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## Technology for Development: Ten True Stories Revealing the Complexity of Replicating South Korean Success

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**JOURNAL OF SCIENCE, TECHNOLOGY AND INNOVATION  
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Volume 05, Issue 02, December 2020**

**FOREWORD by EDITOR-in-CHIEF**

We are pleased to present to the readers with the fifth issue of the Journal of Science, Technology and Innovation Policy and Management. In this issue, we continue to publish the results of interdisciplinary scientific researches in various aspects of STI Policy and Management. This issue, prior issues, and other resources are available at [www.stipmjournal.org](http://www.stipmjournal.org).

We thank the reviewers and editorial boards for taking their precious time to ensure the quality of the articles through the double-blind peer review process. The seven articles in this volume cover a wide range of topics in STI policy and R&D governance and management. In this issue, we introduce a special topic on *Original Concept Formation*. This is a new focus and scope of STI Policy and Management Journal. A concept formation in technology policy (TP) and management of technology (MOT), including proven soft technology concept based on rigorous data, cumulatively published references, and long experiences in the academic sphere. The original concept formation should deal with soft technology problems, policy context for problem-solving, concept formation, and its effective implementation.

M. Nawaz Sharif presents an original concept formation entitled *Technology for Development: Ten True Stories Revealing the Complexity of Replicating South Korean Success*. The essay comprises ten true stories presented to highlight personally observed problems encountered by Asian developing country leadership who tried to replicate South Korean success in fostering technology innovation induced sustainable economic growth strategy without paying robust attention to the crucial role of creating an "innovation climate/culture" as a necessary foundation for myriad development efforts.

The subsequent articles revealed research findings on the various issue of STI policy and R&D governance and management. First article is presented by Erwiza Erman entitled *Changing Stages of System Innovation at the Ombilin's Coal Mines of Sawahlunto: From Ghost Town to World Heritage*. This paper examines system innovation, a transition from one socio-technical system to another by transforming the historical and cultural area into a world heritage city. The objective of this study is to reconstruct the changing stages of system innovation in achieving the World Heritage status at the Ombilin coal mines site of Sawahlunto.

The second article is composed by Rachmini Saporita and Savitri Dyah, entitled *Mechanism of Implementing Technology in the Community of Eastern Indonesia (Case Study in Belu Regency, Nusa Tenggara Timur Province)*. This paper focuses on the mechanism of technology implementation to increase society's welfare. The study also evaluated technology implementation activities in the period 2003 to 2019, using meta-synthesis. The analysis found that there are five types of technology transfer mechanisms carried out by researchers at LIPI.

The third article is composed by Budi Triyono, Ria Hardiyati, and Aditya Wisnu Pradana, entitled *Lack of Contribution of the Indonesian R&D Program to Economic Sector: Learning from the RPJMN Implementation*. Through a review of the National Medium-Term Development Plan (RPJMN) documents on the S&T Sector period of 2015–2019, this article attempts to analyze various obstacles related to the minimal contribution of Indonesian R&D Programs in supporting Indonesia's economic sector and national competitiveness.

Wati Hermawati presents an article entitled *Key Success Factors in Managing and Implementing Public Funded R&D Projects in Indonesia*. In this paper, she mentioned that the role of public-funded R&D institutions in supporting innovation and economic performance of MSMEs (micro, small and medium enterprises) is still very small. Therefore, the success factors in managing and implementing R&D projects at R&D institutions should be identified, particularly in providing solution for MSMEs' problems. Through the two case studies, this article provides key success factors and lessons learned to improve R&D project activities at PRCs.

The fifth article is presented by Trina Fizzanty, Kusnandar, Sigit Setiawan, Radot Manalu, and Dini Oktavianti, entitled *The International Research Collaboration, Learning and Promoting Innovation Capability in Indonesia Medical Sectors*. This article presents the case of eight international collaborative research projects in medical research in Indonesia. The research found that International research collaboration has opened the opportunity for Indonesian researchers to learn and upgrade their capability and contribute to the scientific arena. However, none of international research projects reached the commercialization stage yet, but some of which were at the beginning of clinical trial stage.

Finally, Budi Harsanto presents an article entitled *Eco-innovation Research in Indonesia: A Systematic Review and Future Directions*. The article analyzes the recent development of eco-innovation research in Indonesia and provides some potential avenues for future research. The analysis was carried out using Systematic Literature Review (SLR) techniques to synthesize knowledge development of a scientific field in a structured, transparent, and reliable manner.

The editor of STIPM Journal are dedicated to working with scholars in existing and emerging STI issues and produce high-quality papers to expand knowledge in the field of STI Policy and R&D Governance and Management. We believe that all the papers published in this issue will greatly influence on the STI Policy and Management for Sustainable Development.

The STIPM Journal is indexed by Google Scholar, ISJD, IPI, DOAJ, BASE, SINTA, and OCLC World Cat. This makes the journal dissemination wider.

The editor-in-chief acknowledge and are very grateful to the authors, the editorial board, the section editors, the designer, the staff of the LIPI Press Publishing Office, and everyone who has contributed to the publication of the STIPM journal. We are also very grateful to our future readers. By inviting the readers to publish your research results articles in this journal, we believe in the meaningfulness and future collaboration as well as to provide a higher scientific platform for the authors and the readers, with a comprehensive overview of the most recent STI Policy and Management research and development at the national, regional, and international level.

Happy New Year 2021 to all of you!

Jakarta, 15 December 2020

Editor-In-Chief



# JOURNAL OF STI POLICY AND MANAGEMENT

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## LIST OF CONTENTS

Technology for Development: Ten True Stories Revealing the Complexity of Replicating South Korean Success <b>M. Nawaz Sharif</b> .....	95–103
Changing Stages of System Innovation at the Ombilin’s Coal Mines of Sawahlunto: From Ghost Town to World Heritage <b>Erwiza Erman</b> .....	105–119
Mechanism of Implementing Technology in the Community of Eastern Indonesia (Case Study in Belu Regency– Nusa Tenggara Timur Province) <b>Rachmini Saparita and Savitri Dyah</b> .....	121–136
The Gap between Program Planning and Implementation: The Case of R&D Program in Indonesian RPJMN <b>Budi Triyono, Ria Hardiyati, and Aditya Wisnu Pradana</b> .....	137–146
Key Success Factors in Managing and Implementing Public Funded R&D Projects in Indonesia <b>Wati Hermawati</b> .....	147–160
The International Research Collaboration, Learning and Promoting Innovation Capability in Indonesia Medical Sectors <b>Trina Fizzanty, Kusnandar, Sigit Setiawan, Radot Manalu, and Dini Oktaviyanti</b> .....	161–178
Eco-Innovation Research in Indonesia: A Systematic Review and Future Directions <b>Budi Harsanto</b> .....	179–191





ORIGINAL CONCEPT FORMATION

## Technology for Development: Ten True Stories Revealing the Complexity of Replicating South Korean Success

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### ABSTRACT

This essay comprises ten true stories presented to highlight personally observed problems encountered by Asian developing country leadership who tried to replicate South Korean success in fostering technology innovation induced sustainable economic growth strategy without paying robust attention to the crucial role of creating an “innovation climate/culture” as necessary foundation for myriad development efforts. It seems that the country leadership focused too much on the model mechanics, but did not have rigorous concern for the underlying principles of those models. To reveal validity of this assertion, the author presents ten true stories that he personally observed, i.e., (1) true story on suspicion and disrespect; (2) true story on mindset constraint; (3) true story on caring for the weak; (4) true story of super achievers; (5) true story on failure to follow through; (6) true story on “turn right” into the river; (7) true story of motherly protection; (8) true story of supreme commitment; (9) true story of KIST and MOST mirages; and (10) true story on plan implementation.

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## I. INTRODUCTORY NOTE FROM EDITOR

The editors are please to publish this paper on “Ten True Stories” by Prof Dr. Nawaz Sharif (Former Chair Professor and Vice-President for Academic Affairs of the Asian Institute of Technology and Former Director of the UN-ESCAP’s Asian and Pacific Center for Transfer of Technology) in his preferred format of having a dialogue goal of utilizing “viewgraphs” as

mind-share discussion media. Generally, each viewgraph presented by the author is supposed to be a self-contained single-page chart (of idea-boxes, factual-texts and positional-hierarchy connectors), representing one selected technology management related conceptual framework or one practical application oriented example in a real-world global enterprise operations setting. From the list of published documents on the subject of “Technology for Development” (see last page of this paper), the readers can visualize the author’s two decades of subject matter related studies and programs conducted in the Asian region.

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**II. TEN TRUE STORIES ON TECHNOLOGY FOR DEVELOPMENT**

**Ten True Stories on Complexity of Replication South Korean Success**

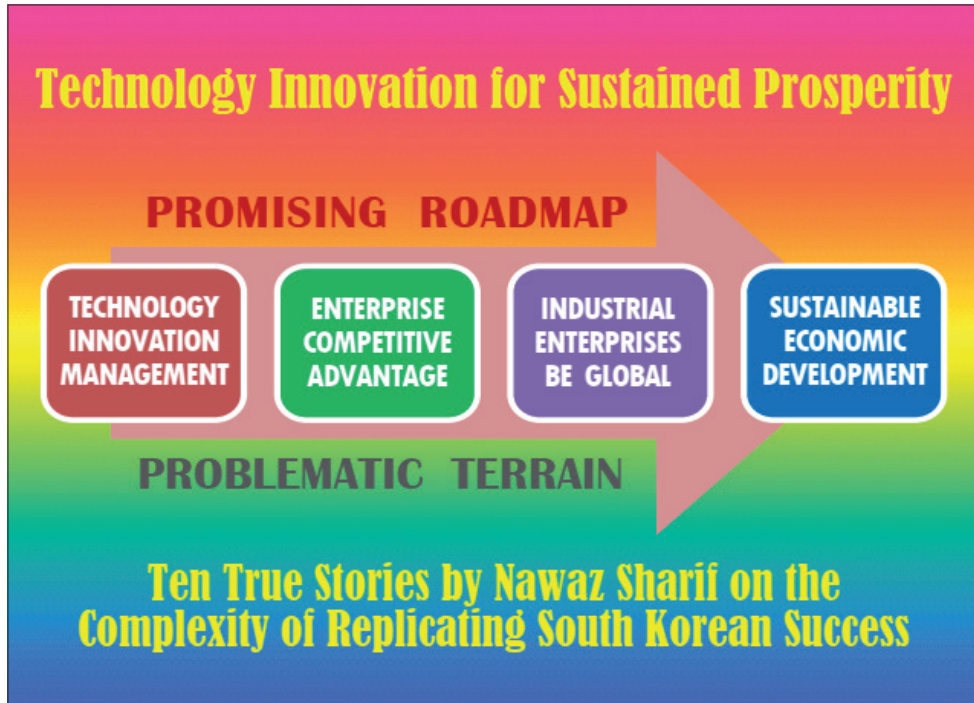


Figure 1. Technology for Development: Promising Roadmap and Problematic Terrain

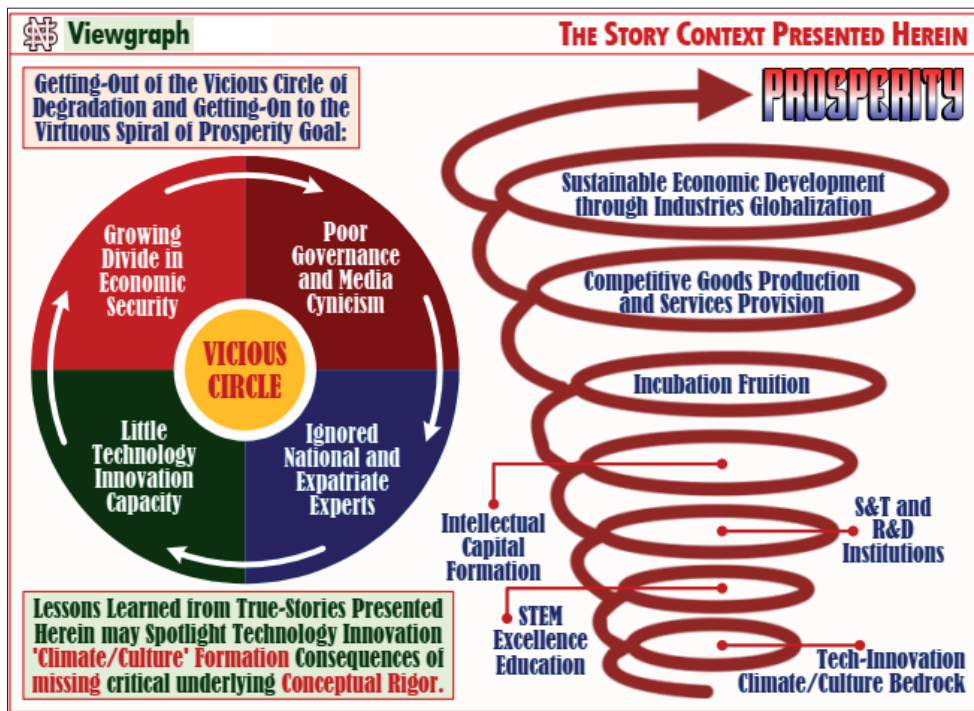


Figure 2. The Context for the Ten True Stories Presented Herein



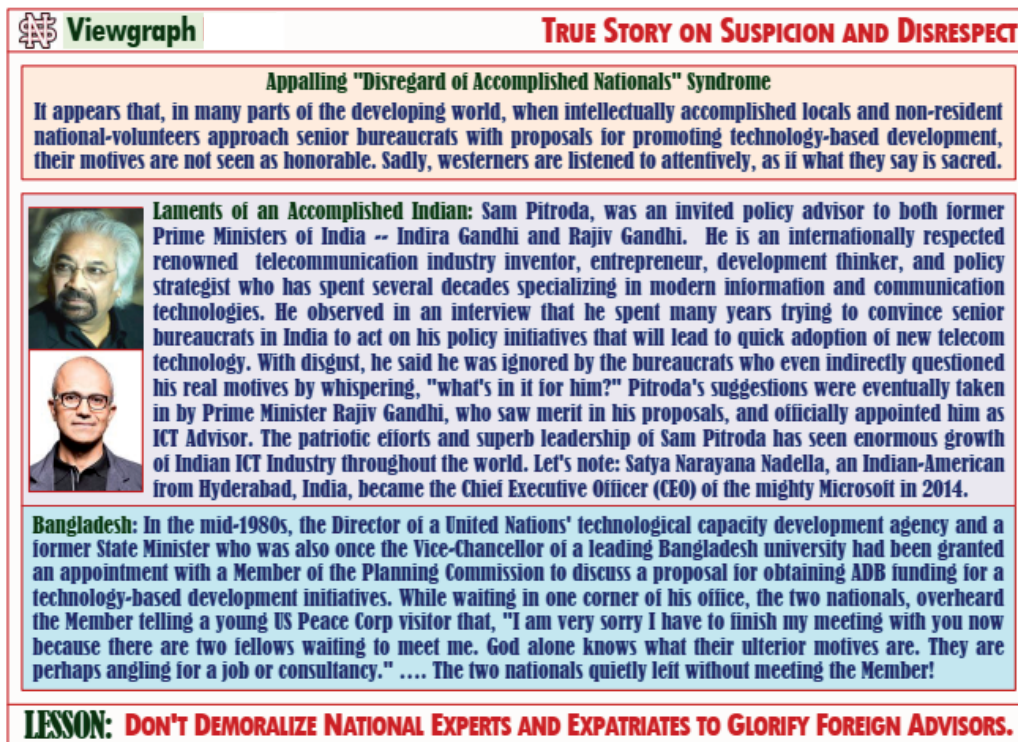


Figure 3. Viewgraph of True Story on Suspicion and Disrespect



Figure 4. Viewgraph of True Story of Mindset Constraint



 <b>Viewgraph</b>	<b>TRUE STORY ON CARING FOR THE WEAK</b>
<b>When companies in an emerging economy attempt to get a global market foothold, pragmatic policy is essential at the national level to develop more than one player in an industrial sector to ensure healthy competition, which is the impetus for innovation, and also to minimize the risk of weak companies failing to gain market success.</b>	
<b>The Case of Government Patronage of Mazda Car versus Toyota and Datsun Cars of Japan (in early days)</b>	
<p>In the mid-1970s, Toyota Motor Co. of Japan managed to acquire significant foothold in the global market place. However, other Japanese makes, such as Datsun (later Nissan) and Mazda were still struggling to succeed. Around that time, a Japanese faculty member of the well-known Asian Institute of Technology (AIT), was Prof. Hiroyoshi Shi-Igai. From the University of Tokyo he came to AIT to be a Prof. of Coastal Engineering in 1969 on "secondment" sponsored by the Government of Japan. After completing six years of service at AIT, he returned to take on a senior academic position at Tsukuba University. However, he was seconded again to AIT in early 1980s and was then a Vice-President for Academic Affairs.</p> <p>All international faculty members of AIT enjoyed a privilege of duty-free purchase of any model of car from anywhere in the world. Many faculty members used this privilege to purchase prestigious European cars (such as Mercedes; BMW; Volvo; etc.) because their resale value was very high. However, the Japanese faculty members always bought Japanese cars. When Prof. Shi-Igai purchased a Mazda car (which was then regarded as quite inferior compared to Toyota) one of his Asian faculty colleagues, asked him why he had purchased a Mazda and not a Toyota. He gave a reply that made a profound impression on two Asian faculty members who later went to head the UN-ESCAP's agency "APCTT" in India. He said that because his salary was coming from the Japanese Government, he should use that money to help Mazda, the weakest of the then three companies. He said that not only Government funds should be used to procure local products, but weak companies with potential should also be supported affirmatively through those funds to help them grow and establish an internationally competitive presence. Prof. Shi-Igai's sacrifice showed deeper meaning of government's patronage for local companies.</p>	
<b>LESSON: GOVERNMENT PROCUREMENT POLICY HELP GIVE PROTECTION AND ALSO FOSTER COMPETITION.</b>	

Figure 5. Viewgraph of True Story on Caring for The Weak

 <b>Viewgraph</b>	<b>TRUE STORY OF SUPER ACHIEVERS</b>
<b>The Tendency to Overload High Achievers</b>	
<b>Fostering technology-based development requires leadership at all levels. While inspirational leadership at the top is a necessary condition, capable and focused leadership is also needed at specific industrial sector levels in the nation. Expecting high achievers to be Superhuman who can single-handedly deliver miracles can be risky!</b>	
<b>The Indonesian Experience</b>	
	<p>Even today, the story of how Prof. Dr. Eng. B.J. Habibie single handedly built up an aircraft industry in Indonesia, through the establishment of IPTN: Nusantara Aircraft Industry, is narrated with awe and reverence. His success in establishing IPTN led to him being appointed, by President Suharto, as the Minister for Research and Technology and the Chair of the Agency for the Assessment and Application of Technology. At one time Dr Habibie oversaw ten state-owned strategic Industries (BPIS) that included, among others, aircraft, ship- and train-building, steel, arms, communications, and energy. He was also the Executive Head of 24 enterprises. He made all the decisions and no one dared to do anything without his approval. With the departure of President Suharto, this complex institutional infrastructure came undone. Soon after when Dr Habibie also retired, the leadership vacuum could not be filled and technological progress lost its momentum.</p>
<p>Particularly for Nationally Identified Strategic Industries, competent leaders must be developed at all levels so that they can inspire those who report to them. Technology-based thinking must become a mindset at all levels. Mentoring, developing replacement managers, delegating authority, providing resources, and sorting out all implementation barriers must be the role of top leadership. Top leadership must become a coach and develop captains at all levels who can get things done so that there never will be any technological leadership vacuum. Excessive reliance on a few high achievers is often counterproductive!</p>	
<b>LESSON: NATIONAL LEADERSHIP SHOULD ASSUME RESPONSIBILITY FOR TEAM-BUILDING AND TRAINING.</b>	

Figure 6. Viewgraph of True Story of Super Achievers

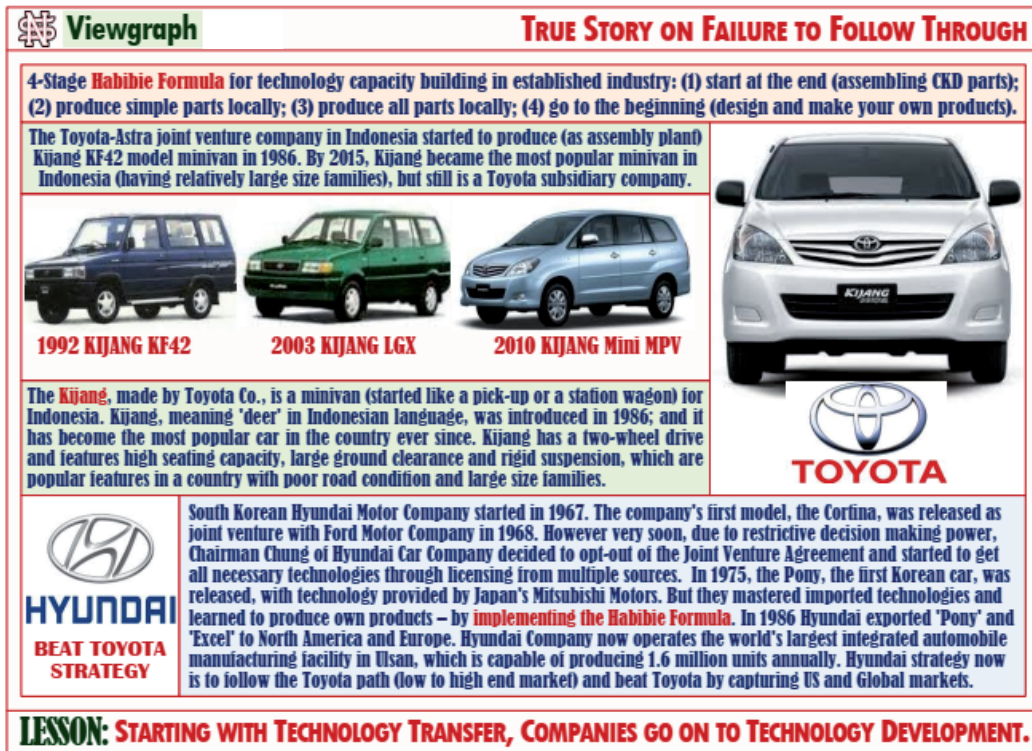


Figure 7. Viewgraph of True Story on Failure to Follow Through

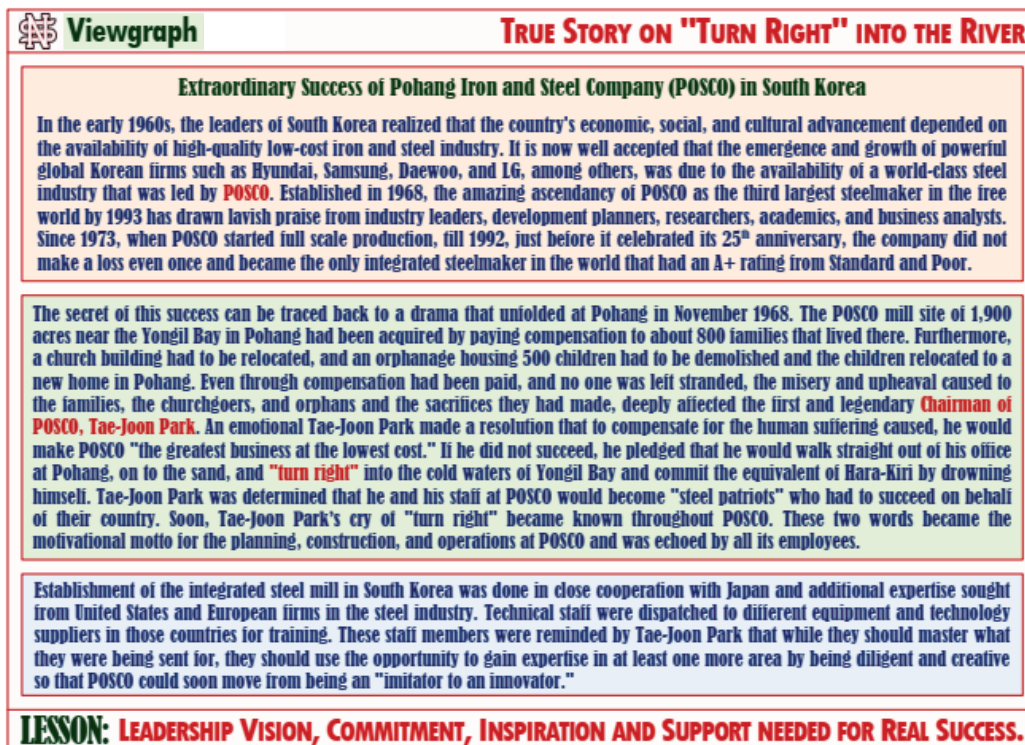




Figure 8. Viewgraph of True Story on "Turn Right" into The River




**Viewgraph**

**TRUE STORY OF MOTHERLY PROTECTION**





**The Case of Polyester Film Production Industry of South Korea**

Cheonan\* Film Plant was established in 1976.  
It began producing polyester film just one year later.  
Soon it became globally operating SKC Company.  
SKC Company produces polyester films, and magnetic tape and optical media.  
SKC is the first in Korea, and only the fourth in the world, to produce magnetic tape for VHS recorders.



Dr Han-Ben Lee (PhD in Chemical Engineering from R-1 US University) returned to Seoul and decided to set up a magnetic tape manufacturing plant, since both audio and video cassette players were becoming high-demand household appliances throughout the world. When he contacted the three major world-renowned companies--BASF, 3M and SONY--to set up a **joint-venture**, none responded positively. Instead, they offered to set up their own **franchise** in Korea. Dr Lee had a gut-feeling that the chemical engineering process to make polyester films should not be that complicated. So, he paid his fees for a **contract research project to KIST** for the development of the process. KIST, with its world-class laboratory researchers, was able to produce a working scheme that produced the film at the laboratory scale. But, the **lab-scale to industrial-scale transformation** was not feasible in South Korea. Since local machine-tool industry was basic, and could not produce the machinery needed for the scale-up operation, Dr Lee had to give a contract to a Japanese Company\* for the purpose, with a clause specifying to demonstrate performance before the machines could be shipped to South Korea.






\* Possible mistake in recalling names

When the machines were built, the Japanese company found the KIST Process was producing better quality products at cheaper cost, which they communicated to the Japanese producer SONY. Immediately, SONY Co. entered into a joint venture project with a holding company in Seoul and provided best of terms (no local investment; least royalty payment; etc.) compared with Korean Government policies. When the news appeared in local papers, Dr Lee went to see Dr Choi (KIST President) to express total dismay that his new company will not be able to survive against the power of the multinational company. Dr Choi went to see President Park explaining that his veto is essential to kill the Joint-Venture, which Gen. Park refused to do. Dr. Choi submitted his resignation letter and requested President Park to close down KIST, and went home. Three days later, President Park vetoed the joint-venture and took Dr Choi back to manage KIST.

**LESSON: NATIONAL MACHINE AND EQUIPMENT BUILDING INDUSTRY IS CRUCIAL FOR START-UP FIRMS.**

Figure 9. Viewgraph of True Story of Motherly Protection



**Viewgraph**

**TRUE STORY OF SUPREME COMMITMENT**

In many parts of the developing world, heads of governments tend to make great proclamations about fostering technology-based development planning. Comprehensive documents on technology strategy are prepared. But these speeches and documents are only statements of intent. Unless the heads of government show absolute commitment through direct involvement for private sector R&D facilitation goal, various national entities treat these plans and statements as "flavors of the month." In reality, nothing happens!

**An Example of Direct Involvement to National R&D Institute Building by South Korean President**

From 1961, till his death in 1979, General Park Chung-Hee was the President of South Korea. Possibly due to his military background and early life as a teacher, General Park was a true believer in science and technology and was convinced that South Korea's future was dependent on its industrialization success. Among many measures that his government implemented, was the establishment of the **Korea Institute of Science and Technology (KIST)** to help accelerate economic development. KIST was expected to quickly solve technological problems of direct interest to Korean companies by incorporating modern science and technology. President Park chose Dr Hyung-sup Choi, a Japanese-&-American educated metallurgical engineer who had previously headed the Korea Atomic Energy Institute, to lead KIST. To strengthen Dr Choi's status as Head of KIST, and to underscore the government's commitment to the bold venture, President Park let people know that he himself is the "official founder" of KIST. The purpose was to allow KIST deliver results quickly without being hampered by bureaucratic red tape.

Dr Choi persuaded President Park to draw up a **special law that allowed the government to donate money and land to KIST**, but with the provision that, for at least five years, the government would not audit KIST and exert approval power over its plans. Also, a law was drawn up to encourage industry to use KIST by providing special tax incentives. However, this upset the Korean legislature which was annoyed at the idea of handing out money without controlling it. Secondly, the Ministry of Finance, which didn't want to lose the tax revenues, was opposed to the idea. However, Dr Choi stood firm. When Dr Choi was out of the country, the legislature passed the law but ensured that the reworded law would strip KIST of its autonomy. Dr Choi said, "I really got disappointed, went to President Park, handed in my resignation, and told him he had better forget about the success of KIST." Dr Choi added with great emotion, "The President was taken aback, but he understood, and the original law that ensured the autonomy was restored." This strong signal sent by President Park showed his total commitment to technology-based development and enhanced the status and performance of KIST, local scientists, and local technologists in the industrialization of South Korea.

**LESSON: DIRECT BLESSING OF THE HEAD OF STATE IS SUPREME FOR BUILDING INNOVATION BEDROCK.**

Figure 10. Viewgraph of True Story of Supreme Commitment

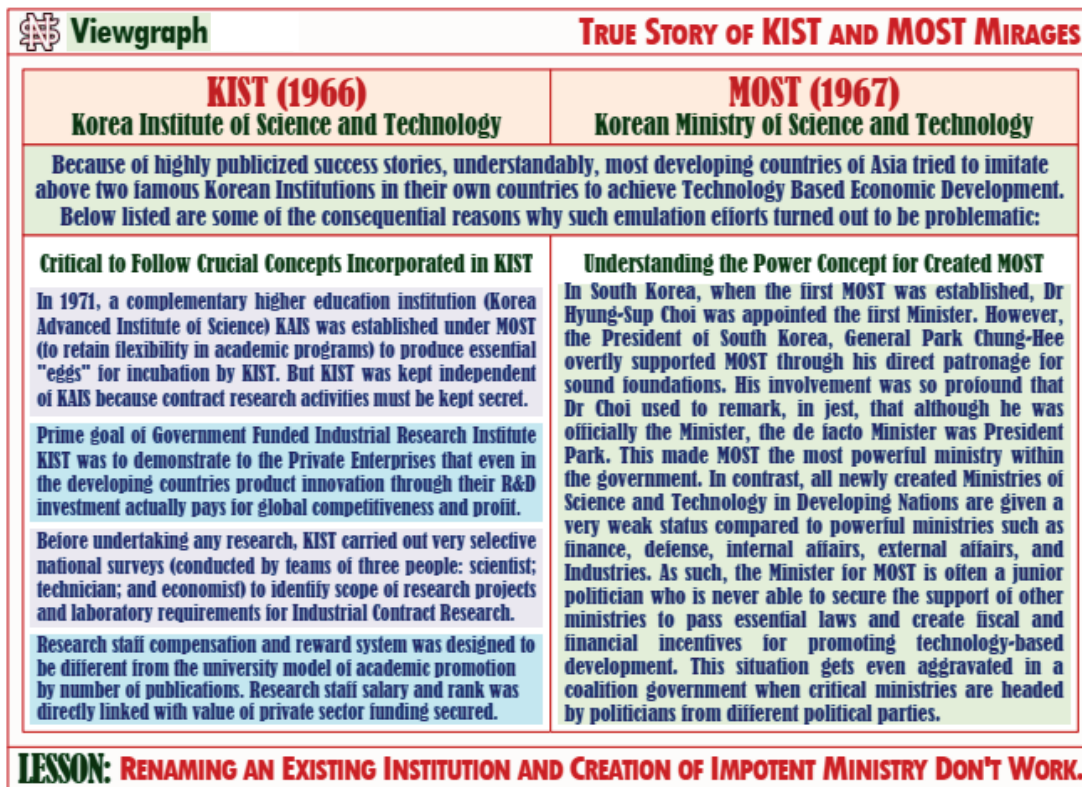


Figure 11. Viewgraph of True Story of KIST and MOST Mirages

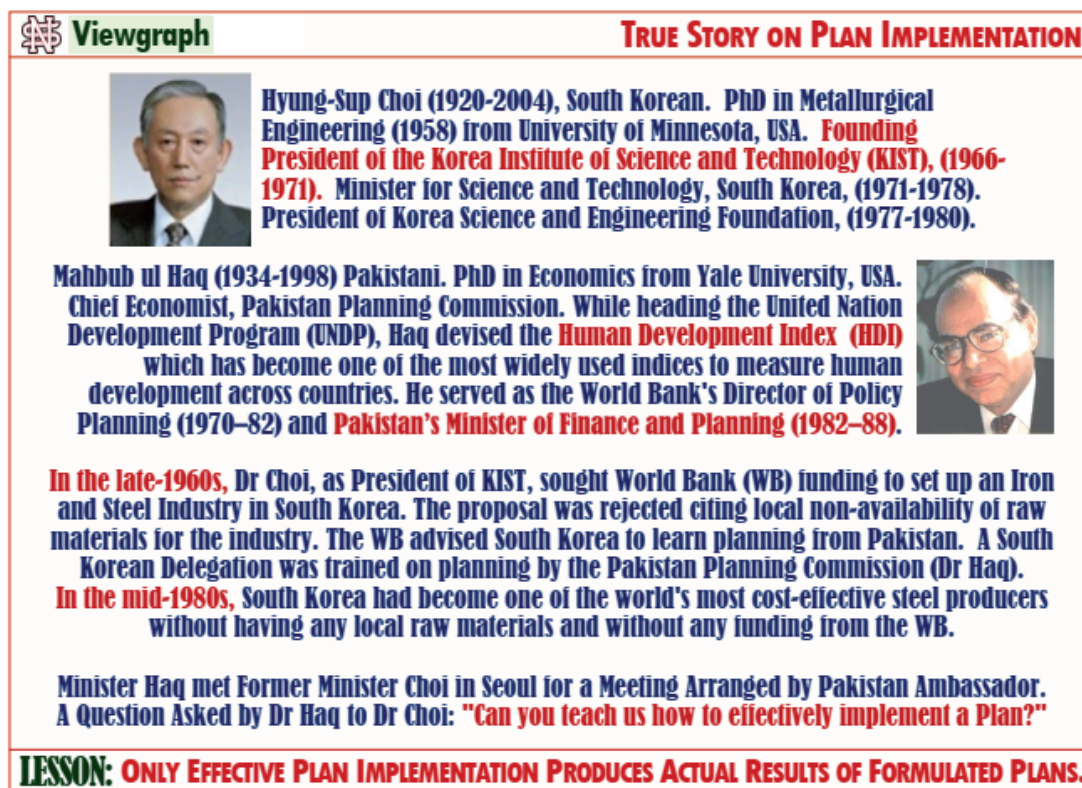







Figure 12. Viewgraph of True Story on Plan Implementation

### III. CONCLUDING NOTE

Though the stories are dated, since similar situation may be prevailing in many other parts of the world, by publishing this essay it is hoped that the lessons learned from the stories would be useful for all developing countries.

The author has spent over 40 years of his professional life in Asian developing countries

(Bangladesh, India, Indonesia, South Korea, Malaysia, Pakistan, Philippines, Thailand, and Sri Lanka) and 20 years in the United States of America. Therefore, claiming to have the heart of a developing country citizen, the author finally presenting his earnest request “to shun four universal lies” as depicted in the following viewgraph below.

 <b>Viewgraph</b>		<b>BE FOREWARNED AND FOREARMED ABOUT 4-LIES !!!!</b>
<b>White LIES</b> by AID Agencies, we keep silent about!		Growth <b>MEASURES</b> of developing countries are <b>higher</b> compared to that of the developed countries .... 10 added to 100 (=10% <b>HIGH</b> ) vs. 10,000 added to 1,000,000 (=1% <b>LOW</b> ).
<b>Plain LIES</b> by AID Agencies, we like not to hear!		Global Pollution <b>SHARE</b> of the developed countries are <b>smaller</b> compared to that of the developing countries ... because we measure the contribution as % of GDP.
<b>Damned LIES</b> by AID Agencies, we show not to see!		Global <b>RANKING</b> of countries, in terms of: Competitiveness; Innovativeness; and Good Governance, prepared solely from <b>OPINION SERVEYS</b> of the <b>CHOSEN</b> ones.
<b>And STATISTICS</b> , we agree with to get Foreign AID!		Policy Planners in developing countries, fed by Statistics of Economic <b>HITMAN</b> , sacrifice national interest for personal gains; and <b>BRAG</b> to have acquired foreign assistance.

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