity

ILLUSTRATIVE

Key Trends in Financial and Physical Capital

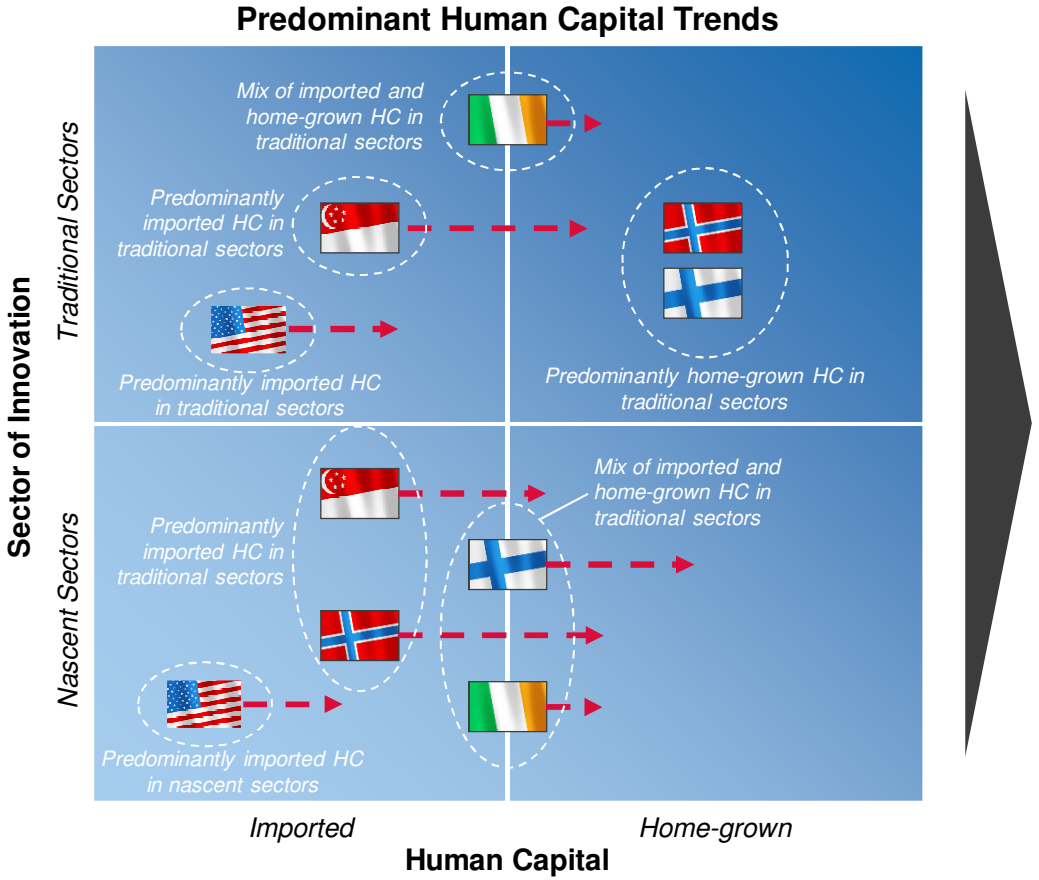


Takeaways

- Innovation activity increases in collaborative environments where access to financial and physical resources is effectively facilitated
- Governments play an important role in the provision of resources through direct investment, tax incentives, and the establishment of geographic zones designed to encourage innovation (e.g. science parks), as well as fostering networks and linkages among public sector institutes, academia and the private sector
- The development of complete clusters requires further initiative by the private sector and allows leveraging of R&D efforts among multiple stakeholders and along the entire value chain
- Established innovators have been successful at building collaborate innovation efforts through the strategic use of financial and physical resources

Talent-friendly environments help attract knowledge workers while home-grown talent is being developed

Key Trends in Human Capital



Key Takeaways

- Home-grown human capital is essential to achieving sustainable innovation capabilities. However countries need to ensure the right mix of home-grown and imported human resources that best matches their needs
- Typically, traditional sectors draw on home-grown human capital that has already developed the expertise and skills required to innovate, while foreign human capital is generally imported to fill in gaps in needed specialisations until home-grown supply catches up with demand
- Hence, countries need to provide an environment that is attractive to foreign talent
- Imported human capital is typically needed to support the innovation activities in nascent sectors, although over time, countries strive to develop home-grown skills in these sectors
- Successful innovators are able to transition from dependency on imported human capital to home-grown human capital over time

Furthermore, some patterns have emerged from strategies that innovation agencies use to leverage resources and achieve results

Strategies for Growth

Attracting Multinationals	Expanding Nascent Sectors
▪ While supporting local sectors of high growth, innovation agencies can leverage their domestic talent to attract multinationals ▪ In some cases, countries may go so far as to establishing themselves as a hub for global research and innovation ▪ Substantial innovation park development is often accompanied by this strategy ▪ FDI is often seen as being key to jump starting innovation in targeted sectors	▪ National innovation priorities frequently build on competitive advantage in traditional sectors, and in nascent sectors which attract foreign investment ▪ Established and rising innovators generally have strong ICT infrastructure and cluster development for nascent and growing industries ▪ Pioneering new and emerging innovations requires that countries channel funds to R&D effectively, from both the public and private sectors

Example: Twinning Network promotes ICT development as an independent company, creating its own cluster within a single area

Twinning Network

- Catalysed development of world-class ICT cluster near Amsterdam
- The Twinning Network: Fully commercial company with a management team of experienced industrialists and entrepreneurs, and funded by public and private sector
- Purpose: 'pull' high potential ideas, and 'pair' entrepreneurs from universities and business

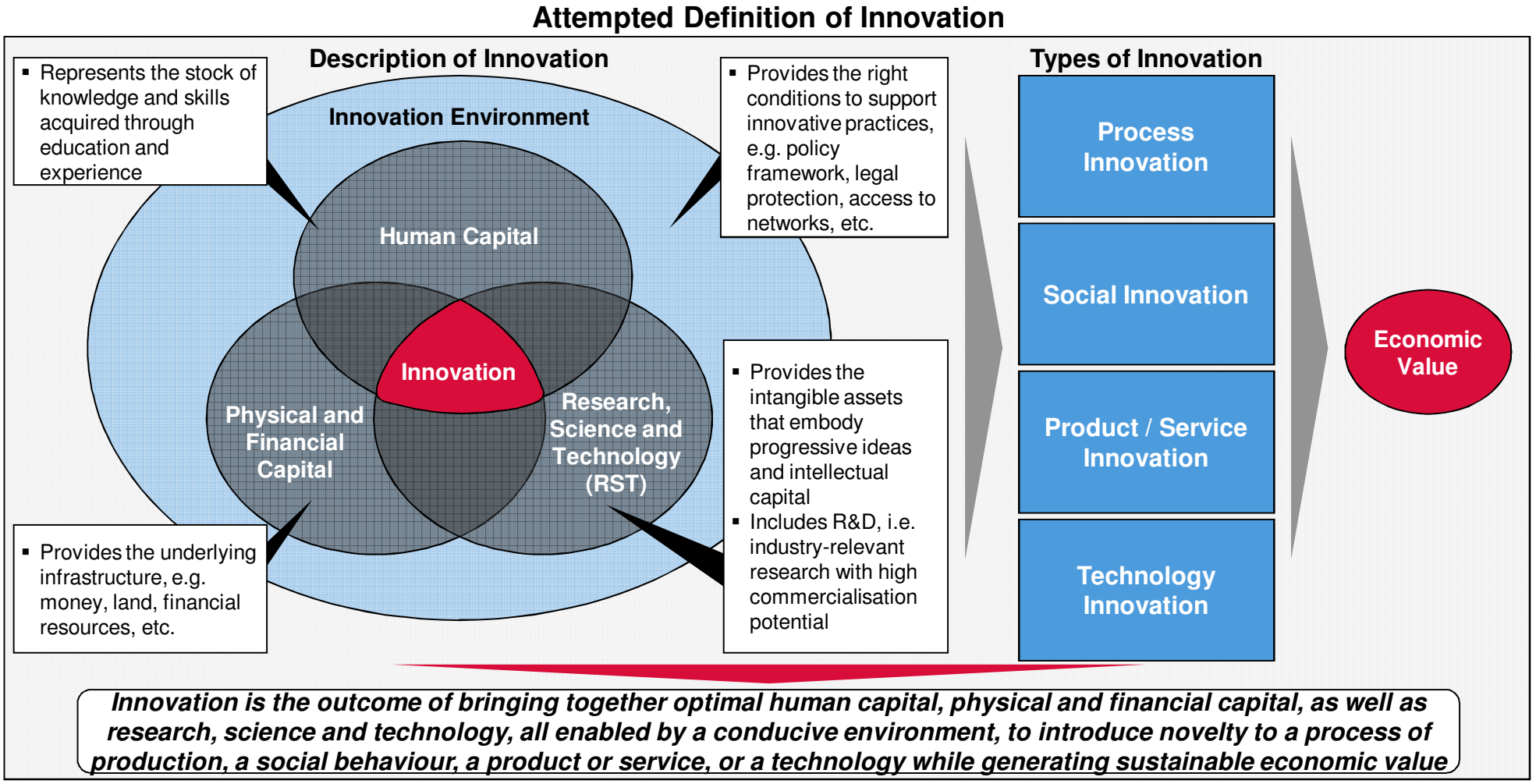
- Provides an integrated range of services designed to maximise the success rate of start-up technology companies
  - Finance: seed, start-up, and early stage growth
  - Support: state-of-the-art ICT infrastructure, and especially management support
  - Networks: links Netherlands to international markets
- Successfully addressed key constraints faced in the Netherlands
  - The need for a high profile 'flagship' initiative
  - The need for seed and early stage-start-up funding to commercialise innovative technologies
  - The need for management support, housing and state-of-the art infrastructure faced by start-up
  - 'Hub' linking ICT businesses, venture finance, academia, entrepreneurs and international marketing networks

Implications

- A high impact, Nationwide "Flagship" initiative, catching the public imagination, and providing a point of focus for business, academics, and the entrepreneurial community
- Directly addressed the key constraints to the growth of the Netherlands Knowledge (ICT) industries
  - Financing
  - Support
- Harnessed the particular strengths of the Netherlands
  - Strong entrepreneurial spirit, much of it latent
  - Fair research and industrial base
- Boosted cluster development

From these studies, we have observed that innovation is the outcome of linking people, capital and research

CONCEPTUAL



Steps need to be taken to enable Thailand to achieve greater success in innovation and development

Key Takeaways

	Current Situation	Potential Steps
Regulation	▪ Thailand is trailing rising innovators such as Singapore in the establishment of strong regulatory structures to encourage and support innovation and encourage the development of a strong innovation culture	▪ Improve IP regulations and protection ▪ Review bankruptcy laws and tax code to incentivize innovators
Operational Support	▪ Support for innovators is lacking in Thailand at a stage where the provision of services plays a crucial role in expediting innovation, bringing stakeholders together and providing the means for translating ideas into commercial products	▪ Provide centralized location for innovation stakeholders in Thailand (example: Innovation Park) ▪ Provide regional support for innovation throughout the country
Coordination	▪ Overall coordination of innovation landscape is limited in Thailand due to other agencies overlapping with NIA's role as a central coordinating agency	▪ Clearly-defined, coherent, and mandated roles for AIN and other agencies ▪ Support ASEAN hub for innovation, similar to EU

Source: Global Innovation Index 2008-2009, INSEAD;