

# **A New Paradigm for Technology Exchange:**

## **Moving from Technology Transfer to Exchange**

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# Overview

- Inspiration
- Origin of Technology Transfer
- Models of Technology Transfer
- Theories of Technology Transfer
- Technology transfer lessons
- Technology Transfer in the 4<sup>th</sup> Industrial Revolution
- For SDGs :Environmentally sound Technology Transfer
- Green and innovative Social Entrepreneurship of Hope
- Concluding Remarks

# **INSPIRATION!**

**“It has become appallingly obvious that our technology has exceeded our humanity.” - *Albert Einstein***

**“The human spirit must prevail over technology.” - *Albert Einstein***

**“If we continue to develop our technology without wisdom or prudence, our servant may prove to be our executioner.” - *Omar Bradley***

**“Technology made large populations possible; large populations now make technology indispensable.” - *Joseph Krutch***

# Technology Transfer Inspiration: dialogue of imagination and critical thought

**'All advances in scientific understanding, at every level, begin with a speculative adventure, an imaginative preconception of what might be true- a preconception which always, and necessarily, goes a little way(sometimes) a long way) beyond anything which we have logical or factual authority to believe in. It is the invention of a possible world, or of a tiny fraction of that world. The conjecture is then exposed to criticism to find out whether or not that imagined world is anything like the real one. Scientific reasoning is therefore at all levels an interaction between two episodes of thought-a dialogue between two voices, the one imaginative and the other critical, a dialogue, if you like, between the possible and the actual, between proposal and disposal, conjecture and criticism, between what might be true and what is in fact the case.'**(Medawar,The Hope of Progress, Methuen, London, 1972,p.22)

## **Origin of Technology too is Transfer!**

- **It is claimed that over 50,000 years back technology evolved**
- **18<sup>th</sup> Century first industrial revolution with steam power**
- **The 2<sup>nd</sup> Industrial Revolution with electricity**
- **The Third with ICT**
- **Now the 4<sup>th</sup> Industrial Revolution with the digital, Nano and quantum computing is creating the digital/cyber world is upon us all.**

# What is Technology Transfer?

- New knowledge , new skills and new tools continue to emerge and diffuse throughout the world
- Technology is not just created and stay where it is created
- Technology transfer is born where and when new technology emerges
- Electricity did not stay where it is created
- It has now become a universal human need replacing wood and charcoal in many parts of the world.

# The Question is:

- How does technology transfer take place?
- From the producer to the consumer?
- Is the transfer based on mutual benefit?
- Or is it based on commercial gain and loss?
- Given the world is divided between developed and developing economies
- How is technology transfer from the developed go to the developing world?
- Is the technology transfer negotiated, shared or forced or done through illicit transactions?

# Technology Transfer Flows

Differences in different cross-border flows:

- The Developed to the Developed
- Developing to Developed
- Developed to Developing
- Developing to other Developing
- Within a national border
- Within inter-regional cross-border
- Within inter-local transfers within a country like South Africa
- Impact of Technology Transfer on National Sovereignty
- National Supererogation— where donors decide the terms!

# Technology Transfer (TT) Levels

- International—Global North –South, From East Tigers to LDCs, From BRICS to each other and to LDCs
- Inter Regional in Africa how to transfer—indigenous technology and deal with and respond to foreign Technology
- Industrial Planning and the role of Technology Transfer to deal with opportunities and threats
- Technology Transfer from Corporate monopolies—licensing program
- Technology Transfer using internal linkages between agriculture, manufacture and services in a country, region and continent

# Technology: Finding Ways for Transfers?

- Commercial gain only through the transfer
- Social gain with economic gain included
- Donor engagement through supererogation
- Environmental gain with economic gain included
- Mutual benefit between the transferee and the recipient
- Illegal, illicit and unacceptable modes of transfer
- Technology transfer used as external interference especially with military technology
- Technology transfer in the global value chain

# For TT-New Conceptual Frames

- Critique Technology Transfer (TT) with narrow economic logic
- Include in the conceptual frame validation not only through commerce and market
- Include validation through measurable and explicit social and environmental gains
- Principle of mutual benefit need to be clearly acknowledged
- Rethink and reinvent technology transfer with technology exchange

# Changing the Technology Transfer model

- Technology transfer to technology exchange
- Technology transfer to retransfer
- Technology transformation
- The action-and-reaction between transferor and transferee
- Technology transition process between the technology the laboratory to the market
- From originator or possessor to the receiver
- Without harm or loss to all the stakeholders involved
- A new model is essential to construct

# Current channels of Technology Transfer

- Foreign direct investment
- Buying and selling through markets
- Public exposure and dissemination
- Applying reverse technological application
- Acquisitions: Licensing, Franchise Joint venture, Patent and IP transfer acquisitions, Foreign direct investment, Technological consortium & joint R&D

# Technology Transfer Lessons

- From Africa, technology transfer is dominated by supererogation
- But in Asia we have two examples where technology transfer has been managed
- Singapore
- Taiwan

# In Singapore TT

- TT has been championed by the Government and not the market
- Supported by advanced and well organized infrastructure
- Stable and non-corrupt political regime
- State management by the establishing an Asian operation center for global corporations

# In Taiwan, TT

- Strong and sustainable industrial championship
- Managing medium- and small-sized corporations
- Creation of technological research & incubation center for facilitating technology diffusion— evaluation and imitation of technology
- Building the manufacturing capability
- Organizing science, technology and innovation park for fostering the industry cluster
- Building absorptive capacity— employing Diaspora educated engineers and using the talent to training local citizens

# TT in the 4<sup>th</sup> Industrial Revolution

- Now Technology is everywhere
- It is not transfer, but Technology Re-transfer (TRe) and technology exchange (TE) is on
- Digital and cyber-space is everywhere
- The key question has the 4<sup>th</sup> industrial revolution changing TT to TE, TRe now
- New research is needed how the global flow of technology occurs at the present time

# From TT to TE , EST and TR for Africa

- Africa is still mainly agricultural and mineral based economy
- The global value chain still demands Africa exports raw materials and important manufactures
- Technology transfer is highly skewed against Africa
- Time to change Technology Transfer to Technology Exchange and ESTs also for Africa
- To revision, rethink, re-design and reinvent a new African development path

# We have the SDGs.. From TT to EST

- New environmentally sound technologies(ESTs) need to be transferred or exchanged or re-turned from one part of the world to the other
- Still we have international division of labour which is not built on mutual benefit
- How to transfer ESTs and not TT is on the agenda now
- SDGs cannot be realised without moving from TT to EST and TRe

# A New TT Theory?

- A Critique of TT
- Acknowledging existing patterns of TT flows
- Recognising the need to deal with SDGs
- With the 4<sup>th</sup> Industrial Revolution
- Acknowledging technology through commercial validation from laboratory to market is not sustainable
- It creates unemployment, inequality , poverty and nature damage

# A New TT Theory

- We need to frame a new approach where TT is not only commercially validated  
But also social, humane and environmental variables are included  
Benefit is not calculated only through profit  
But through social , environment, knowledge and economic gains  
A new theory of Technology exchange and reverse technology transfer is needed

# Concluding Remarks

- It is time to link TT with the
- Green
- Innovative
- Social Entrepreneurship of hope
- Good to link state with market
- Economics with politics
- Governance, leadership, institutions and systems
- Government, universities, industries and civil society
- To create a new theory and policy learning for all those engaged in Technology Transfer with the current pattern full of deficiency.

# Some useful References

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# Finally

- Asante Sana
- Ameseagnalehu
- Sebiah
- Thank you

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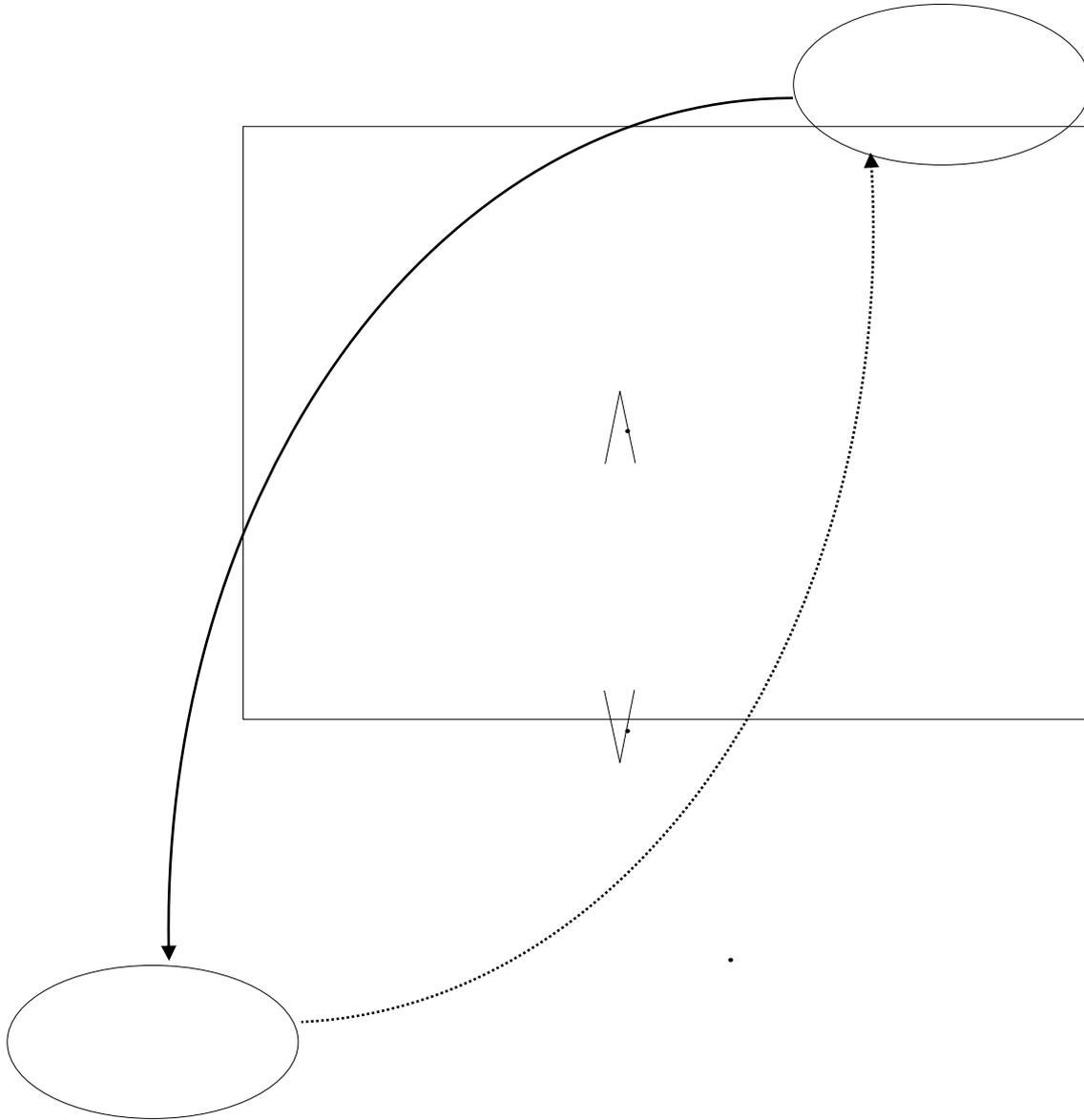












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