

NARRATING THE INDUSTRIALIZATION STRATEGIES OF EAST ASIA ECONOMIES: POLITICAL LEADERSHIP, TECHNOCRATS AND POLICY PROCESS

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Prepared by Wong Chan-Yuan

**Senior Lecturer, Department of Science and
Technology Studies, University of Malaya,
Malaysia**

Diffusion of Catching-up Industrialization Strategies: The Dynamics of East Asia's Policy Learning Process

Chan-Yuan WONG*

Department of Science and Technology Studies, Faculty of Science, University of Malaya, Kuala Lumpur, Malaysia

Kee-Cheok CHEONG

Faculty of Economics and Administration, University of Malaya, K

Abstract

This paper provides an overview of catch-up industrialization in East Asia over the past few decades, articulating a transition from Akamatsu's Flying Geese Model to a learning-by-doing catching-up model. Within this intellectual framework, the paper explores the economic, political and institutional context of implementation of catch-up strategies (management of rents) in South Korea, Taiwan and Malaysia. It provides a conceptual grid that summarizes the current research on industrialization, explicitly acknowledging China's multi-pronged mixed-mode model. The strategic model proposed may provide policy lessons for other developing countries aspiring to follow the path of technology upgrading.

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Governing the Economic Transition: How Taiwan Transformed Its Industrial System to Attain Virtuous Cycle Development

Chan-Yuan Wong

Department of Science and Technology Studies, University of Malaya, Kuala Lumpur, Malaysia

Mei-Chih Hu

Institute of Technology Management, National Tsing Hua University, Hsinchu, Taiwan

Jyh-Wen Shiu

Industrial Technology Research Institute, Hsinchu, Taiwan

Abstract

This study explores the transitional processes of Taiwan's innovation system over the decades, evolving from being rooted in traditional industries to attaining development in a dynamic environment. Our approach is inspired by the Arena of Development theory and acknowledges transformation failures, in which we highlighted the types of failures that might progress and how they were overcome in the evolutionary targeting of Taiwan's industries. Our findings demonstrate that the success of Taiwan's economic transition is targeted with a series of macrolevel policies in the early phase of development; mesolevel institutions to attain the industrial emergence settings; and, in pursuit of the virtuous cycle of microlevel collaboration platform. We attribute the success of Taiwan's industrial system to systematic government interventions. This study provides novel and salient normative guidance for policymakers in governing transitional processes of innovation.

KEY WORDS: transformation, transition process, evolutionary targeting policy, non-Taiwan, innovation, institutions, industry



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Rent-seeking, industrial policies and national innovation systems in Southeast Asian economies

Chan-Yuan Wong

Department of Science and Technology Studies, Faculty of Science Building, University of Malaya, 50603 Kuala Lumpur, Malaysia

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ABSTRACT

This paper seeks to deepen our understanding of the national innovation systems of Southeast Asian economies through formulating a conceptual framework that articulates the industrial policy mechanism, rents and rent-seeking activities that in turn lead to economic growth. The framework is built on the cases of industrialization and development in Southeast Asian economies to provide a context which is conceptual in orientation and seeks to address how industrial policies and rent-seeking activities can create an environment that supports a functioning innovation system. This paper highlights the importance of industrial policy and value-enhancing rents for indigenous technology development. Singapore recorded significant progress in indigenous technology development. This is largely attributed to an industrial support mechanism that promotes learning in the indigenous production system. In addition, the state structure of Singapore appears to be better positioned for creating value-enhancing rents in order to develop its indigenous industries. This study suggests developing economies such as Malaysia, Thailand and Vietnam should pursue an industrial development strategy that promotes indigenous technologies in order to obtain linkages and technology spillover that are similar to those in many of the newly industrialized economies of Asia.

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1. Introduction

Riding on the back of massive inflows of foreign direct investment (FDI) since the 1970s when many free trade zones were opened in Southeast Asia, economies such as Malaysia, Thailand, Singapore and Vietnam (inflow of FDI since the mid of 1980s) have recorded rapid industrialization since. With a heavy emphasis on high-technology

multinationals relocating their labor-intensive stages of assembly in these emerging economies. Along with other high-performing newly industrialized economies (NIEs) of Asia, Southeast Asian economies witnessed considerable success in their drive towards growth and industrialization, mainly fueled by growth-advancing capital accumulation rents. However, in contrast to the case of NIEs, many Southeast Asian economies, particularly Malaysia and

INTRODUCTION

- We would like to provide an overview of catch-up industrialization strategies in East Asia over the past few decades, articulating a theoretical conceptual change from Akamatsu's flying geese model to a leapfrogging followed with a path-creating catching-up model.
- Within this intellectual context, this study explores the economic, political and institutional conditions for effective implementation of catch-up strategies.
- South Korea, China, Taiwan and Malaysia

FLYING GEESE

- The Flying Geese model was useful to explain the economic integration of Asia-Pacific countries.
- It was often depicted as a hierarchy of industrialization.
- The Flying Geese model portrays Japan as the driving force for economic and technological innovation in the Asia-Pacific Region.
- But when wages and other costs in manufacturing rose in Japan, production activities were relocated and technology flowed outward to other Asia-Pacific countries.

- There are, however, two flaws in Flying Geese model.
- The first is the assumption of a stable hierarchy. Japan's position at the head of the hierarchy was not guaranteed. Many latecomer firms in first tier NIDEs caught up with Japanese firms at the technology frontier.
- Second, the Flying Geese model seems to assume that there is a simple linear relationship between the leading economy (Japan) and the followers (the NIDEs). At a certain stage of their development, the followers will automatically pursue upgrading strategies to advance their technological capabilities to challenge the dominant position of technological leaders. However, this fails to recognize the possible existence of impediments to late-comer upgrading.

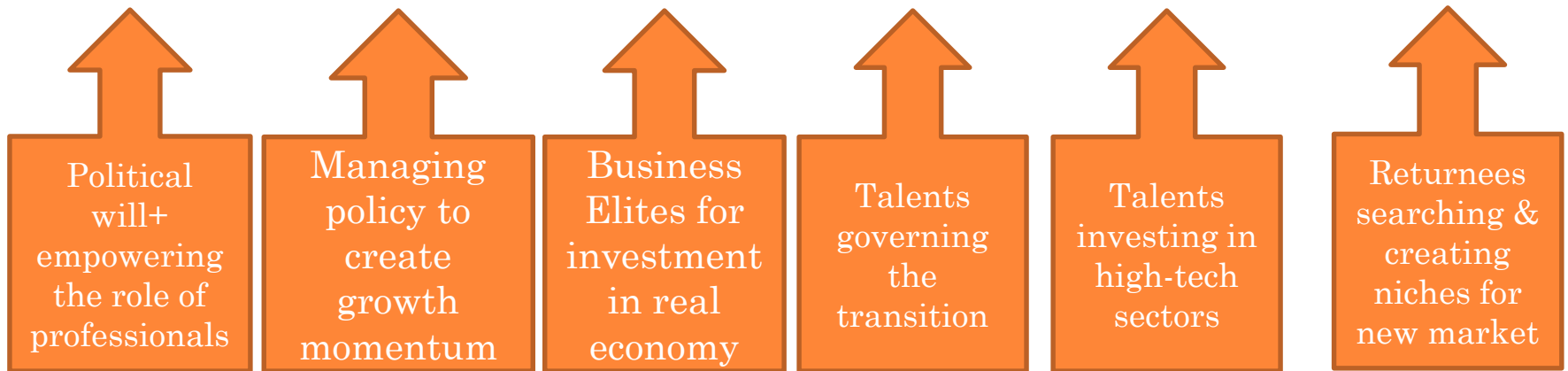
DEVELOPMENTAL DICTATORS

- Many “developmental dictators” of Asia had organized and reorganized the socio-economic systems and purposefully engineered institutions of their respective economies to ensure the success of their development policies.
- These development policies legitimized many methods to mobilize capital and human resources to serve the interests of the state to achieve its goals.
- Akira Suehiro: The trajectory and prospects of East Asian Economies

	Regime	The renowned architects of economics and industrial structure	Influential entrepreneurs/organizations during the early catch-up
South Korea (1961-1979)	Park Chung-Hee Regime	Park Chung-Hee and Kim Chung-Yum	Chung Ju-Yung of Hyundai and Park Tae-Joon of Pohang Iron and Steel
Taiwan (1961-1985)	Chiang's Regime (Chiang Kai-Shek and Chiang Ching-Kuo)	Li Kuo-Ting and Zhongrong Yin (K.Y. Yin)	Stan Shih of Acer, Morris Chang of TSMC and Xianqi Fang of United Microelectronics
Malaysia (1981-2003)	Mahathir Mohammad's Regime	Mahathir Mohammad, Daim Zainuddin, Lim Chung Eu (for Penang) and Anwar Ibrahim	Shamsuddin Abdul Kadir of Sapura Group, Perwaja Steel, and Proton (automobile)
China (1981-1989)	Deng Xiao-Ping's Regime	Zhu Rongji, Zhao Ziyang and Wan Li	Liu Chuanzhi of Lenovo and Ren Zhengfei of Huawei Technologies

Developmentalist Regimes in Selected East Asian Economies

Regime	Architects for economics structure	Elites during early industrialization	Architects industrial transition structure	Influential entrepreneurs during the early catch-up	Influential returnees during the expansion phase
Chiang Ching-Kuo (Taiwan)	K.Y. Yin	Lin Sha-Chih of Tatung and M.P. Chen of Sampo	Li Kuo-Ting, Chintey Hsih	Stan Shih of Acer and Terry Guo of Foxconn	Morris Chang of TSMC, Matthew Miao of Mitec, Yang Ding-Yuan of Winbond, etc.



ON A PATH TO CREATIVE DESTRUCTION: A RIGHT COMBINATION FOR GROWTH?

THE LEAPFROGGING AND PATH-CREATING MODEL

- Industrial Policy: Alice Amsden; H-J Chang, Stiglitz, J. etc.
- Economics of Catching-up: Linsu Kim, Keun Lee etc.
- Innovation Process: Those who have written on NIS of Asia
- OEM-ODM-OBM strategy in Asia: Mike Hobday
- Building upon this “OEM-ODM-OBM” framework, Keun Lee proposed the Leapfrogging and Path-creating Model to explain the process of catching-up. First there is a path-following catching-up, which is similar to the OEM-ODM-OBM strategy.
- The latecomers develop their capabilities by following the path taken by the forerunners.
- Second, there is a leapfrogging catching-up, when the latecomers pursuing the forerunners’ path but skips some development stages and starts competing with the technological leaders.
- Third, there is path-creating catching-up, when latecomers explore their own path of development after pursuing just a few stages of the forerunners’ path.

SOUTH KOREA: PICKING-WINNERS-CUM-LEAPFROGGING APPROACH

- South Korea experienced a similar path of development with Japan where local conglomerate firms were selected as the main agent of development.
- To move up the value-chain of technology, South Korea practised a state protection strategy, and mobilized resources targeted at *chaebol* (conglomerate firms) to build technology capabilities and competencies, particularly during the infant stage of industrial development.
- The government, on the one hand, deliberately promoted *chaebols* to acquire learning capabilities, while, on the other, constructed crises to stimulate entrepreneurship from *chaebols* to meet the imposed targets. The strategic crises often related to export targets set by the government.

- Many South Korean companies are now renowned internationally in many industries and technologies. Most of the *chaebols* have venture into engineering consulting services, exporting innovative solutions to many firms abroad.
- However, this strategy had ignored the development of SMEs' technological capabilities. Leapfrogging approach, directing resources to develop *chaebols* had marginalized the progress of SMEs in South Korea.
- The organization inertia built over the years may prevent them to leap-frog into a new economic paradigm.

CHINA: MIXED-MODE WITH POLICY EXPERIMENTATION MODEL

- China achieved remarkably rapid industrialization and technological catch-up through heavy reliance on the massive inflows of foreign direct investment (FDI) since 1978 when the Chinese economic reform programs were launched.
- The Chinese government foresaw the potentials for high growth in medium and high technology sectors, and were aware the need for commitment in building competitive and dynamic industrial regions.
- Therefore, a thoroughly reorganization and streamlining of the institutions to subsidize learning in the production system is vital for national economic development.
- The Chinese government has sought to invest in high technology industrial sectors and locally owned production organizations to diversify from MNCs' manufacturing dependent economy to reduce the reliance on FDI for growth and development. The inward FDI as percentage of gross domestic products were kept low, a level comparable with South Korea and Taiwan.

- There are three distinct approaches followed by China in promoting technological upgrading.
- Chinese enterprises, taking advantage of such modular production, would outsource design and other technology-intensive activities to overcome their weak domestic technological capability.
- A second strategy is to leverage off the large number of foreign invested enterprises (FIEs) that are the products of China's export-oriented model of growth.
- Since FIEs produce goods with higher technology and quality than Chinese enterprises, the Chinese government's objective is to gain technology spillovers using this 'learning by exporting' model.
- However, since FIEs will not transfer technology voluntarily, there is a large role for government. This role consists of designating local enterprises with which FIEs were to enter into joint ventures (JVs), as well as stringent technology transfer agreements in JV contracts, both of which is to enable local enterprises to benchmark FIEs.

SOME IMPORTANT REMARKS FROM KAHNEMAN, D. AND TALEB, N.

- Planning fallacy
- Illusion of understanding: we believe we know the past, which implies that the future also should be knowable
- Is there a recipes for success: are we learning too much from these success stories
- Narrative fallacy: Are stories of success and failure consistently exaggerate the impact of leadership style and specific best practices? Are the message useful?

CERTAIN VIEWPOINTS/KEYWORDS ARE GAINING THE ATTENTION OF MANY SCHOLARS

- Evolutionary path and acknowledge the role of luck
- Phased-oriented policy approach
- Exploratory/Experimentation approach- for policy learning
- Platform (instead of top down type of management)
- Supporting the self-evolving/natural clusters and rethinking the engineered model type for high-tech cluster or science park
- Seeking the views of the skilled one in planning

TEUBAL'S VIEW ON GOVERNMENT FAILURES

- Implicit or Very General Priority or Ignoring Emerging Areas of National Importance
- Biases in(generic, multi-ministerial) Priority Setting: lack of coordination, politics and faulty governance
- Unmet Need for Priority Re-specification in response to a change in the Global/Domestic environment
- Priority Setting in relation to HLOs (Higher Level Organizations) is Non Systemic and Non Evolutionary
- Priority Articulation (into Policies)leading to Biased Policies

TRANSFORMATION FAILURES

	Type of Failure	Failure Mechanism
Transformational Failures	Directionality Failures	<ol style="list-style-type: none">1. Lack of shared vision in the transformation process that may ultimately lead to collective coordination failures.2. Lack of policy infrastructure to establish a development path.
	Demand Articulation Failure	Insufficient space/platforms for learning user/market demands.
	Policy Coordination Failure	Lack of multi-level policy coordination in a governing system.
	Reflexivity Failure	<ol style="list-style-type: none">1. Lack of policy learning opportunities.2. Lack of adaptive policy portfolios to address uncertainty.

Source: Adapted from Weber and Rohrer (2012).

NARRATING THE EXPERIENCE OF ASIAN ECONOMIES

- Three Phases of Development
 - Pre-emergence
 - Emergence
 - Virtuous Cycle
- Government/Transformation failure
- Transition
- Taiwan and Malaysia

TAIWAN: EVOLUTIONARY TARGETING WITH PATH-CREATING APPROACH

- Review the policy process
 - John Mathews
 - W-W Chu
 - Alice Amsden
 - Sophia, L.
 - Wade, R.
 - Mike Hobdays,
 - Jomo, K.S.
 - Rasiah, R.
 - etc.
- Interview

DESCRIPTIONS OF INTERVIEW (E.G. TAIWAN)

Type of Organization	Organizations	Position of Interviewee	Main Topics Discussed
Government agencies	<ul style="list-style-type: none"> Council for Economic Planning and Development Industrial Technology Research Institute (ITRI) Ministry of Economic Affairs Academia Sinica National Science Council Taiwan External Trade Development Council 	<ul style="list-style-type: none"> Former deputy minister Deputy division director, former president Industrial policy advisor Senior fellow Director general for science and technology policy research Researcher 	<ul style="list-style-type: none"> What is the process for policy design and development? What types of programmes and innovation financing activities are administrated? The history and role of agency in every transition and in interactions with other actors. How the agency created a new platform/conducive environment for actors to innovate? What types of infrastructure prepared existing actors for the next wave of innovation? Diffusion of vision and professionalism
Universities	<ul style="list-style-type: none"> 7 National Chaio Tung University (NCTU) 8 National Tsing Hua University (NTHU) 	<ul style="list-style-type: none"> 7 Academic professors 8 Academic professors 	<ul style="list-style-type: none"> Research priorities What types of programmes were used to develop human capital for the new wave of innovations?
Private firms	<ul style="list-style-type: none"> 9 United Microelectronics Corporation (UMC) 10 Taiwan Semiconductor Manufacturing Company (TSMC) 11 Precision Semiconductor Mask Corporation 12 Global Unichip Corporation 13 Kingston 14 Phison 	<ul style="list-style-type: none"> 9 Engineers, Vice president of the development division 10 Division manager, senior engineers 11 Division vice president 12 Division manager 13 Division manager 14 Founder 	<ul style="list-style-type: none"> Any interaction with government agencies or universities? How your organizations adapt to become a niche players in the global supply chain Diffusion of vision and professionalism in the global value chain

PRE-EMERGENCY PHASE: ESTABLISHING MACRO-INSTITUTION FUNDAMENTALS (1960S TO THE MIDDLE OF 1970S)

- It targeted agriculture output and development of light manufacturing industries- employment opportunities to address its labour-surplus issues
- A group of technocrats diffused professionalized forms of economics-related decisions in the government, and instituted professionalism in governing and administering economic affairs.
- To stabilize the political authority in Taiwan, a massive land reform was initiated in 1953 to encourage farmers to acquire land, so that they would switch their focus on political attention toward businesses.
- This had led to higher productivity in the agriculture sector and the lands were managed efficiently by the farmers to produce increased marketable surplus.



- A number of development plans were implemented to stimulate economic activities, ultimately lead into resource redeployment (Gerschenkron's view on mobilization) from low value-added to higher value-added activities.
- Consequently, various economic occupations, such as street vendors, motorcycle and bicycle repair shops, and taxi drivers in urban areas can trace their roots to the farming villages.
- The social status and economic welfare of these rural workers were greatly improved since 1960s
- The government provided diverse vocational and technical training programs for **farmers**, while encouraging them to switch their occupations into higher value-added occupations.



FOSTERING INVESTMENT ENVIRONMENT THROUGH MACRO-ECONOMIC POLICIES: POLICY MEASURES TO ADDRESS COORDINATION FAILURE

- The government made decisions on the direction and goal of industrialization, including the selection of targeted industries to be developed and the milestones and time frames of the development
- Trade was championed as a means to increase **manufacturing** outputs and employment, with the intent of improving income distribution and reducing income inequality.
- The Production Board then helped the entrepreneurs (who mostly had migrated from China during the civil war) to build light manufacturing industries such as textile and glass industries, aiming at increasing their production scale and scope as well as their capabilities.



- To upgrade Taiwan's manufacturing processing capabilities, the industrial learning policy was designed to favor MNCs.
- Government machinery was employed to ensure that supported industries or firms remained interested in long term investment rather than focused on short term profits.
- Technocrats were assigned to audit import substitution policy programs for the government, and to ensure that their commitments to accountability and transparency would convince the public of the benefits of government programs to support specific industrial activities for economic development.
- This administrative principle appears to be a useful tool to constrain unproductive rent-seekers to the status-quo and avoid monopoly power derived from government inefficiency.



INDUSTRIAL EMERGENCE PHASE: BUILDING A MULTI-AGENT STRUCTURE AND INSTITUTIONAL ENTREPRENEURSHIP (MID 1970S-1990S)

- Many local professionals and nationals living abroad were invited to provide advices on which sectors would have great potential for technological spillovers.
- The government had shifted the representation of high-tech knowledge diffusion and investments from central authorities to new public agencies/institutes and to various other non-profit organizations.
- This shift greatly reduced the force of status quo interests and paved the way for institutional entrepreneurs in the later growth phase.



EMPOWERING INSTITUTIONAL ENTREPRENEURS FOR INDUSTRIAL UPGRADING: POLICY MEASURES FOR DIRECTIONALITY FAILURE

- A new Science and Technology Law was enforced to empower the role of the new agencies in technology development and to reduce the possible red tape restrictions that might impede development.
- The institutional entrepreneurs were playing essential roles in translating the concepts of specialized infrastructure into concrete advanced technologies.
- During the translational process, a science park is established for semiconductor industry.
- It is located near the ITRI campus and two renowned universities focused on science and engineering, so as to create synergy for production of science-based technologies.



BUILDING COLLECTIVE INDIGENOUS TECHNOLOGY CAPABILITIES AND SPAWNING NEW AREAS OF SPECIALIZATION: POLICY MEASURES FOR DEMAND ARTICULATION AND REFLEXIVITY FAILURES

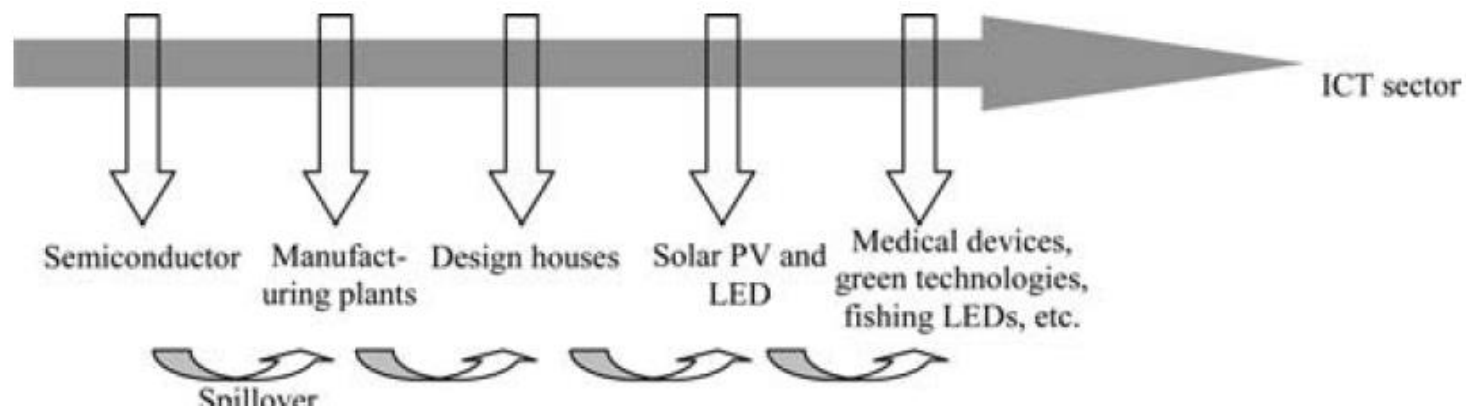
- Taiwan sought to position their national competitiveness in the form of original equipment manufacturing (OEM) through MNCs' subcontracting and international operations, so as to quickly infiltrate themselves into the global market.
- In 1976, ITRI, together with other agencies, was assigned the task of seeding semiconductor industries through technology transfer from established overseas firms.
- ITRI spun-off two pillars of Taiwan's semiconductor industry, UMC and TSMC, in the 1980s, deliberately germinating a centre-satellite system for SMEs.
- Many SMEs (farmers who were trained) were deliberately incorporated into the orbit of UMC and TSMC's international operations to promote a higher level of productivity and move up the technological chain while these companies were mostly being seed in the Hsinchu Science Park.
- Mediatek, RealTek, Novatek and Faradaytek-spun off from UMC. In the 1990s, UMC also expanded its manufacturing capacities by separating its facility into five separate entities, namely UMC, UICC, USIC, USC and SIS. These five entities were reintegrated in 2000.

- Those subsidized entrepreneurs who emerged early (e.g. SAMPO and TATUNG), who had limited entrepreneurial abilities and were only devoted to near-sighted profit, ultimately submitted to the *'built-in' sunset clause*
- Those showing institutional entrepreneurship (such as Acer) were helped by the creation of a favorable environment for local techno-entrepreneurs, while overseas Taiwanese (such as Morris Chang) were encouraged to return home to contribute to building a knowledge-intensive economy.



VIRTUOUS CYCLE DEVELOPMENT PHASE (SINCE THE 2000S): INITIATING PLATFORMS TO DEVELOP MICRO-LEVEL NICHE

- The accumulated knowledge in the semiconductor industry has laid a solid foundation for Taiwan to develop derived and extended industrial sectors.
- It is clear that the key to niche innovations has to be derived from applications integrated with diverse downstream markets and products.



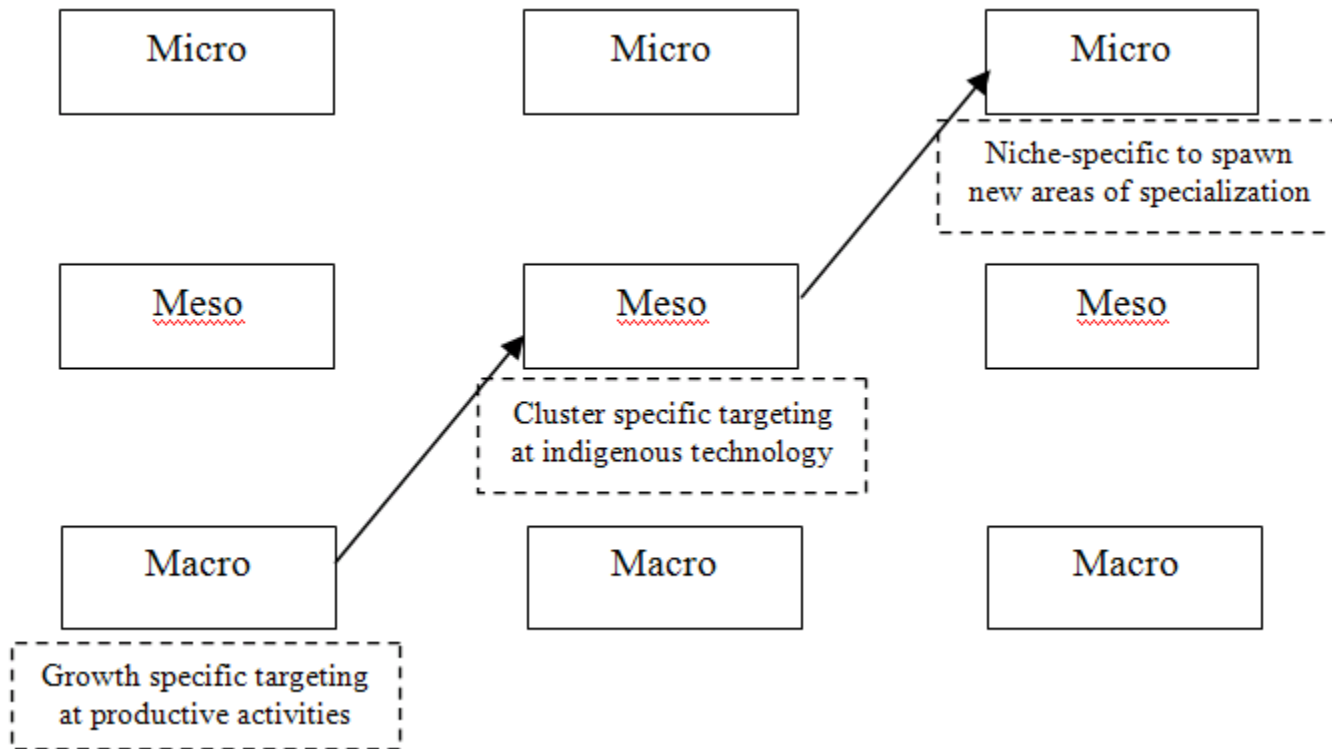
INITIATING USER-CENTRIC PLATFORMS: RECENT OBSERVABLE MEASURES FOR DIRECTIONALITY AND DEMAND ARTICULATION FAILURES

- Many public research institutions have emerged to provide latecomers with specific “platforms” to facilitate these transformation processes..
- which are intended to support the key stakeholders of specific industries..who by their activity will generate new industries and markets.



- The development process (discussed above) is elevated to other parts of Taiwan.
- Bicycle and machine tool industries in Taichung (organization of subsistence farmers that eventually led to a critical mass of sophisticated and high quality parts suppliers),
- The yacht industry in Kaohsiung (subsistence fishermen who were empowered to venture into businesses in luxury yachts)
- The moth orchid industry in Chaiyi (florists were empowered with scientific knowledge to cross breed different species of orchid for the export market) (for example, see Yan, 2008 and Hsieh, 2011).

- Our findings highlight the role of a number of agents in each of these phases:
- Technocrats and multinationals, who interacted under a top-down policy in the first pre-emergence phase;
- Techno-entrepreneurs and institutional entrepreneurs, who interacted under a mixture of top-down and bottom-up policy settings in the second take-off phase; and
- Stakeholders in R & D consortia and niche markets, who interacted under a bottom-up policy and top-down initiated collaboration platform in the third virtuous cycle development phase.



Three phases of evolutionary targeting policy cycle



MALAYSIA: MIXED-MODE MODEL AND POLICY LEARNING OF A LATECOMER

- Many economic policies in tier-2 NIDEs have to comply with the Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS) and the Agreement on Trade-Related Investment Measures (TRIMS) rules and agreements and other World Trade Organization (WTO) standards.
- However, selected industries in Malaysia operate under a different trade regime.
- For example, automobiles, telecommunications equipment and steel production have been highly protected in the Malaysian market since the mid-1980s.
- A number of state-initiated projects for the development of heavy industries were launched. There were a number of joint ventures (JVs) between the state and foreign manufacturers to produce for the domestic market and for export.
- That Malaysia achieved only modest technological development..

- Malaysia also initiated a number of science parks and high-tech clusters targeting information technology and biotechnology as part of the Malaysian government's intention to develop a post-industrial knowledge-based economy..
- The precondition to achieve a critical mass of entrepreneurs/talent for techno-entrepreneurial take-off has not been met.
- Reason: policy often targeted high-technology industries with scant regard to social capabilities or to the need for production learning.

- One exception that stands out from other state-initiated industrial projects is the palm oil refining industry
- The government had sought to use duty exemptions and tax incentives as the industrial policy instrument to promote the export of higher value-added processed palm oil (PPO) products
- The intention was to distort (reduce) the domestic prices of crude palm oil (CPO) from the real market price while keeping the price of PPO products at world market prices.
- Such policy had promoted many local firms to invest in PPO businesses and discouraged the export of CPO.

PRE-EMERGENCE AND EMERGENCE PHASE OF PPO INDUSTRY

- The importance of PRI/technocrats: The Palm Oil Research Institute (PORIM) was established in the late 1970s to support the technology upgrading of the PPO industry.
- It plays an important role in initiating, developing and supporting industrial R&D activities, including the chemistry and technology of processing
- The promotion of PPO businesses has led to a new breed of local entrepreneurs and talents in agro-businesses.
- There are engineers who left PORIM to venture into process engineering consultancy services, exporting palm oil processing machines and sustainable and environmental engineering solutions to many firms abroad.
- Many PPO industries shifted their manufacturing activities from labour-based in the 1970s to technology-intensive to produce more sophisticated high-technology products.
- See also the case of FELDA: from FELDA settlement scheme to large cultivation of rubber and oil palm trees to promoting high value added PPO products

	Phase 1 (pre-emergence)	Phase 2 (Industrial emergence)	Phase 3 (virtuous cycle development)
Objectives	<ul style="list-style-type: none"> Productive activities Quantity of jobs Critical Mass of agents 	<ul style="list-style-type: none"> Quality of jobs Indigenous capacity building 	<ul style="list-style-type: none"> New industries New areas of specialization
Policy Focus (Perspective: Directionality Failure)	<ul style="list-style-type: none"> Pro-poor growth policy-(Top Down) 	<ul style="list-style-type: none"> Pro-indigenous growth policy (Top down and bottom up) 	<ul style="list-style-type: none"> Pro-niche creation growth policy (Bottom up)
Coordination/ governing approach (Perspective: Policy Coordination Failure)	<ul style="list-style-type: none"> Diffusion of professionalism through highly credible institutional entrepreneurs Building credible communication between bureaucrats and the congress Market-led variety and pre-selection settings Targeting activities (such as financial infrastructures and vocational and technical trainings) to accelerate the emergence of new industries 	<ul style="list-style-type: none"> Professionals from both locals and locals abroad must be engaged to plan the transformation activities and make sense of the re-structuring processes. Pursuing and experimenting different institution-organization approach to articulate the demand of leading-edge technologies. Pursuing and experimenting different institution-organization approach to articulate the demand of leading-edge technologies. Make ways for indigenous growth Intermediaries to spawn new start-ups Bridging science and technology 	<ul style="list-style-type: none"> Establishing R&D consortia to provide entrepreneurs a platform/test bed to learn the markets (Direct top down policy measures must be reduced).
Administrative components (Perspective: Reflexivity Failure)	<ul style="list-style-type: none"> Central government as the main component for targeting policies 	<ul style="list-style-type: none"> Divisional entities to engage in alliances with central government and other agents 	<ul style="list-style-type: none"> Divisional entities to engage in alliances with stakeholders and other agents to foster user-centric innovations (Direct top down policy measures must be reduced).
Demand articulation	<ul style="list-style-type: none"> Trainings for vocational and technical skills to support productive industries 	<ul style="list-style-type: none"> Cluster/satellite model Internationalize domestic operations 	<ul style="list-style-type: none"> Interacting with major stakeholders
Principles for transformation	<ul style="list-style-type: none"> Supports be provided to only productive activities Institutionalize managerial professionalism in both government and businesses operation Built-in sunset clause 	<ul style="list-style-type: none"> Market-led selection Guided competition 	<ul style="list-style-type: none"> Facilitating the process of new niches/business emergence

Salient Principles for Structural Transformation



CONCLUSION

- The orderliness of industrial development envisaged by the Flying Geese model of Akamatsu has been shattered in the last decades of the twentieth century and the first decade of this century by East Asian economies' adoption of various catch-up strategies. These strategies have brought major industries in these economies to the technological frontier that was formerly the preserve of advanced countries.
- The experiences of catch-up in several economies analysed in our studies clearly show the diversity of catch-up strategies that can lead to a successful outcome.
- The experience of the selected economies in development could provide policy guide and lessons for other economies to develop their niches for new market development.
- However, it is not (and never will be) sufficient to be used as policy template for economic development. An evolutionary approach that emphasizes sequential policy experimentation for learning is needed. Systemic policy learning would recognize an appropriate government structure in supporting development and what so bridging institutes is established.

THANK YOU

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