

The State and Innovation Policy in Late Development: Impact of Divergent Policy Choices

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Sources of data

- **Latecomer Development: Innovation and Knowledge for Economic Catch-up**
- **Uneven Development: Innovation and Learning in Asia and Africa**
- **The Poor in Health: Institutions for Health Innovation in Asia and Africa**
 - **Data collected through country-level field surveys of firms in several sectors between 2006-2008.**
 - **Over 2000 firms surveyed in Africa and Asia**

Our main hypothesis

1. States need to formulate a long-term vision and goal and pursue it.

- The technology vision was prominent in the Japanese, Korean and Taiwanese cases.
- States achieved optimal resource allocation from a long-term dynamic viewpoint which cannot be accomplished by the market mechanisms alone.
- These are the critical areas in which industrial policy should play a useful role through a wide array of instruments and incentives to acquire technology, build entrepreneurial (innovation) capacity through targeted and selected intervention in key sectors.

Our main hypothesis

2. States have to provide coordination functions in order to bring harmony and efficiency to the action of multiple actors acting in a system.

- The strength and success of the Japanese system of innovation which Freeman highlighted became a model for a number of East Asian countries
- The Alvey programme contains “radical features” such as clear commitment to a national strategic goal in technology policy, it had strong elements of “collaboration between firms, universities, and government; the setting up of a special Directorate within the DTI to organize and administer the programme.
- In an extremely detailed account of the state role in a wide array of sectors an sub-sectors, empirical evidence highlights the role of “state-led networking” in traditional as well as high-tech sectors in East Asian economies.
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Our main hypothesis

3. States have to put in place institutions where they are missing and strengthen those that are weak

- These institutions include those that foster interactive learning through systemic coordination.
- Incentive systems tend to develop from more fundamental institutional roots such as labour laws and even national constitution.
- States have been involved in creating institutions promoting academic-industry exchange by encouraging channels of learning, such as: joint publications, mobility of scientists and engineers, cooperative R&D,

Our main hypothesis

- 3. **States have to put in place institutions where they are missing and strengthen those that are weak.**
 - facility sharing, research training (e.g. capacity development at PhD level, international and local exchange of staff), IPRs (licenses, patents, copyrights), and academic entrepreneurship (spin-off firms).
 - Absence of certain “popular” institutions were actively pursued as part of this (IPRs).
 - **EXAMPLES: INDIA and KOREA**
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Our main hypothesis

3. States act as guarantors of risks and provide innovation “insurance” .

- Entrepreneurs are slow to uptake innovation prospects coming out of the activities in a sector/ economy due to risk and uncertainty, especially in sectors and technologies that are new to the local contexts.
- Successful state action has involved the creation of several mechanisms, including newer systems of property rights that insure rents for having taken up the risks of engaging in innovation. The case of data exclusivity in pharmaceutical and biotechnological innovations is one such example.
- Apart from creating alternate property rights structures, state actions can insure innovation in a variety of other ways, including helping to create or protect consumer markets both local and export-oriented. All these forms of innovation “insurance” tend to play a very important role especially for firms in emerging sectors in latecomer contexts.

Our main hypothesis

5. States have to manage conflict and resolve problems of asymmetric power relations..

- The fundamental nature of innovation (risk and uncertainty) and the problems of incompleteness of contracts that is deeply inherent in large-scale industrialization efforts helps us to explain some of the roles above.
- Innovation as with the execution of large scale projects such as heavy chemicals, iron and steel, and electronics industries involve the participation and in ideal situation, collaboration of several actors all of whom might not be willing participants. This could happen when powerful actors in an economy with vested interested stand to lose influence, profits and markets as a result of emerging new sectors and industries. In other words, some actors might potentially gain while others potentially lose; and more invidious is the uncertainty of the extent of gains and losses. This raises the prospects for conflict. Where then is the platform for bargaining and mediation?
- The state acts as the **overall coordinator** with the mechanisms of institutions and incentives.

Basic propositions

- **We examine the well-established notion that the microeconomic processes of interactive learning leads to innovation even in the context of latecomer economy.**
- **Firms in a latecomer economies require state support to produce and innovate because markets do not function well.**
- **Policy choices are therefore instrumental in explaining the success/failure of sectors**

In the paper we have circulated, we have examined these notions using:

- Empirical data collected in South Africa and Malaysia in the hardware and software sectors to illustrate the inter-linkages between state policy, technological capabilities and interactive learning.
- Technological learning involves not just technical learning but learning to build the right kinds of organizations and to foster the institutional forms within which policies would make the expected impact.
- In Malaysia we found strategic policy choices made very early on that continued to exert impact on performance for a very long period of time.
 - Policy deliberately focused on infrastructure (physical and knowledge), promoting coordination and facilitating firms' to accumulate capabilities.
 - For example, Penang Development Corporation facilitated coordination through the Free Trade Zone Penang Companies Association (FREPENCA), apart from providing infrastructure and coordination services.
 - As a result, it attracted a lot of flagship companies, including over ten semiconductor firms to Penang.

Results continued:

- Productive capacity was the focus, and state action facilitated this (through ports, etc).
- In SA, a different kind of choice was made and this impacts on the capabilities available to expand from the software sector (which is performing well) to the hardware sector.
 - Policy was non-interventionist, with very few limitations imposed by the state.
 - Policy choice was to open the space up for foreign firms, that has no strategic direction to encourage **local production**.
 - While knowledge infrastructure was also built in SA, there was no purposive policy action to engage this in local hardware manufacturing.
 - As a result, SA remains a consumer of hardware, while Malaysia is a global hardware exporter.

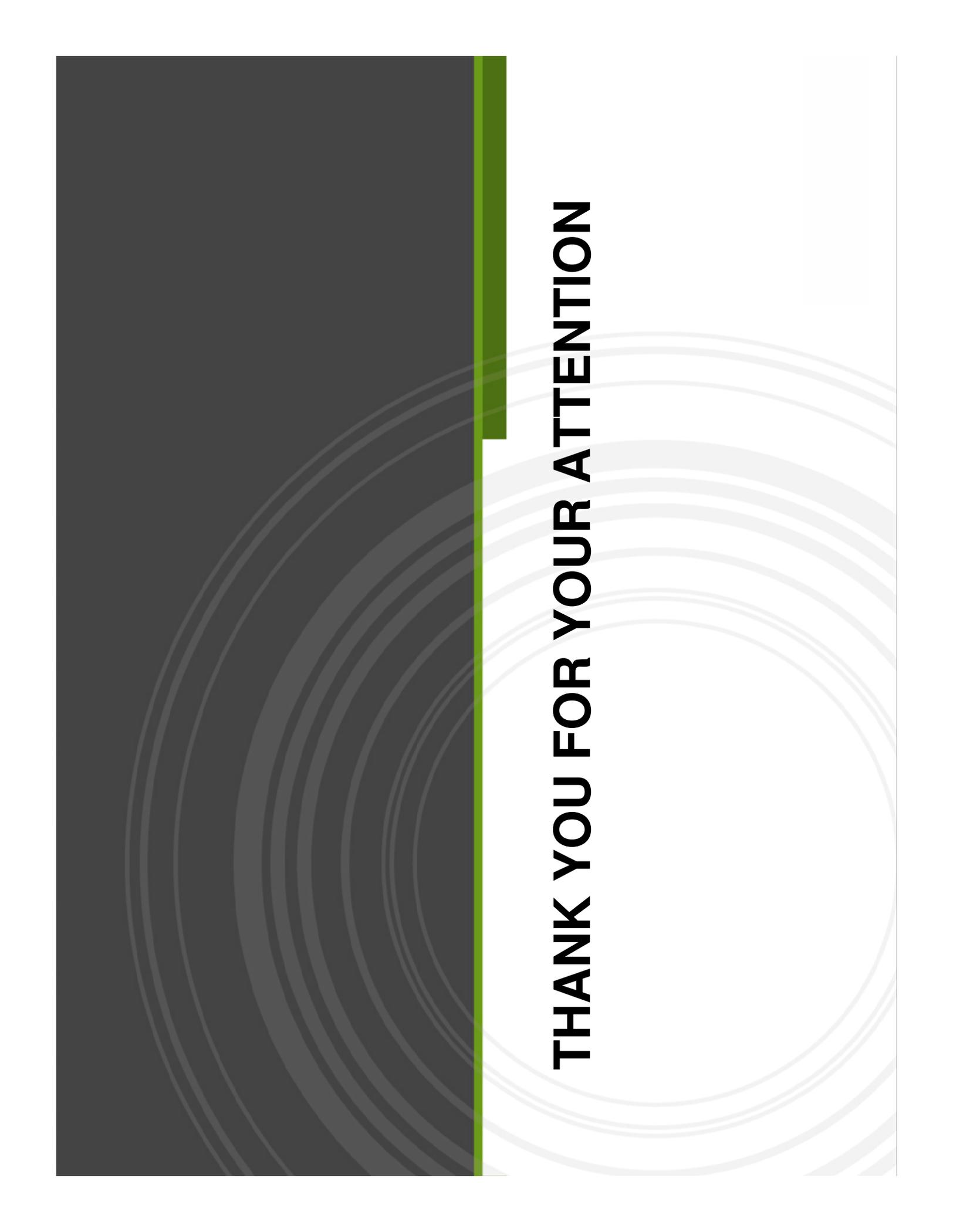
These results are reinforced through our research in other sectors and countries:

- We find evidence of the limitation of the state in deliberately building knowledge infrastructure to promote hardware manufacturing.
- The empirical results reinforce the role of the state in supporting innovation holistically through purposive action. While knowledge infrastructure is necessary, it is not sufficient.
- **Policy choice determines the nature of actors that are attracted within the national system.**
 - Malaysia's hardware sector attracted giant multinationals with strong links to export markets indirectly helping Malaysian economy to connect globally.
 - Kenya's floriculture sector remains agriculture and not an industry due to policy choice on a particular form of breeders' rights protection.
 - Policy choices in the Indian pharmaceutical sector made it unattractive for the foreign firms to operate in the country. Present policy choices continue to seek solutions in favour of domestic firms.

Results continued:

- **Policy choices condition the depth of technological capabilities acquired, e.g.,**
 - Taiwanese IH companies relocated to China partly as a result of declining profit but more crucially due to policy choice to change legal constraints that prevented notebook production earlier in place by Taiwanese firms in China.
 - Bangladesh's pharmaceutical sector operates at the manufacturing end (formulations) of a high knowledge intensive industry, due to the policy choices made for secondary and tertiary education, technology acquisition and public funding of research and coordination.
- **How policy choices play out depends on social and historical contexts.**
 - India versus Bangladesh pharmaceutical sectors
 - Nigerian and Korean steel industry

Strong technocratic capacity of the state to make decisions and allocate resources for both low-tech and more complex technological processes.



THANK YOU FOR YOUR ATTENTION