Self-Engineered Sustainable Economic Development through National Industries Globalization



Baseline Information Document

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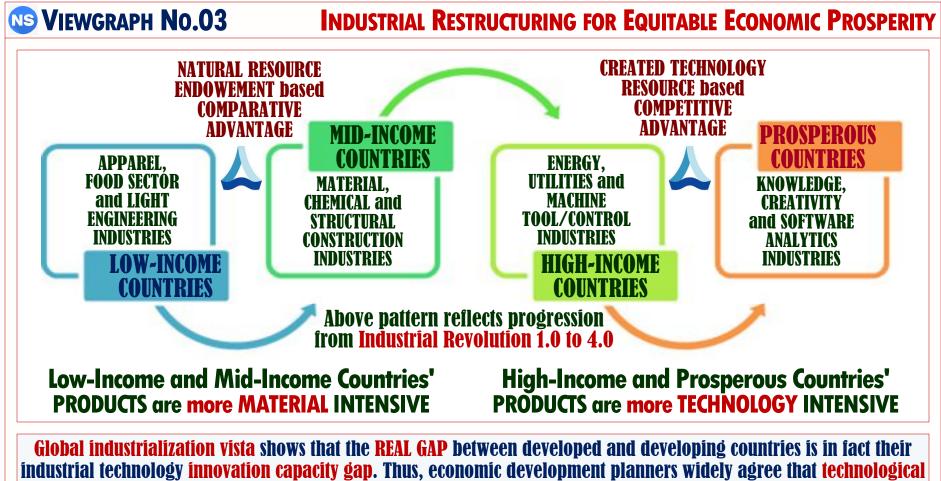


Technology is a 'game' for the rich, a 'dream' for the poor, but a 'key' for the wise; technological innovation is the 'master key' for sustainable economic development through "industries globalization" in the current highly-competitive world setting.

VIEWGRAPH NO.02 INCREASING TECHNOLOGY CONTENT OF EVOLVING INDUSTRIAL PRODUCTS

A scrutiny of following well-acquainted industries show that the relative capital proportion of their products have changed over the years from a greater nature-based material capital content to a greater intellect-based technology capital content: [1] Old Standard Land Telephone (Greater Material Content) to New Smart Cell Phone (Greater Technology Content) [2] Old Incandescent Light Bulbs (Greater Material Content) to New LED Lighting Fixtures (Greater Technology Content) [3] Old Mechanical Automobiles (Greater Material Content) to New AI Integrated Automobiles (Greater Technology Content)





industrial technology innovation capacity gap. Thus, economic development planners widely agree that technological innovation capacity building should be the corner stone for achieving sustainable prosperity. Hence, late developers have no better option than immediately launching an all-out campaign to: (a) promote local high-potential industrial goods producing enterprises to become an integral part of the global value chain particularly in the high-demand areas of universally aspired and already established consumer goods industries; and (b) develop the countries' own global corporations in terms of input sourcing, output marketing and workplace locations of those giant enterprises.

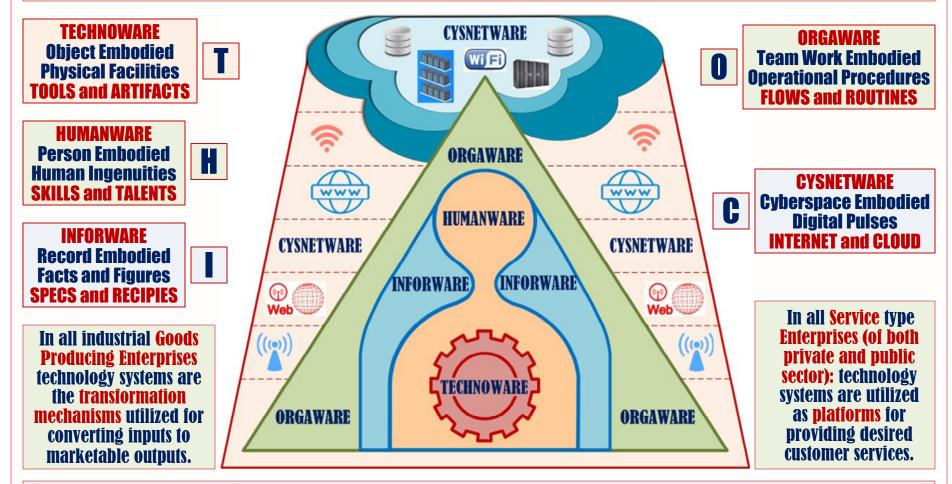
REITERATION: Industrial technology innovation focused sustainable development calls for rapid economic growth. And, technological innovations provide competitive edge to industrial enterprises for rapid economic growth by global marketing of New-Era Industry-4.0 Products and Higher-Value-Added Established Products.



POSTULATE: Industrialization strategies of emerging economies should facilitate selective high-potential Local Enterprises to become Global Corporations for national prosperity.

VIEWGRAPH NO.05 TECHNOLOGY SYSTEM COMPONENTS AS LEVERS IN MANAGERS' TOOLBOX

TECHNOLOGIES are the **MEANS** that enable performance of production functions. But, to manage technology well, it's essential for system components of technology framed such that Enterprise managers' can deploy and manipulate those components as control LEVERS in their TOOLBOX for achieving desired beneficial production outcome. One such scheme is presented below:

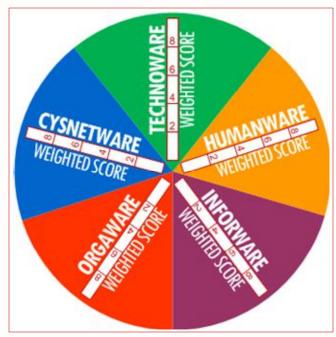


IMPORTANT FACTS: (1) The technology-system-component levers **THIOCs** in any manager's toolbox enable the Enterprise to produce marketable goods and services. (2) Dynamically interrelated and unique technology-system-components **THIOCs are** essential for both primary and supporting functions of all types of goods-producing and services-providing Enterprises. (3) The relative importance (dominance) of the technology-system-components utilized by different industries are uniquely different.

VIEWGRAPH NO.06 THIOC SOPHISTICATION AND DOMINANCE APPRAISED BY MANAGERS

Measurement of the Degrees of Sophistication of all technological system components utilized by any Enterprise is useful for production management decision making	Enterprise Tech-System Components	LOW Primitive Score: 1-2-3	MEDIUM Traditional Score: 3-4-5	HIGH Contemporary Score: 5-6-7	TOP Emerging Score: 7-8-9	IDEAL Optimal Score: 10
	Technoware	Manual	Powered	Automatic	Programmable	Zero Deviation
	Humanware	Basic	Superior	Advanced	Extra-ordinary	Zero Error
	Inforware	General	Special	Unique	Frontier	Zero Unknown
	Orgaware	Adhoc	Orderly	Managed	Optimized	Zero Tolerance
	Cysnetware	Linked	Asynchoronus	Synchronous	Dynamic	Zero Failure

Technology System Components THIOC utilized by an Enterprise are made more sophisticated to do newer work, better work and work faster than before. Through continuous innovations, technological system components utilized by an Enterprise are deliberately made more sophisticated for improved performance. However, there is always an absolute minimum required synergistic combination of technological system components THIOC that determine unique necessary condition for successful transformation in goods production and/or as operating platform for services provision work. Managers determine investment priorities regarding the THIOC sophistication based on specific dominance hierarchy in the industry concerned because relative importance of technology system components THIOC used in any goods or service industry is different. Due to resources constraint, dominance based targeting of components for innovation enables optimization of ROI. NOTE: Weighted score in the polar chart reflects the relative dominance.

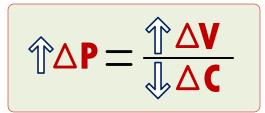


For developing countries, it is beneficial to note that highly trained HUMANWARE is the most DOMINANT component of myriad technology-systems utilized by any enterprise attempting: (a) catching-up operation to join the Global Value Chain of already established industry global markets with higher value-added goods and services; and (b) leapfrogging efforts of the new era international marketing in emergent high-technology-intensive-product-centric ascendancy to become Global Corporations.

VIEWGRAPH NO.07 CAPACITY BUILDING FOR PRODUCTIVITY DRIVEN COMPETITIVENESS

Let's remember: Technology components sophistication is a necessary condition but is not a sufficient condition for market competition. Enterprise's Own Technological Capacity Building is an essential prerequisite for success.

Technological innovation driven productivity gain is a requirement for acquiring competitive edge in marketplace.



Productivity gain $[\triangle P]$ can be achieved through: Increases in the value of outputs $[\triangle V]$; Decreases in the cost of inputs $[\triangle C]$; or Both occurring simultaneously.

Cost Reduction part of the above equation is related to Capability for operations optimization, which can be achieved through additional experiences that lead to higher efficiencies in all operations of the firm.

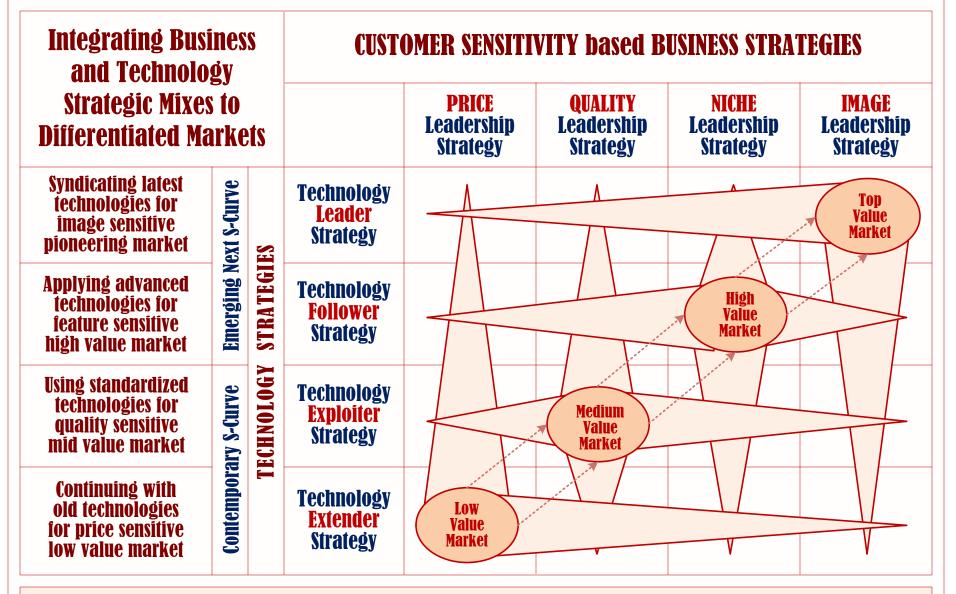
Continuous technological capacity building through capabilities accumulation by enterprises (from organized group experiences related to — procuring, utilizing, upgrading, and modifying — through introduction of technological system innovations) enables productivity gain.

Technological capability accumulation is a process of team-based learning involving — experience of doing, failing, and changing — within the current available technology constraints, for producer's/provider's cost reduction through economies of scale, some rework and waste elimination, and also substitution; and through efficiency in supply chain management (such as: selecting, prioritizing, treating, and preventing technical problems). Value Addition part of the above equation is related to Competency for performance optimization, which can be achieve through elevated and often unique kind expertise that lead to effectiveness of firm operations.

Continuous technological capacity building through competencies elevation by enterprises (through organized group expertise related to — anticipating, configuring, developing, and syndicating — by introducing technological system innovations) enables productivity gain.

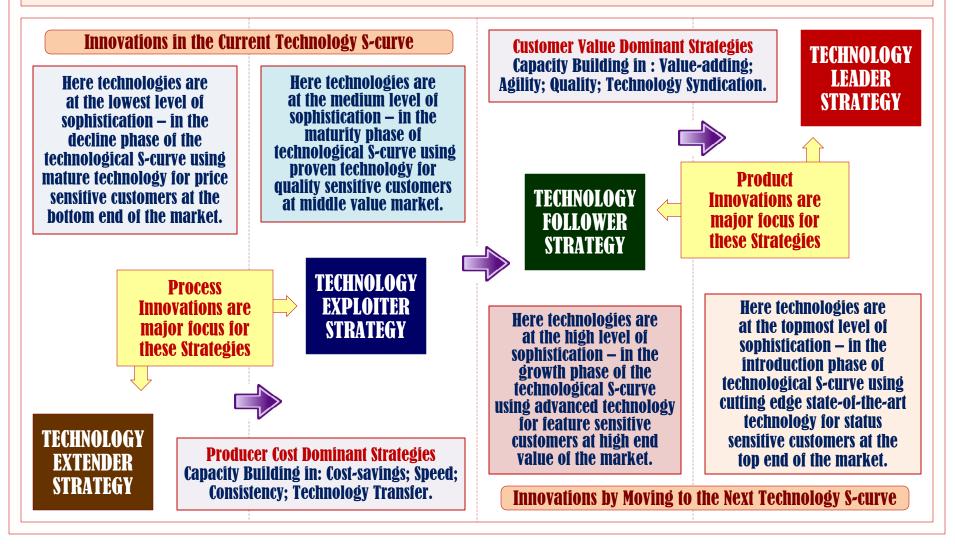
Technological competency elevation is a process of team-based learning requiring — expertise in foresight and best practice analysis — by shifting a limiting technological constraint, for customer's/client's value addition through economies of scope for satisfying customers' needs and improving reliability; and through effectiveness of customer relationship management (such as: refining requirements, and steadily improving solutions to technical problems).

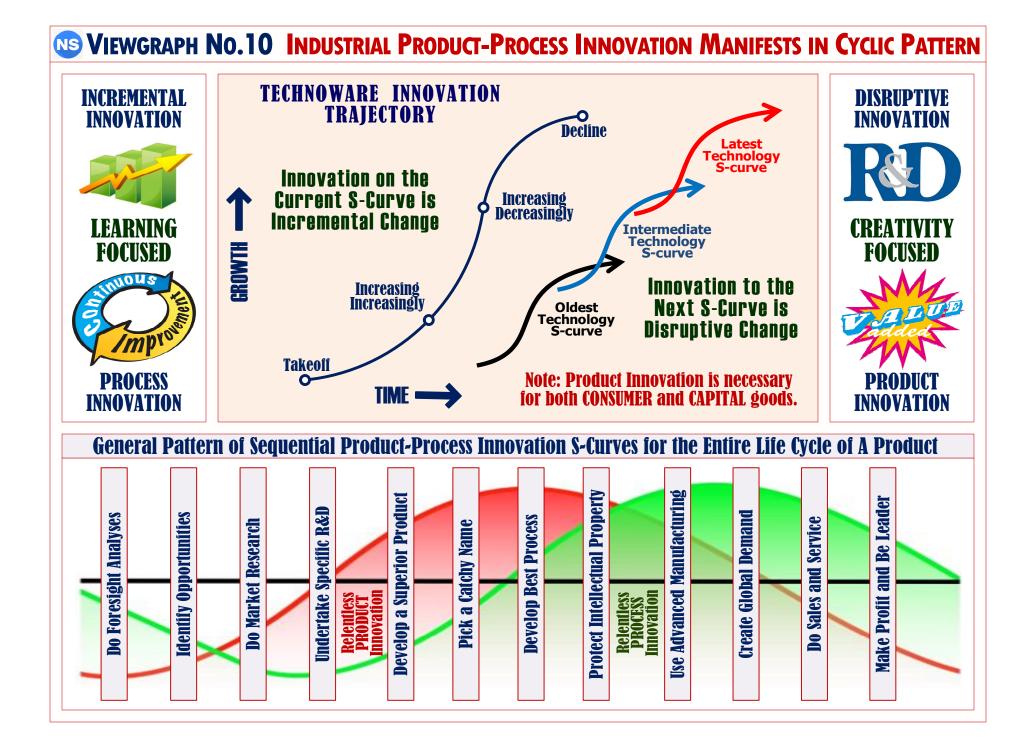
VIEWGRAPH NO.08 MARKET CENTRIC INTEGRATION OF TECHNOLOGY AND BUSINESS STRATEGIES



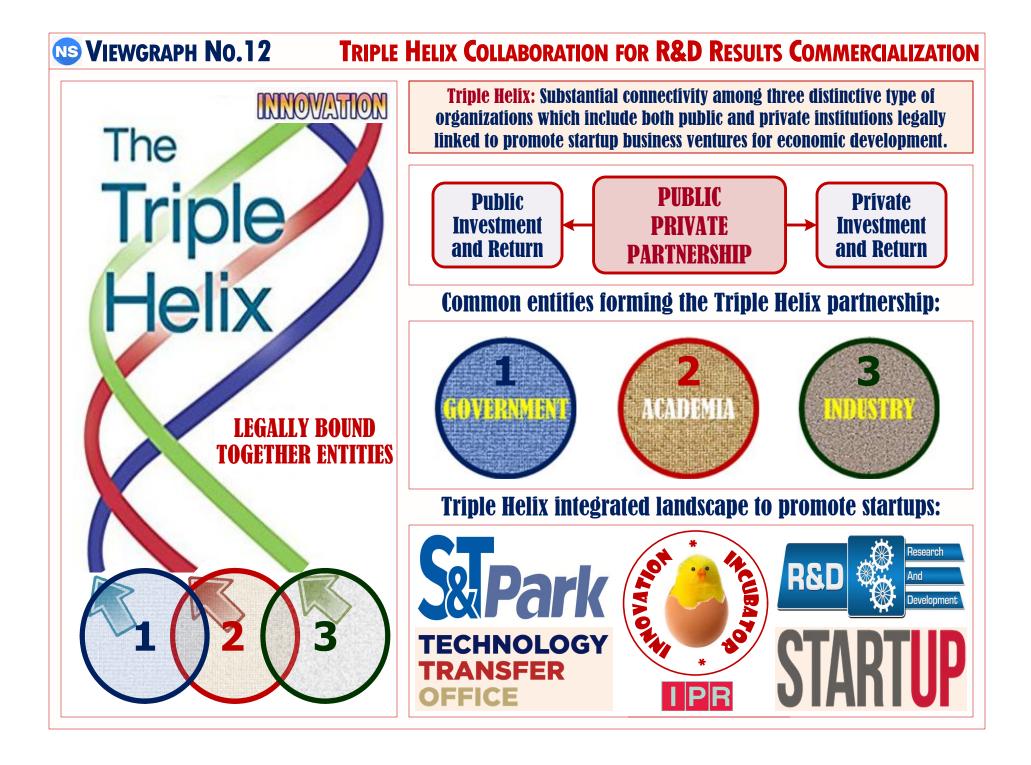
Progression from the 'low-end to the top-end' market value position with a 'family of product offering' is a proven pathway for 'sustainable prosperity achievement' of an enterprise in the fiercely competitive global marketplace.

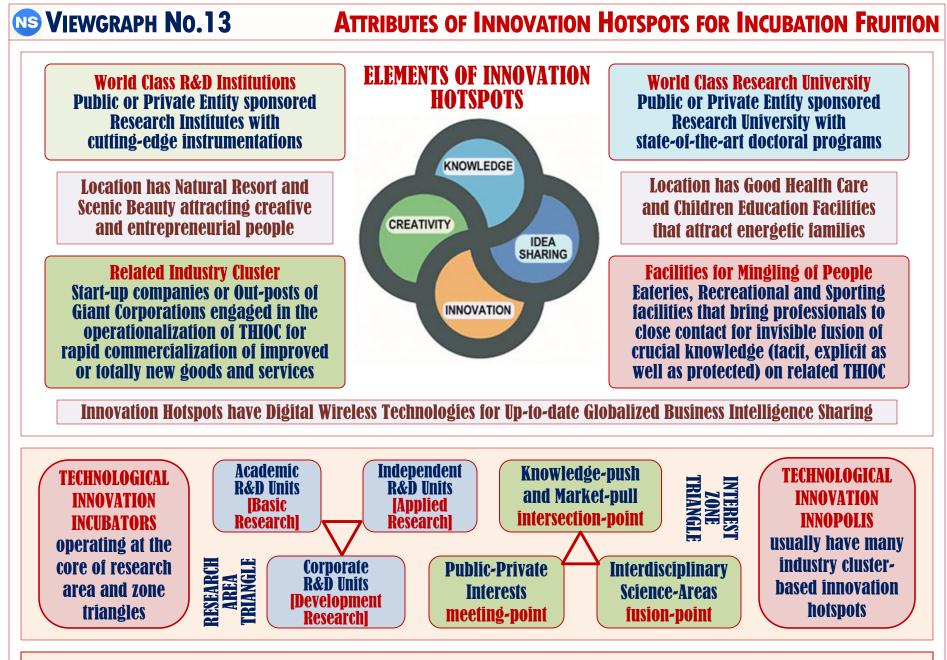
NS VIEWGRAPH NO.09 ROADMAP FOR ENTERPRISE COMPETITIVE POSITION ENHANCEMENT











Face-to-Face Personal Interaction within Innovation Hotspot Space give Impetus to New Product Development.

VIEWGRAPH NO.14 OBSERVED PROBLEMATIC AND ENDEMIC FAILINGS AND SHORTCOMINGS

Most Common Overall Problematic in Pursuit of Academic Excellence and Research Preeminence:

EXCELLENCE in Academic Programs emphasize only **KNOWING** most up-to-date knowledge pinnacles (SCIENCES) but almost negligible **DOING** in terms of application of that knowledge for practical use through laboratory activities (TECHNOLOGY). **R&D** Institutions attempting **PREEMINENCE** with negligible considerations for **RELEVENCE** and focus on output **QUANTITY** without **QUALITY** in terms of private enterprise needed **R&D** projects for research and development to compete globally.

The Fundamental Reason for an Endemic Lack of Synergy between S&T and R&D Infrastructure:

RESEARCH UNIVERSITY









Shortcomings of Technology Innovation System Linkages and National Innovation System Climate:

Elements of the National Technology Innovation System Infrastructure in terms of Institutions do exist in most Developing Countries, but often there is very little noticeable concerted activities for prioritized Industries Globalization strategy.

Generally most of the S&T and R&D Institutions lack "minimum critical mass" of Expertise, Equipment, and Money. National R&D investments are very general, diffused, and almost insignificant considering industries globalization norm.

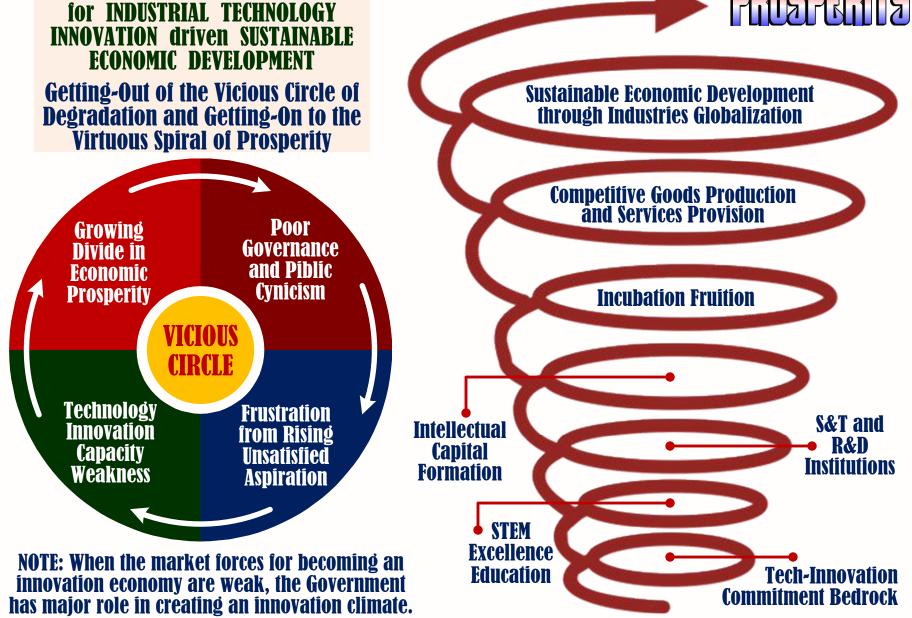
Absence of the full complement of "active intermediaries" to commercialize R&D results are serious limitations and are very critical bottlenecks --- specifically missing are local "Design Engineering" and "Tool Building" companies.

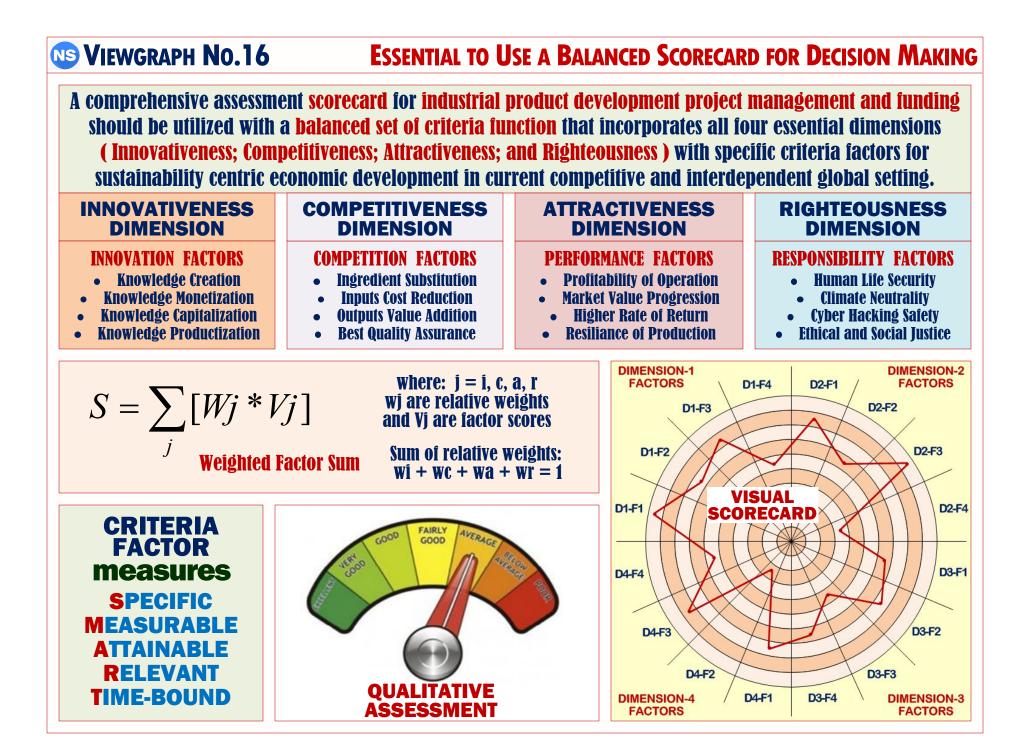
In addition to the common critical deficiency regarding successfully functioning Incubators and Startup Companies, complete lack of Public Private Partnership Projects for creating own Global Corporations are major shortcomings.

Failures to follow through from 'assembling to making to designing' products for global marketing by national enterprises.

Collaborations are managed through High-Powered Councils or Committees with inactive Ex-Officio Members. Meetings are regularly held for fostering linkages among stakeholders, but legal agreements for R&D results commercialization are rare.

VIEWGRAPH NO.15 STRATEGY FOR TECHNOLOGY INNOVATION DRIVEN PROSPERITY PATHWAY STRATEGIC POLICIES PATHWAY for INDUSTRIAL TECHNOLOGY





NS VIEWGRAPH NO.17

UTILIZING THE 'THIOC' TAXONOMY FOR EXPLORING POSSIBILITIES

HUMANWARE

Give Global Market Competitive Edge Technology System Component (THIOC) taxonomy and an appreciation that relative dominance of technology components utilized in any specific Goods Producing or Service Providing Enterprise is uniquely determined, developing countries with high quality and quantity of HUMANWARE have significant advantage over developed countries where same type manpower cost is very high!



Select Projects for Both Catching-up in Established Industries and Leapfrogging in Emerging Industries





HIGH PRIORITY for Catching-up

Select those traditional (established) INDUSTRIES that inherently require proportionately less TECHNOWARE assets and superior HUMANWARE assets for Manufacturing. For both Choices: Design —Engineering and Tool Building Expertise are uniquely critical.





TOP PRIORITY for Leapfrogging

Select emerging INDUSTRIES (4.0) that inherently require available Ai-integrated TECHNOWARE assets and highly trained HUMANWARE assets for Manufacturing.

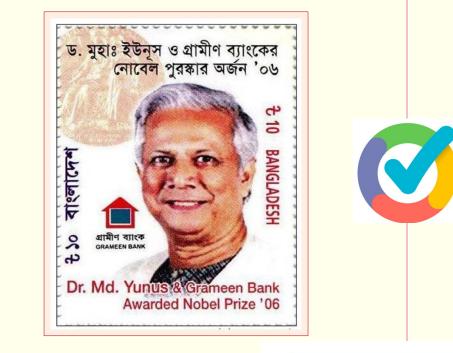
NS VIEWGRAPH NO.18 MOST CRITICAL LEADERSHIP CHALLENGES FOR DEVELOPING COUNTRIES

Earlier days successful models of other countries or other enterprises are generally not useful due to changes in circumstances. However, many core concepts identified from successes of earlier days and places are very valuable. Here is a partial list of useful concepts that are worth consideration by developing country leaders.

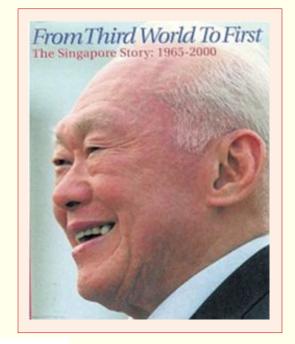


NS VIEWGRAPH NO.19 THIS IS THE ULTIMATE RECKONING FOR ALL DEVELOPING COUNTRIES

NOBEL LAUREATE MOHAMMAD YUNUS



SINGAPORE PRIME MINISTER LEE KUAN YEW



Currently established global systems only help those already well-established!



If you only follow someone else's footsteps, you will always be behind!

Getting industrial technology innovation management driven prosperity for sustainable economic development in the era of Industry 4.0 calls for SELF-ENGINEERING as a virtue!

WORTH PAYING DUE ATTENTION TO AGE-OLD WISDOM AND MINDSETS NS VIEWGRAPH NO.20 **Rabindranath Thakur Nobel Lauriat Tagore** FROM BENGALI WORLD 607 POET "You can't cross the sea merely by In every CRISIS, there is both standing and staring at the water." **DANGER and OPPORTUNITY** Dr Hvung-Sup Choi FROM CHINA **Technology Management Guru FROM JAPAN KAIZEN = MakeBetter** FROM KAIZEN SOUTH KOREAN REALIST 2YOUR HONE "Adaptive implementation of a simple plan is undeniably much better than endless bickering for **KAI=CHANGE** ZEN=GOOD the preparation of a comprehensive grand plan that usually is never wholeheartedly accepted by all So, one should look for leapfrogging opportunity in the **CRISIS** situation and thus generally remains

un-implemented."

of disruptive change type product innovation and catching-up opportunity applying KAIZEN philosophy for gradual change type process innovation.

Argument for Financial Prosperity: We know 'Nothing can buy happiness, but money can buy everything else'.

VIEWGRAPH NO.21

SELF-ENGINEERED ECONOMIC DEVELOPMENT IS THE ONLY OPTION

The people of a developing country are themselves responsible for its sustainable development. As such, the people of those counties should be determined to shun the "BIG LIES SYNDROME" identified by Mark Twain:

White LIES by AID Agencies, we keep silent about!



Growth MEASURES of developing countries are higher compared to that of the developed countries 10 added to 100 (=10% HIGH) vs. 10,000 added to 1,000,000 (=1% LOW).

Plain LIES by AID Agencies, we like not to hear!



Global Pollution SHARE of the developed countries are smaller compared to that of the developing countries ... because we measure the contribution as % of GDP.

Damned LIES by AID Agencies, we show not to see!



Global RANKING of countries, in terms of: Competitiveness; Innovativeness; and Good Governance, prepared solely based on the OPINION SERVEYS of the CHOSEN ones.

And STATISTICS, we agree with to get Foreign AID!



Policy makers in many developing countries, fed by Statistics of Economic HITMAN, sacrifice national interest for personal gains; and BRAG to have acquired foreign assistance.

Since the responsibility for any country's development rests with the people of that country itself, the public officials of those counties' should genuinely support good governance and pay attention to age-old wisdom:

You can fool all the people some of the time and some of the people all the time, but cannot fool all the people all the time. Creating a better future for all the people is the core duty of officials.



A mindshare VIEWGRAPH is a self-contained one-page chart representing one specific technological innovation related "conceptual framework" or one practical application related "methodology" in the real-world global enterprise setting. Each chart was constructed by combining meaningful images (reflecting ideas); boxes (representing facts); and numerous positional connectors (depicting some structure, order, or hierarchy).

The purpose of using the VIEWGRAPH format is to share with the reviewers the author's experience based knowledge acquired over four decades of extensive studies and research assignments in numerous emerging economies as well as a number of industrialized countries of the world as visual perception images.

Since the author presents baseline knowledge to a highly knowledgeable audience, with humility author acknowledges that reviewers could enrich each VIEWGRAPH by superimposing their own knowledge-base to make those useful for their endeavors.

YOU CAN MAKE ANY VIEWGRAPH PERFECT!