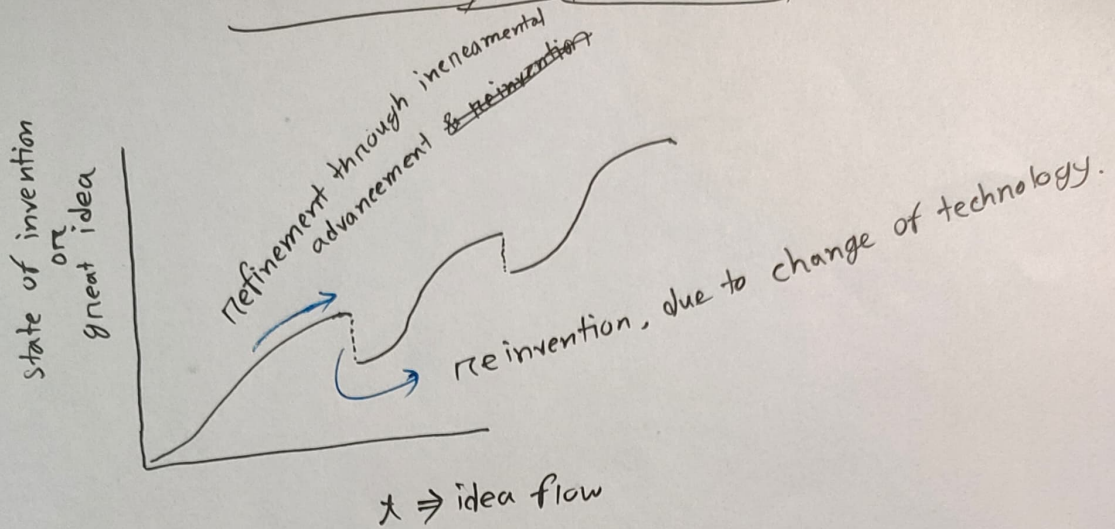


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From Lecture Slide-1

## STEM

- Science
- Technology
- Engineering
- Mathematics

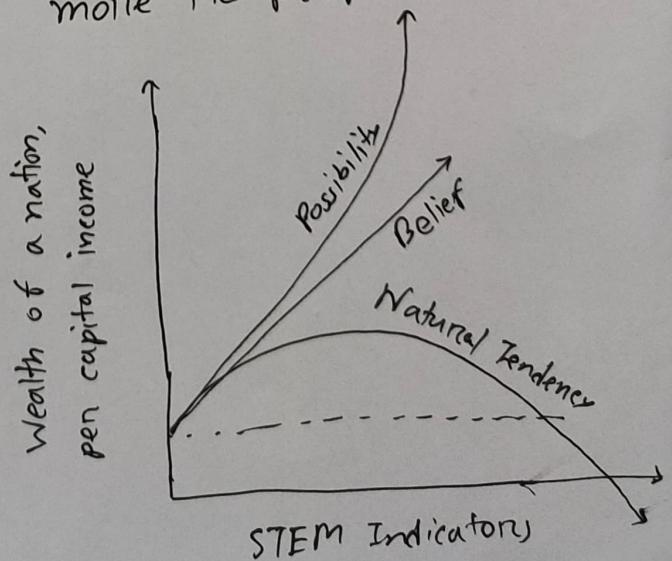
## STEM Indicators

- Graduates
- Degrees
- Publications
- Patents
- R&D investment

⇒ Higher the value of STEM indicators  
more the prosperity.

Natural Tendency: concave down curve

Possibility: Exponential Growth

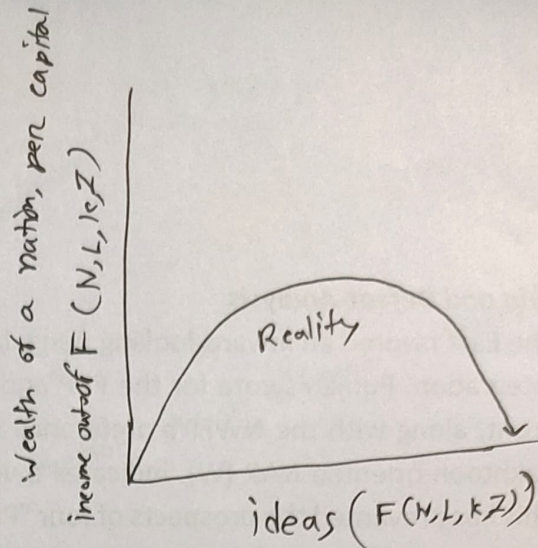




## ⊗ Sources of Wealth

- Natural resources:  $N$
- Labor:  $L$
- Knowledge:  $k$
- Ideas:  $I$

$$\Rightarrow \text{Wealth} = F(N, L, k, I)$$



⊗ Human beings are driven by economic incentives.

⊗ Why people buy products?

$\Rightarrow$  to get jobs done.

⊗ Relentless journey!

- to get jobs done better at less cost, while creating more comfort. And the list of getting jobs done keeps growing.
- consumers are looking for better products at lower price.
- perceived value should be more than the dollar to spend.

⊗ Economic outputs depend on ideas and objects.

$$\Rightarrow D = f(A, x) \quad \left| \begin{array}{l} A = \text{ideas (ECE is the major source)} \\ x = \text{natural resources, labor, ...} \end{array} \right.$$

⊗ Wealth depends on,

- natural resources
- labor
- knowledge
- ideas

$$Y = F(K, L, H)$$
$$Y = MA$$



## \* Ideas Cause Creative Destruction:

- Core strength of free market economy
- profit making firms pursue ideas for offering better products at lower cost.
- Ideas fuel economic innovation and the business cycle.
- known as Schumpeter's gale

## \* How to get ideas and transform them into economic value?

⇒ Schumpeter wrote that, creative destruction is the process of industrial mutation that incessantly revolutionizes the economic structure from within, incessantly destroying the old one, incessantly creating a new one.

This process of creative destruction is the essential fact about capitalism. It is what capitalism consists in and what every capitalist concern has got to live in.

## \* Seeded Marxian economic theory

- the concept to refer more broadly to the linked processes of the accumulation and annihilation of wealth under capitalism.
- Marx uses the term "praxis" to refer to the free, universal, creative and self-creative activity through which man creates and changes his historical world and in himself, changes.



- Praxis is an activity unique to man, which distinguishes him from all other beings.
- Ideas power creative destruction to make it happen

### ⊗ Basic Principles:

- Ownership of capital & ideas
- Freedom to profit from ideas, offering us increasingly better alternative means to get jobs done better
- promoting entrepreneurship
- Ensuring fair competition
- Patronizing science, technology and engineering

### ⊗ Challenges:

- Developing ideas based on ECE knowledge for redesigning existing products and processes for improving the quality and reducing the cost, and innovating new ones.
- more importantly, we need to trade those ideas in a globally competitive Market for generating profitable revenue.

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⊗ The most powerful production input is patent - ideas for redesign and innovation.

- these patents are combining all other inputs to produce the revenue.



⇒ Although idea generation, consequentially claiming patent, is an inherent capability of humans, making them superior to all other living creatures, not every country equally benefits from it. As a matter of fact, growing gap in this capability is increasing inequality among firms and countries.

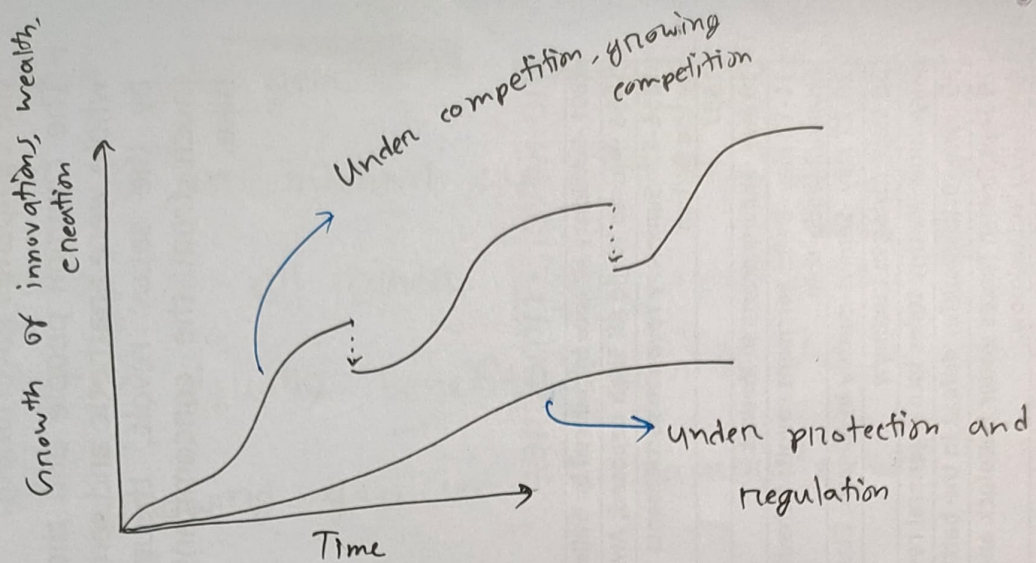
⇒ Its time for developing countries to focus on the economic output creation capability out of ideas-- consequentially building idea economy.

⊗ ECE is a major source of ideas for creating idea economy.

⊗ ECE graduates can apply their ECE competence through three primary means:

- (i) providing ECE technology selection, procurement, installation, integration, testing, operating and maintenance services
- (ii) conceiving, designing, constructing, testing, and commissioning customized ECE solutions
- (iii) innovating ECE idea based products and processes.





⊗ EEM  $\Rightarrow$  Engineering Economics and Management

- Economics deals with the science of optimum allocation of scarce resources - for maximizing welfare.
- Innovation is the heroic act of genius - a magical act. It is about getting jobs done better out of ideas.
- Inventions - creative sparks in the mind of genius.
- Innovation success - heroic ~~act~~ act of a magical personality in making enormous amount of money (wealth) out of ideas.
- Engineering is the use of scientific principles to design and build machines through optimum allocation of resources; cost-effective technology solution of an economic problem.



⑧ Science is about identifying variables and establishing quantitative relations among them to interpret and scale up art.

- Technology is about intentional manipulation of those variables to invent on advance means for getting jobs done better.

- Economics is the branch of knowledge concerned with the production, consumption, and transfer of wealth.

- Scarcity as an economic concept, refers to the basic aspect of life that there exists only a finite amount of human and nonhuman resources which the best ~~techin~~ technical knowledge is capable of using to produce only limited maximum amounts of each economic good.

- Urgence replace the allocation of scarce goods among competing demands and heroic art of innovation by the science of infinite wealth creation out of ~~science~~ scarce resources - so that we keep producing more with less.



EEM focuses on interpreting technology led wealth creation dynamics as reoccurring patterns for scaling up invention & innovation and of economic value creation out of ideas with science, engineering and management practices for endlessly expanding reservoir of wealth from scarce resources.

Quiz - 1

Syllabus, Lecture - 1  
up to this

Date: 04.03.2024