Innovation and Higher Education

Dr. K. (Subbu) Subramanian

President, STIMS Institute Inc., Lexington, MA. USA

SubbuKDG@gmail.com www.STIMSInstitute.com

Prof. Srinivasa U. Rangan

Lukšić Chair Professor of Strategy and Global Studies

Babson College, Wellesley, MA, USA

BBDIT, Ghaziabad, India
October 26, 2013

References:

- **The system Approach –** *A strategy to survive and succeed in the Global Economy (2000)*

  Author: Dr. K. (Subbu) Subramanian

- **Thriving in the 21st century economy:** *Transformational skills for Technical Professionals (2013)*

  Co-authors: Dr. K. (Subbu) Subramanian and Prof. Srinivasa U. Rangan

http://www.amazon.com/K.-Subramanian/e/B001K8H8N8/ref=ntt_athr_dp_pel_1

Outline:

- **“Work” --- What is it ? How is it changing?**
- **Professional Worker --- Solution provider**

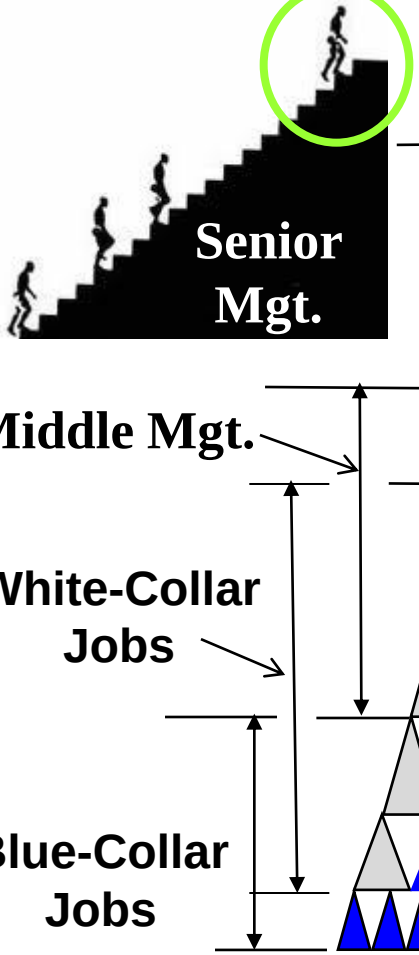
- **“Solution” --- Transform Knowledge into useful end results.**
- **Higher Education --- Three sources of knowledge**
  --- Integrated use of all three sources of knowledge for new solutions.

- **Innovation and Higher Education:**
  --- Transformational Skills and their use.
  --- What is your new “SAT” Score?

Dr. K. (Subbu) Subramanian
STIMS Institute (*Science Based Technology Innovation and Management Solutions*)
SubbuKDG@gmail.com

- **“Work” --- what is it ?**
- **How is it changing?**

Work – What is it ?



Traditional Organization

Dr. K. (Subbu) Subramanian
STIMS Institute (*Science Based Technology Innovation and Management Solutions*)
SubbuKDG@gmail.com

Work – How is it Changing?

"Global Capitalism": **Investment across the globe**

???

Innovation; Entrepreneurship
Work Smarter and Work Harder
Keep Jumping From Job to Job; Become Global
Higher Education; Interdisciplinary

"IT" driven Innovation : **Digital Technology Applications (IT revolution)**

Routine Tasks : **Low cost and low skilled labor available across the globe**

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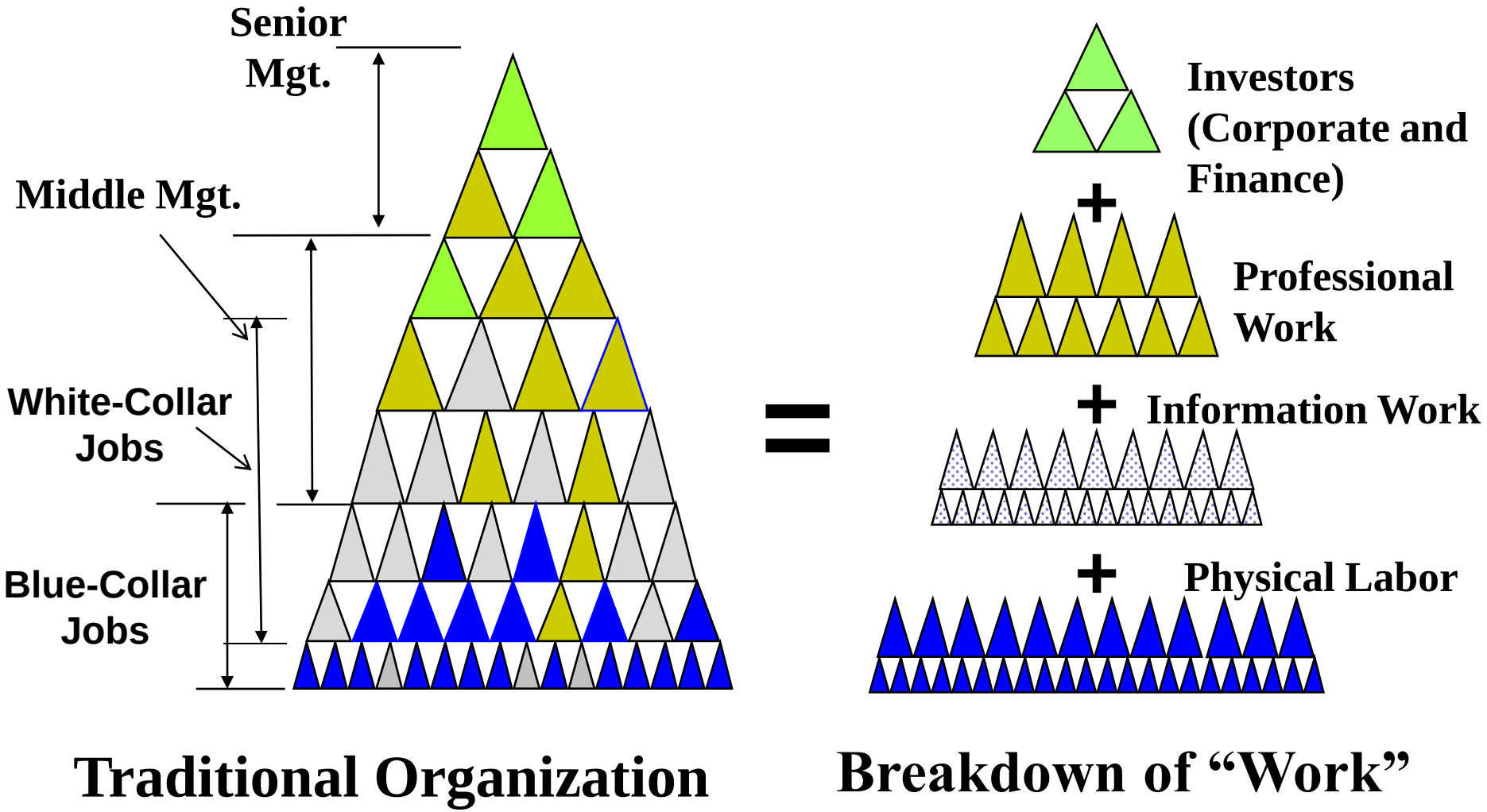
STIMS Institute (*Science Based Technology Innovation and Management Solutions*)
SubbuKDG@gmail.com

Work – How is it Changing?



Traditional Organization **Breakdown of "Work"**

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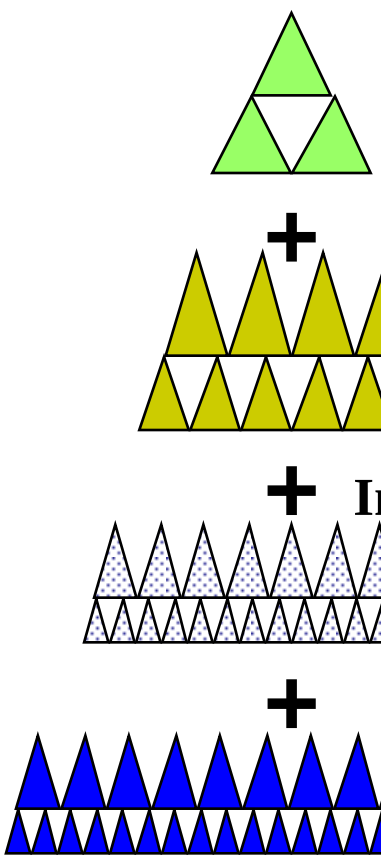
SubbuKDG@gmail.com

Work – How is it Changing?



Investment and Finance → "Global Capitalism"

\+ Professional Work → ???

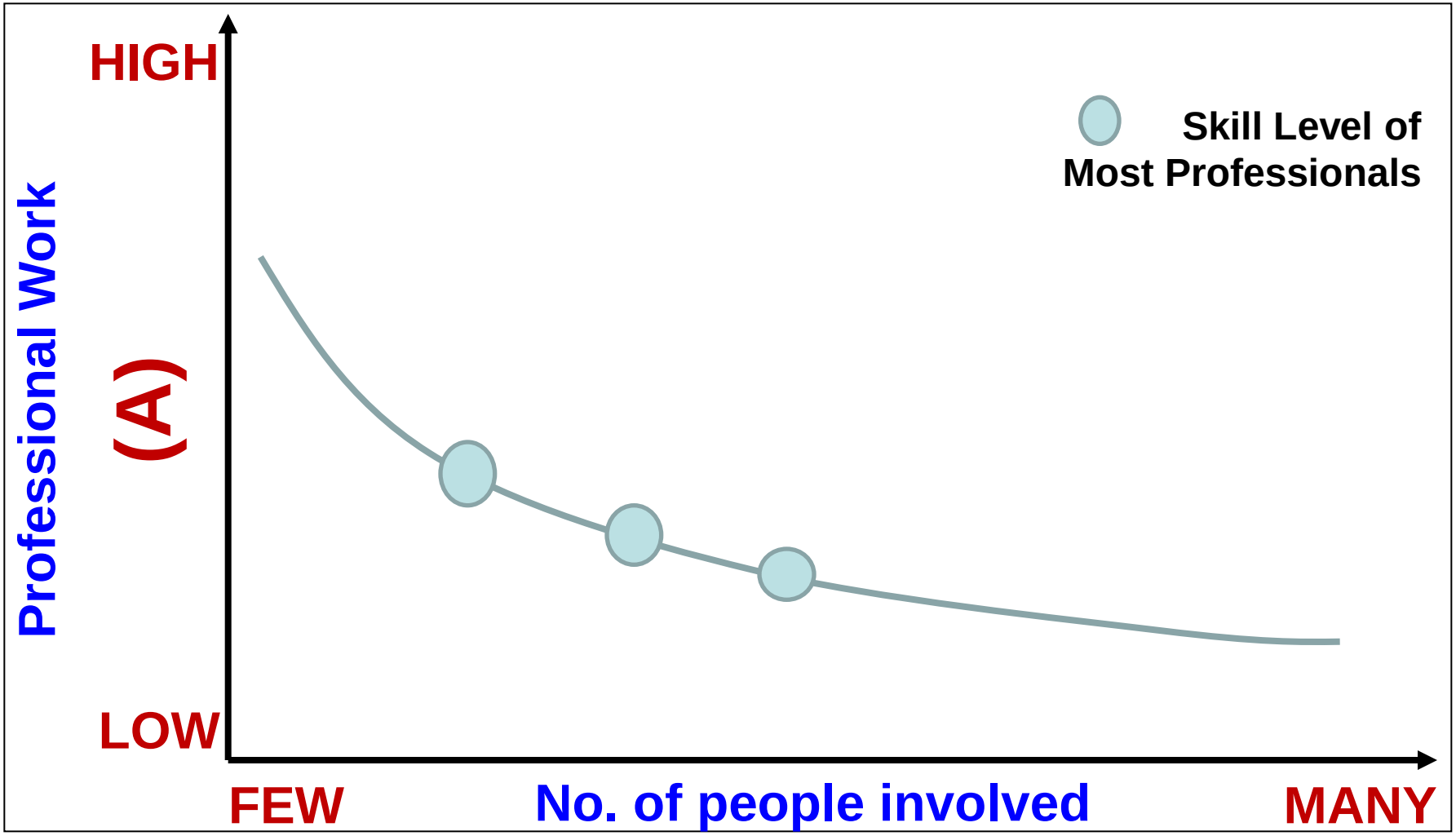
\+ Information Work → "IT" driven Innovation

\+ Physical Labor → Routine Tasks (Standardization, de-skilling)

Work Content
A
B
C

Professional Effectiveness = A / (A + B + C)
= Labor Productivity of "Professional Worker"?

Work – How is it Changing?



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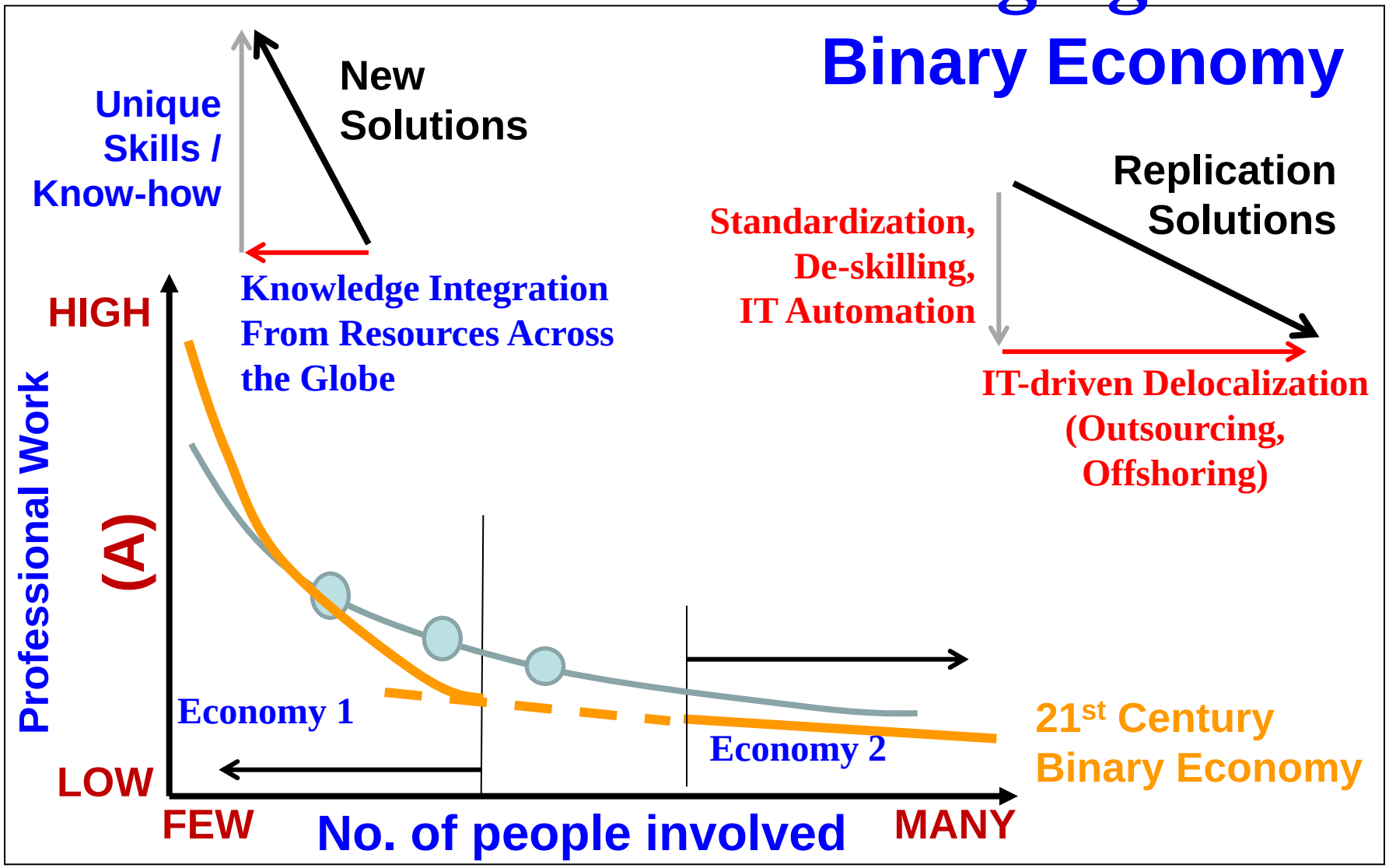
SubbuKDG@gmail.com

Work – How is it Changing?



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STIMS Institute (*Science Based Technology Innovation and Management Solutions*)
SubbuKDG@gmail.com

Work – How is it Changing?

Professional Effectiveness = A / (A+B+C)

Can be High:

- **If "A" – Content of professional work increases (Higher wage Professional Worker)**

OR

- **"B" and "C" – Contribution for physical effort and Information work decreases (Wages decrease, while labor productivity increases: Jobless recovery)**

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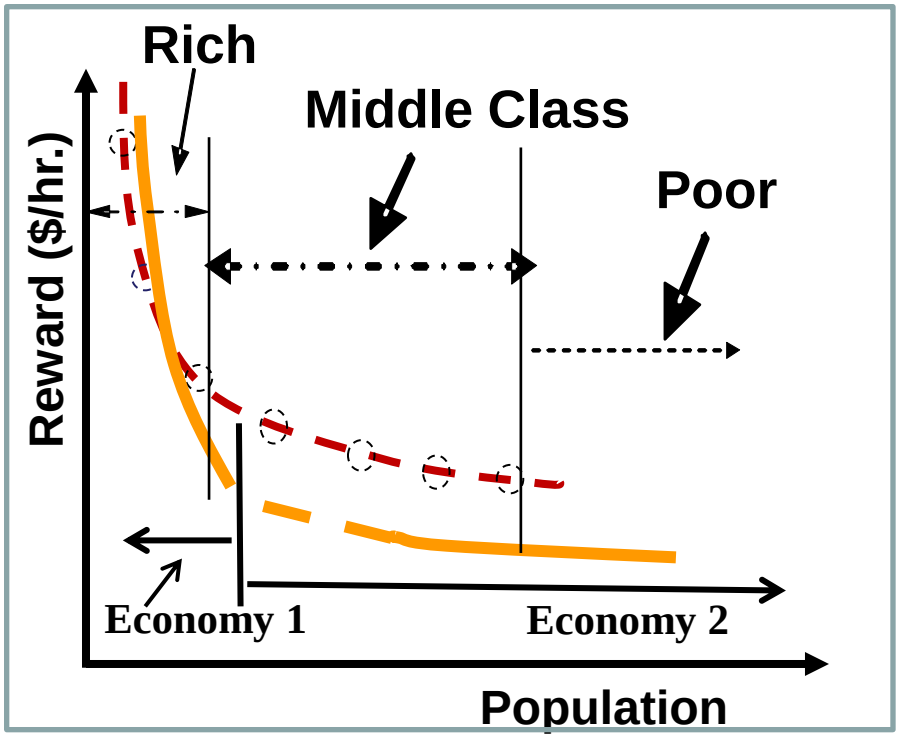
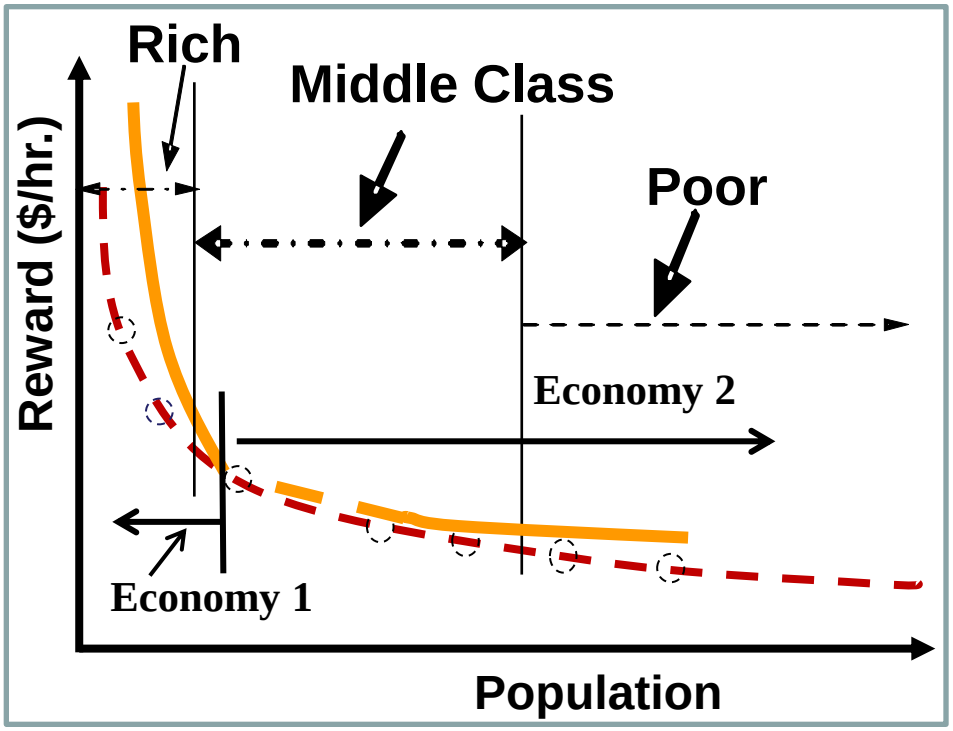
STIMS Institute (*Science Based Technology Innovation and Management Solutions*)
SubbuKDG@gmail.com

Binary Economy: Evidences





Developed Economies

- Higher labor productivity and efficiency
- while wages ($/hr.)) decline!
- Middle class—most of the population in these economies are now being nudges into Economy 2
- Investors and the innovators, who participate in Economy 1 have done very well

Emerging Economies

- Much of the middle class and some poor—most of the population in these economies benefit from Economy 2
- Investors and many innovators, who participate in Economy 1 have done extremely well
- Extreme poor have not seen the benefits

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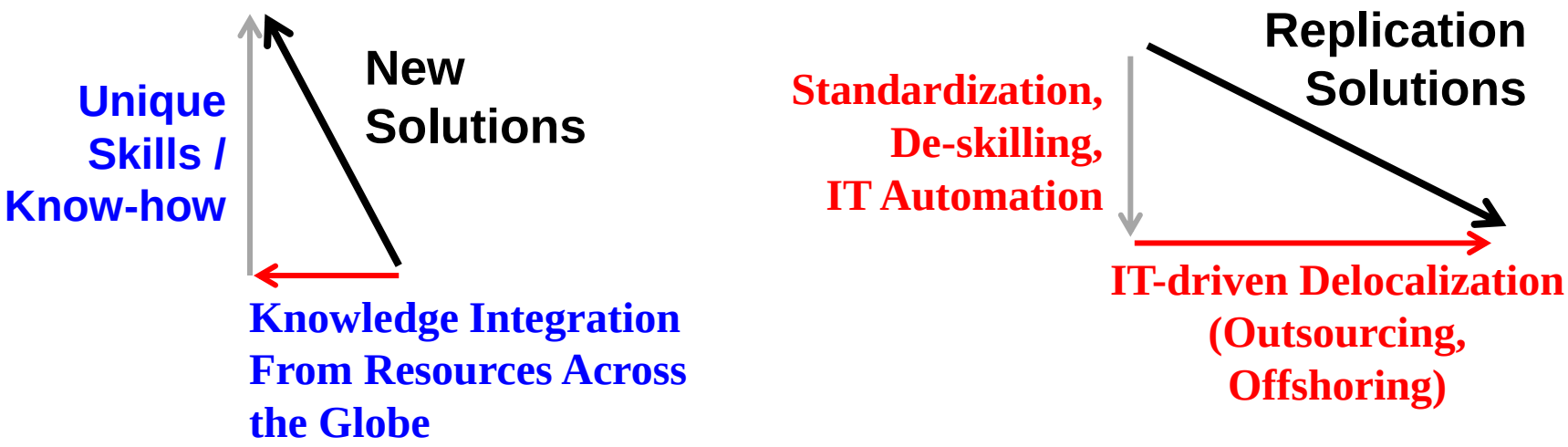
STIMS Institute (*Science Based Technology Innovation and Management Solutions*)
SubbuKDG@gmail.com

Higher Education in the Binary Economy



- **Need:** A relentless stream of new solutions
- **Transformational Skills:**

  Skills to Define/Discover, Develop AND Deploy / Exploit a stream of "New Solutions"

Higher Education: Means to the above end?

Dr. K. (Subbu) Subramanian
STIMS Institute (*Science Based Technology Innovation and Management Solutions*)
SubbuKDG@gmail.com

New Vs. Replication Solutions: Features

	New Solutions	Replication Solutions
Higher Education and Technical Knowledge	**Intensive (critical)**	**Neutral and useful (not critical)**
Skill required	**System Oriented; Solution driven; Transformational**	**Task oriented; Narrow and Generic;**
Risk and uncertainty	**High, thanks to new ideas and their experimentation**	**Low, but can also be replaced easily and readily**
Reward	**Team reward, IPO, Co. growth, and stock options Global Player**	**Individual reward based on task execution**

Dr. K. (Subbu) Subramanian
STIMS Institute (*Science Based Technology Innovation and Management Solutions*)
SubbuKDG@gmail.com

- **Solution --- Transform Knowledge into useful end results.**
- **Professional Worker**
  --- Knowledge Worker
  --- Three sources of knowledge
- **Higher Education --- Integrated use of three sources of knowledge.**

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STIMS Institute (*Science Based Technology Innovation and Management Solutions*)
SubbuKDG@gmail.com

"Professional" : ???

Carpenter: Makes furniture that some one wants to buy and USE.

Plumber: Identifies the leak in a pipe line and fixes it to the satisfaction of the home –owner

Cardiac Surgeon: Fixes the broken heart and restores it to good health

Engineer: ???

Technologist: ???

Some one who provides a "solution" that meets the needs and gets paid for that.

Dr. K. (Subbu) Subramanian
STIMS Institute (*Science Based Technology Innovation and Management Solutions*)
SubbuKDG@gmail.com

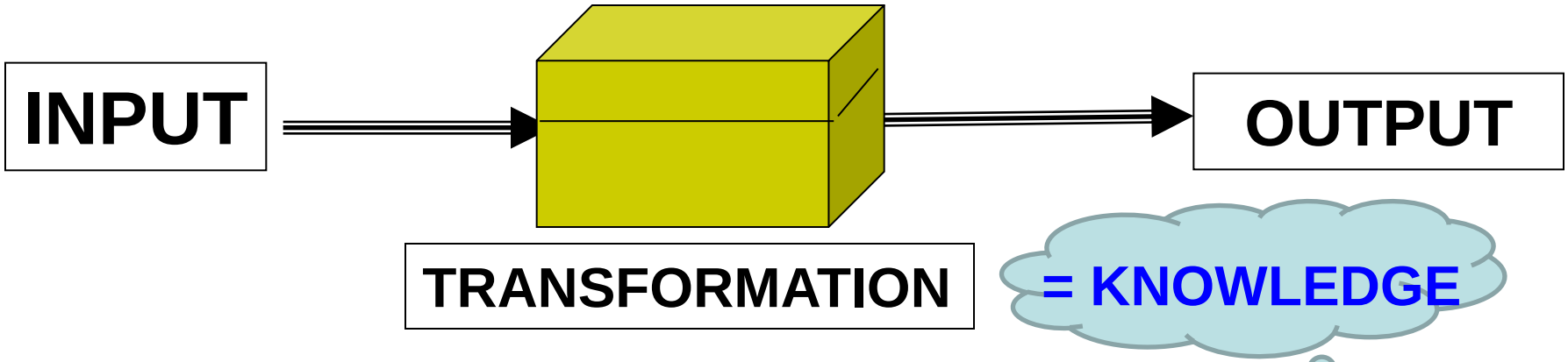
What is a Solution?

Solution:

"input/transformation/output" System,

leading to added value

to those who are willing to reward for such value addition!



Solution: KNOWLEDGE and its USE!

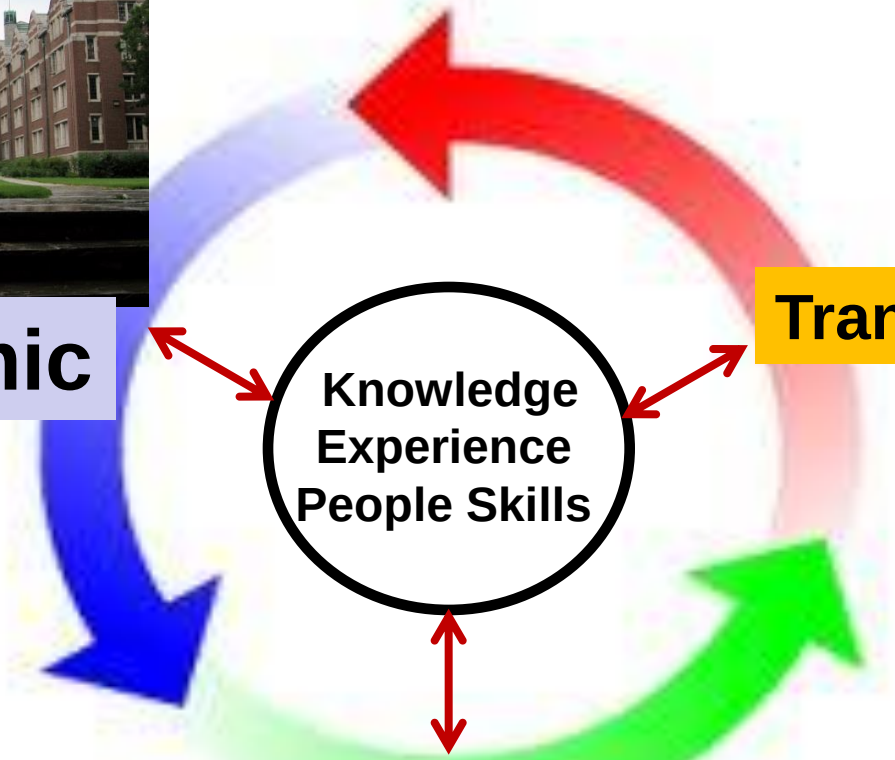
SYSTEM THINKING.

Dr. K. (Subbu) Subramanian
STIMS Institute (*Science Based Technology Innovation and Management Solutions*)
SubbuKDG@gmail.com

Source of Knowledge

Academic

Transformational



Industry Specific

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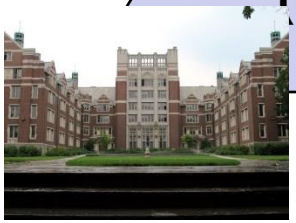
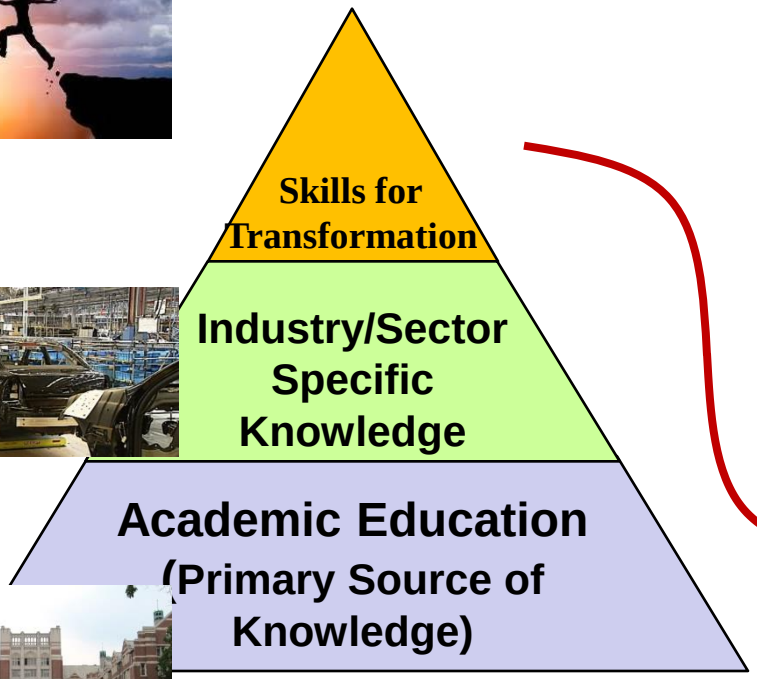
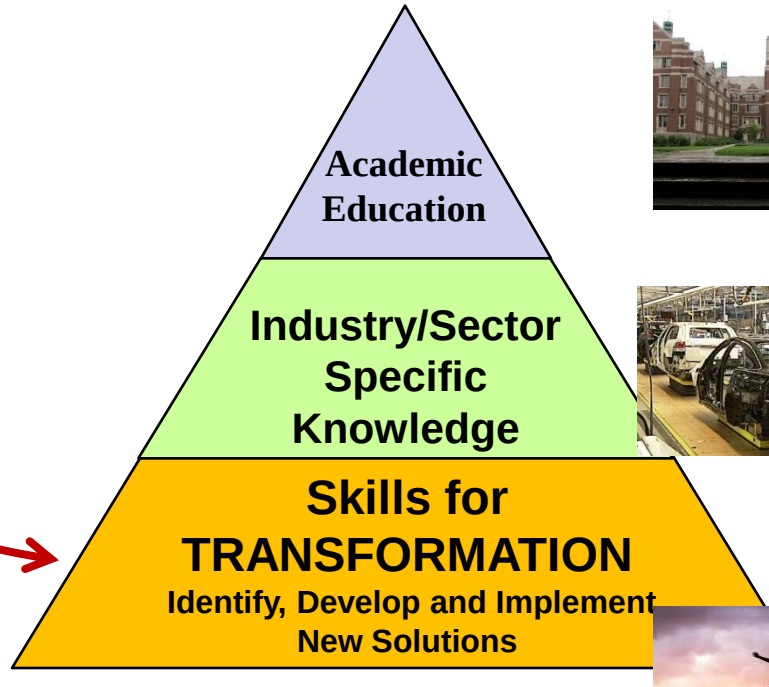
STIMS Institute (*Science Based Technology Innovation and Management Sol*
SubbuKDG@gmail.com

Sources of knowledge and their ordering





20st Century



End of 20th Century

Transformational Skills:
Ability to Discover, Develop and Deploy "New Solutions".

Dr. K. (Subbu) Subramanian
STIMS Institute (*Science Based Technology Innovation and Management Solutions*)
SubbuKDG@gmail.com

Innovation and Higher Education

“With out an ability to put to your knowledge to use, you are no better than your smart phone!”

There are lots of smart people readily available across the globe. Over 80% of what you need to know is readily available through Google search!

What is needed are:

Transformational Skills

Integrate all available knowledge and resources to identify, develop and deploy a stream of new solutions.

Dr. K. (Subbu) Subramanian
STIMS Institute (*Science Based Technology Innovation and Management Solutions*)
SubbuKDG@gmail.com

Innovation in Higher Education:

An educational methodology

that integrates all three modes of knowledge

in an inter-related manner.

Transformational Skills

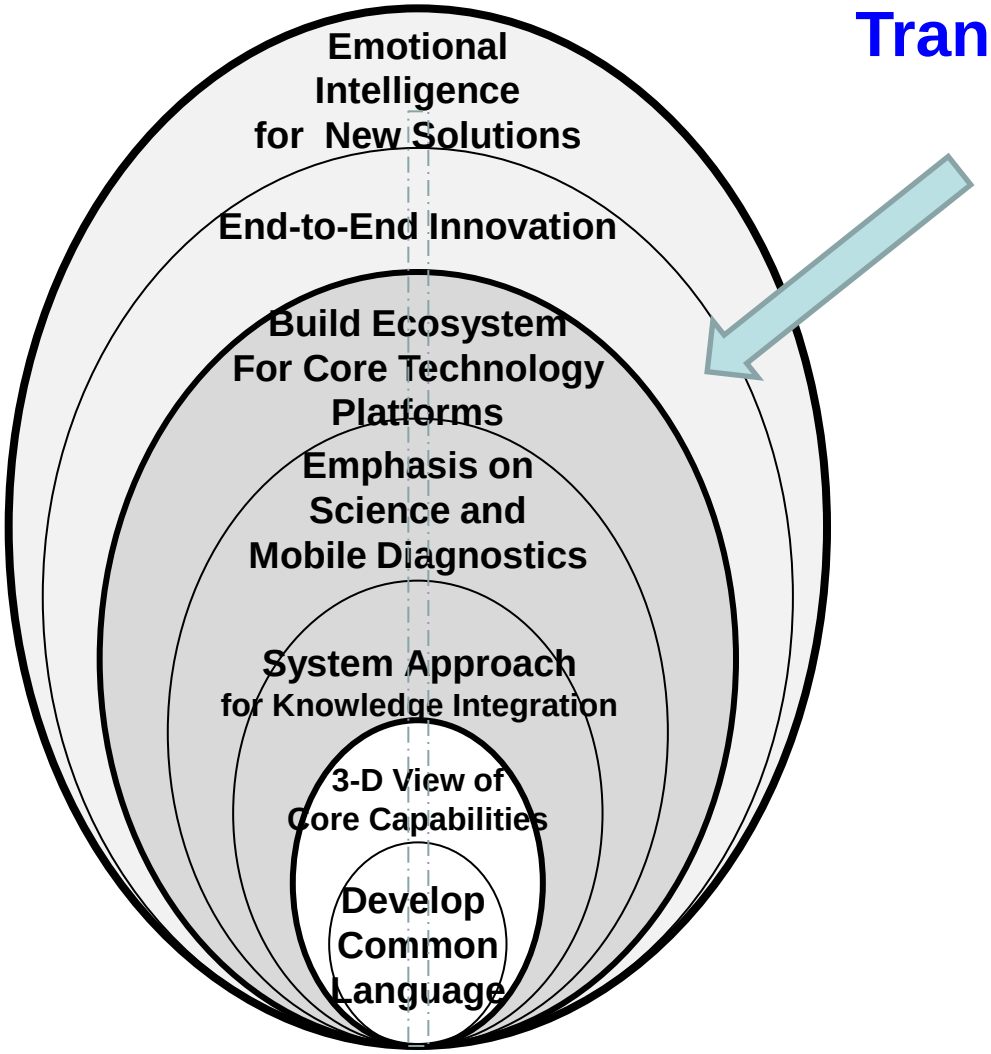
Academic Education

Industry / Sector Specific Knowledge

Dr. K. (Subbu) Subramanian
STIMS Institute (*Science Based Technology Innovation and Management Solutions*)
SubbuKDG@gmail.com

- **Transformational Skills – what are they ?**
- **Few Examples**

Transformational Skills



Transformational Skills are like the wick that transform Academic Knowledge & Industry know – how (the candle and its holder) into usable outcomes.

Picture source: Goofed/images/candle flame

Dr. K. (Subbu) Subramanian
STIMS Institute (*Science Based Technology Innovation and Management Solutions*)
SubbuKDG@gmail.com

Transformational Skills for 21st Century Professionals.

- Emotional Intelligence for New Solutions
- End-to-End Innovation

Deploy

X

- Build Ecosystem for Core Technology Platforms
- Emphasis on Science and Mobile Diagnostics

Develop

- System Approach for Knowledge Integration

X

- 3-D View of Core Capabilities
- Develop a Common Language

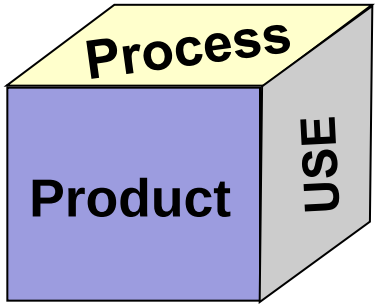
Discover / Define

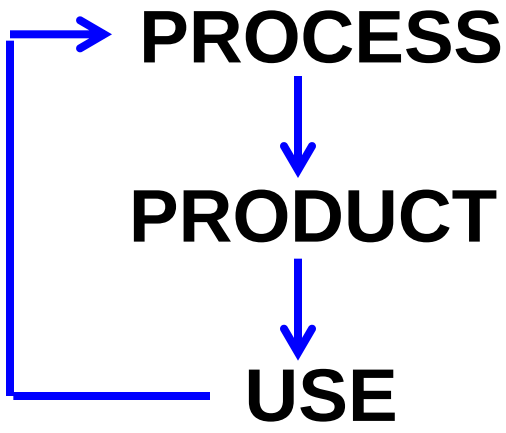
Dr. K. (Subbu) Subramanian
STIMS Institute (*Science Based Technology Innovation and Management Solutions*)
SubbuKDG@gmail.com

Transformational Skills:

1. **Develop a common language:**
   - **What is a "Solution"?** ***"input/transformation/output"***

     System
   - **What are your "Outputs"?**
     - **PRODUCT**
     - **PROCESS**
     - **Application / USE**



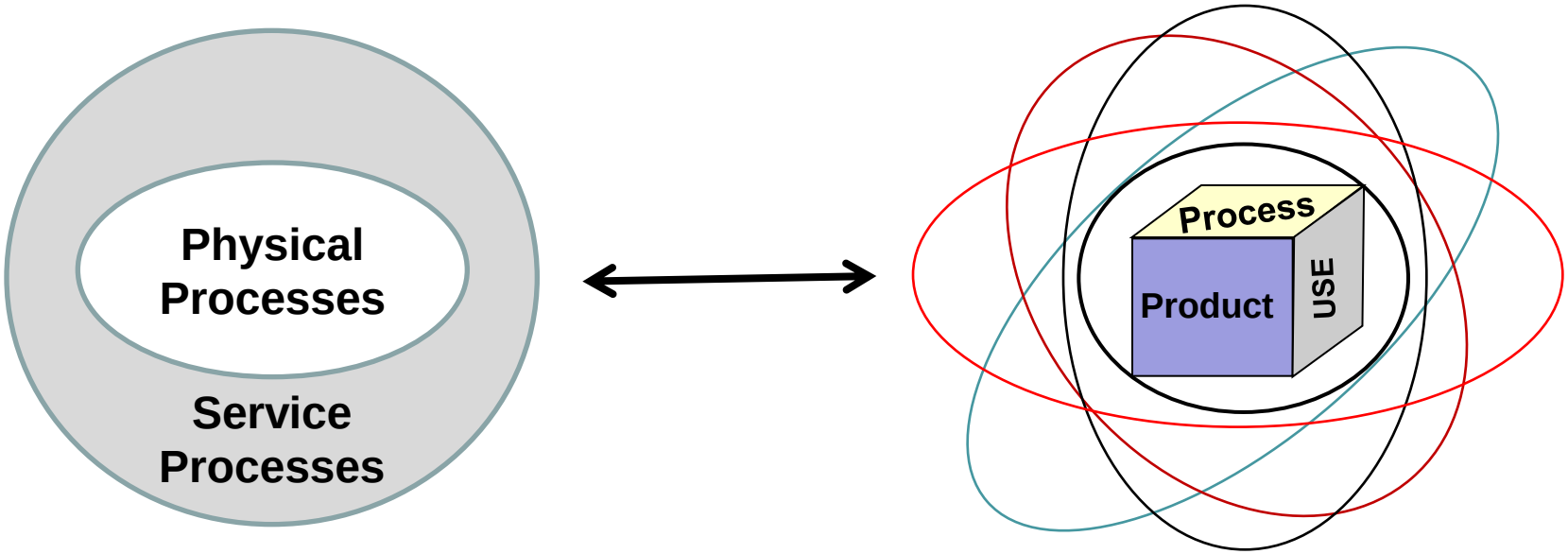


   - **What is Higher Education?**

Dr. K. (Subbu) Subramanian
STIMS Institute (*Science Based Technology Innovation and Management Solutions*)
SubbuKDG@gmail.com

Education :

Knowledge, Experience and Inter-personal skills, Pertaining to a collection of Physical Processes and Service Processes, leading to well identifiable set of Product, Process and USE.



Dr. K. (Subbu) Subramanian
STIMS Institute (*Science Based Technology Innovation and Management Solutions*)
SubbuKDG@gmail.com

Transformational Skills:

1. **Develop a common language:**
   - "Solution"?
   - "Outputs"?
     - PRODUCT ?
     - PROCESS ?
     - Application / USE ?

21st Century Education MUST begin with education on "Common Language".

- Science ? Engineering ? Management ? **Technology ?**
- Manufacturing ?
- STEM ?
- System ? Phenomena ? Value ?
- Innovation ?
- End to End Innovation ?
- Co – Creation of Value? Building from outside in?

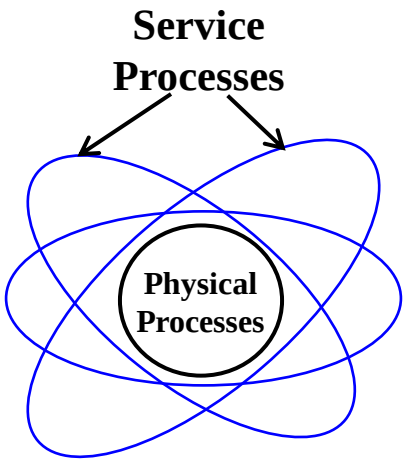
Common Language is the essential building block to identify the "need".

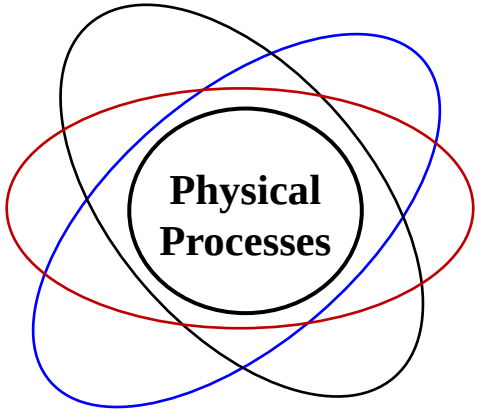
Dr. K. (Subbu) Subramanian
STIMS Institute (*Science Based Technology Innovation and Management Solutions*)
SubbuKDG@gmail.com

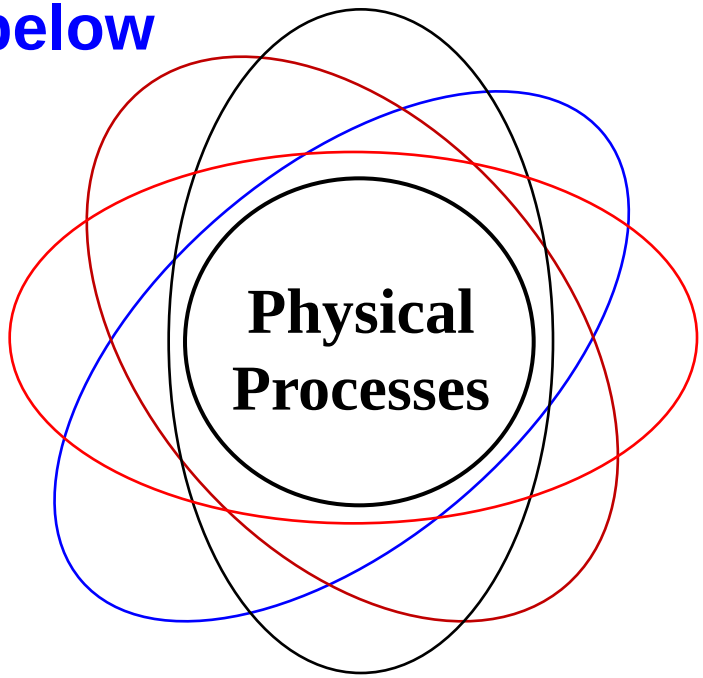
"Management" ?

Dr. K. (Subbu) Subramanian
STIMS Institute (*Science Based Technology Innovation and Management Solutions*)
SubbuKDG@gmail.com

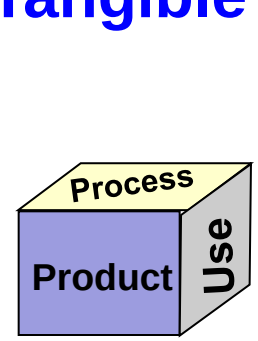
Solution at any level is an orderly aggregation of the Outputs at the level below

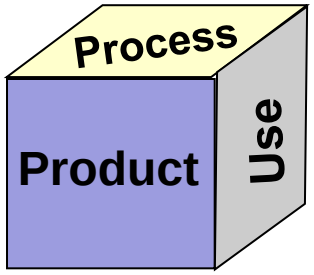


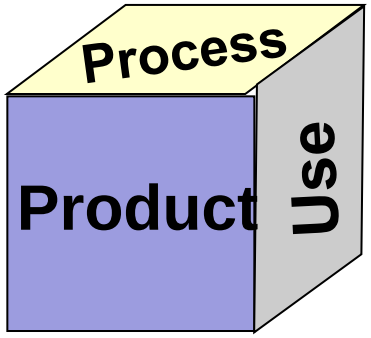




Tangible outputs of every solution:







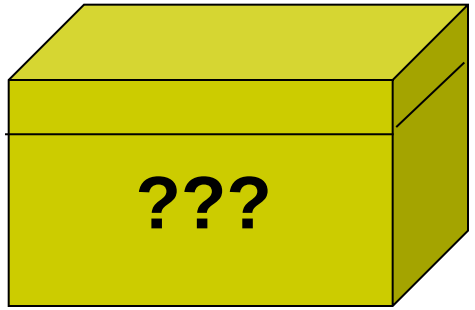
Professional ⟷ **Department/Function** ⟷ **Enterprise**

Dr. K. (Subbu) Subramanian
STIMS Institute (*Science Based Technology Innovation and Management Solutions*)
SubbuKDG@gmail.com

Transformational Skills:

1. **Develop a common language:**

21st Century Education MUST foster education on "Core Capabilities" – What are they and how to deploy them?



2. Core Capabilities –

What do you bring to the job ?

--- On your own ?

--- Along with your team ?

--- As part of your company, industry ?

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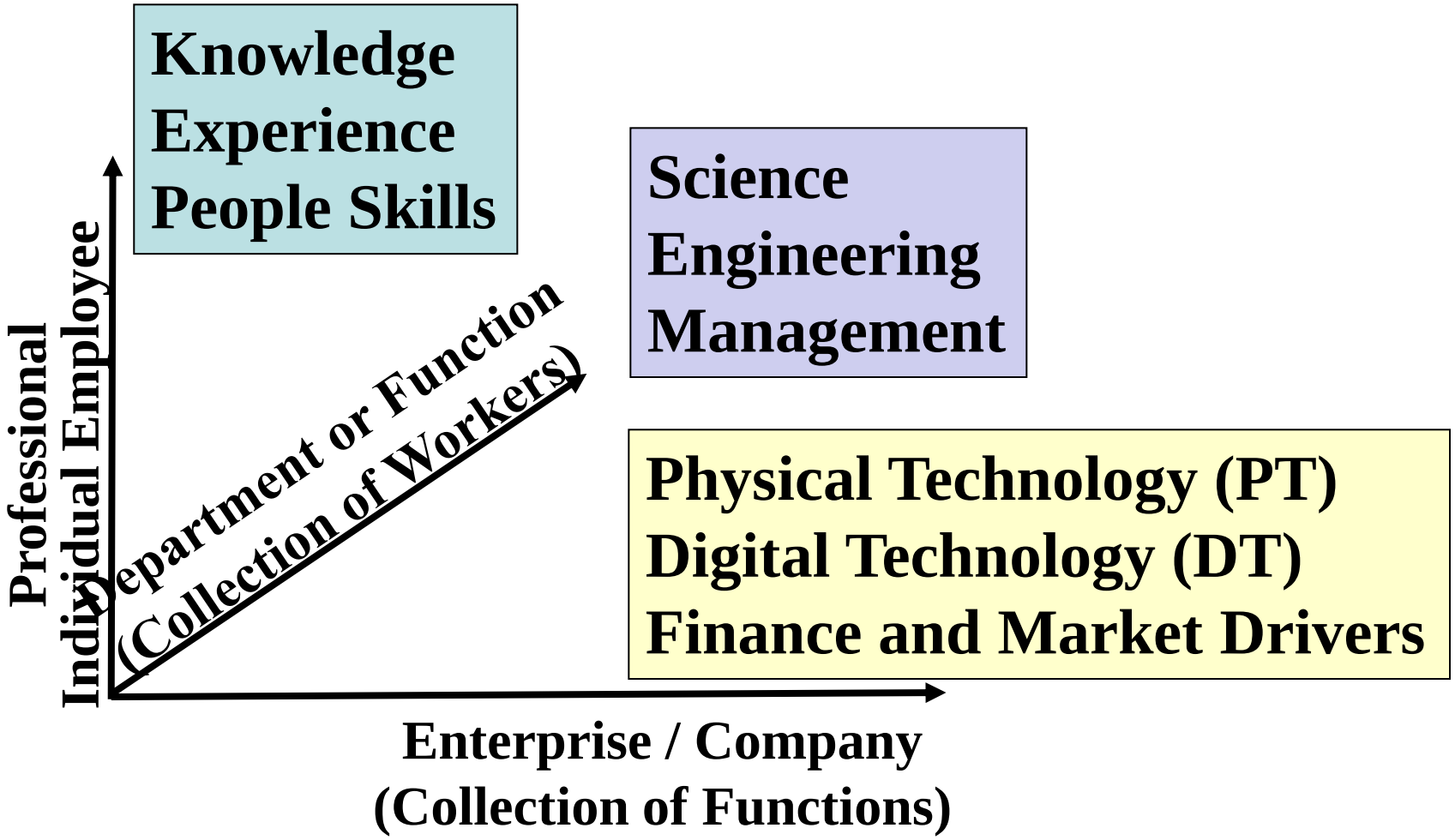
STIMS Institute (*Science Based Technology Innovation and Management Solutions*)
SubbuKDG@gmail.com

3-Dimensions of Core Capabilities



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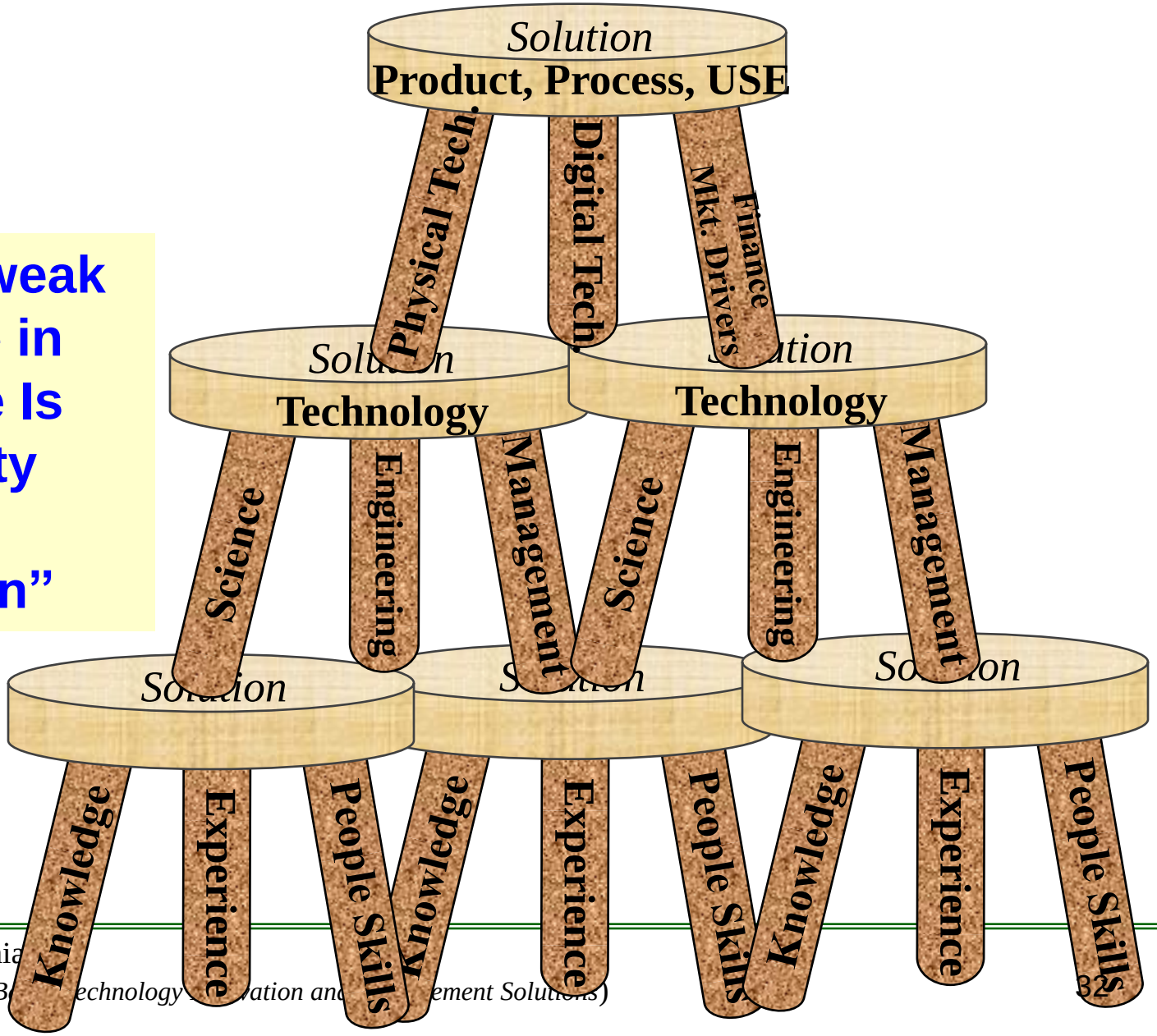
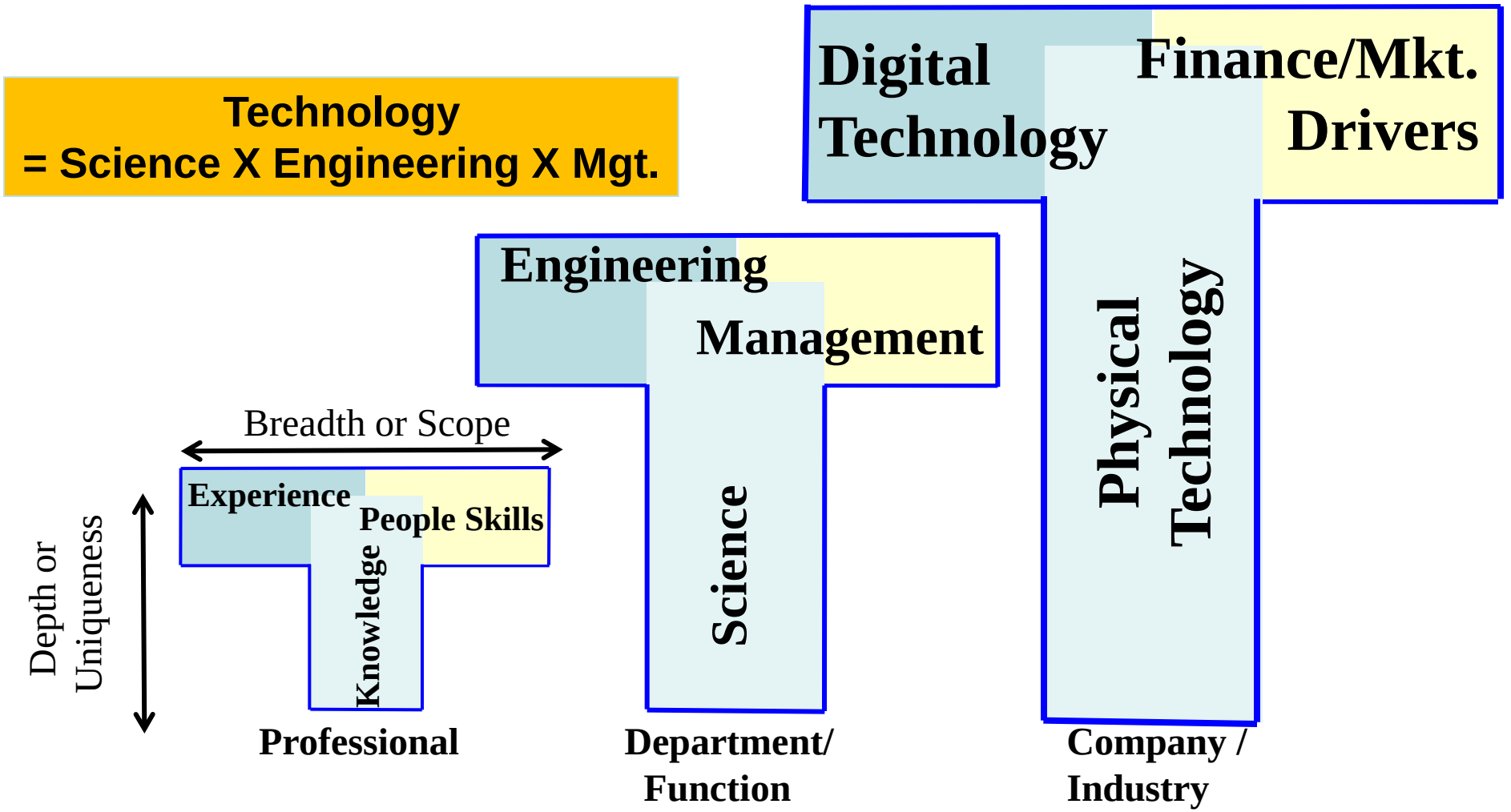
SubbuKDG@gmail.com

New Solutions: They are needed every where!

A broken or weak leg anywhere in this structure Is an opportunity requiring "New Solution"



T- Shaped Thinkers



Alignment of Core Capabilities for Professional Solutions

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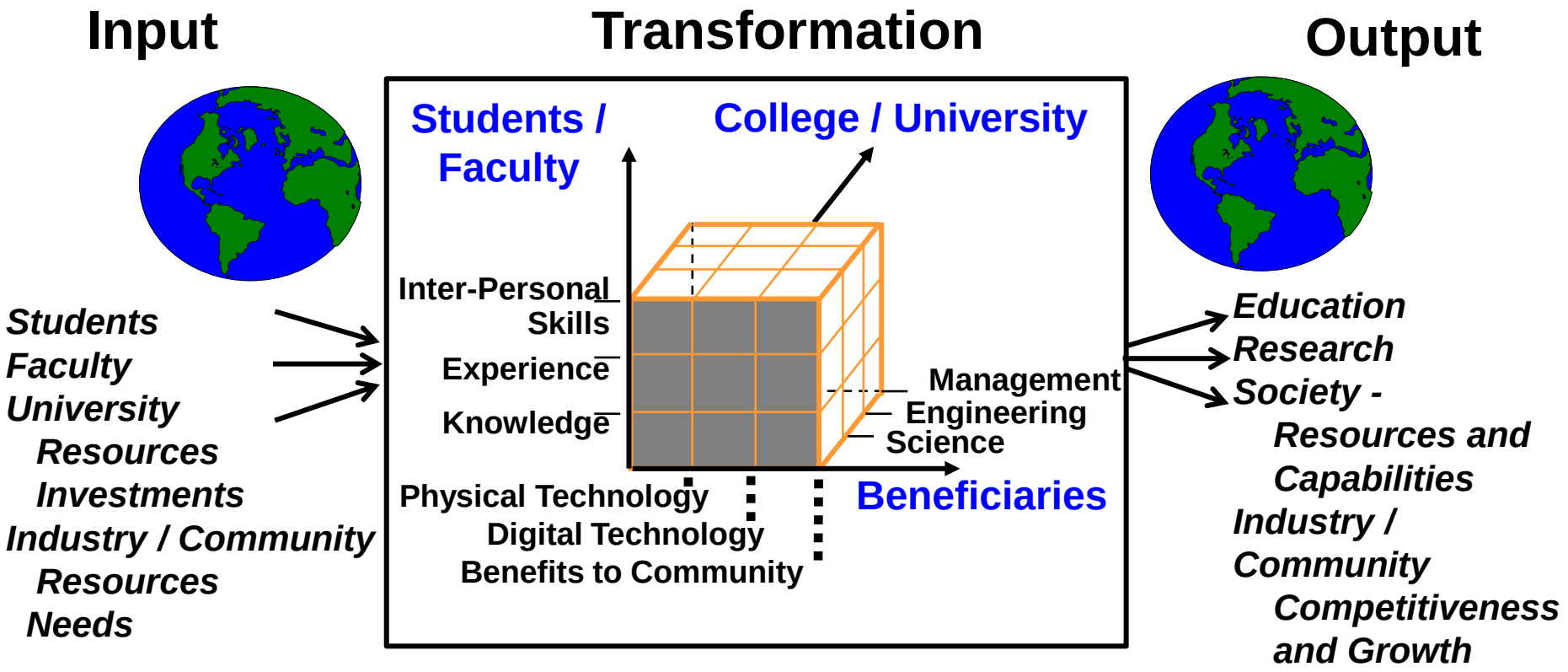
STIMS Institute (*Science Based Technology Innovation and Management Solutions*)
SubbuKDG@gmail.com

Higher Education: Vision

Create and Implement projects and programs by leveraging all core capabilities; provide value added "New" solutions for all users of university resources / capabilities.



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STIMS Institute (*Science Based Technology Innovation and Management Solutions*)
SubbuKDG@gmail.com

Innovation and Higher Education

Innovation = Transformation.

There is a need for a systematic and formal education and training on Transformational Skills?

- **Emotional Intelligence for New Solutions**
- **End-to-End Innovation**

Deploy

X

- **Build Ecosystem for Core Technology Platforms**
- **Emphasis on Science and Mobile Diagnostics**
- **System Approach for Knowledge Integration**

Develop

X

- **3-D View of Core Capabilities**
- **Develop a Common Language**

Discover / Define

Dr. K. (Subbu) Subramanian
STIMS Institute (*Science Based Technology Innovation and Management Solutions*)
SubbuKDG@gmail.com

What is your new SAT Score ?

SKILL

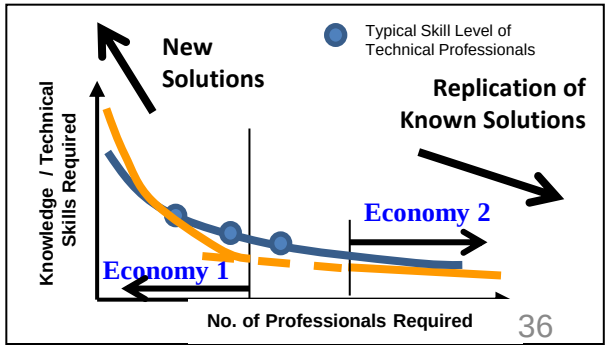
ACCESS

Transformation

Academic Education

Industry/Sector Know-how

Discover, Develop & Deploy "New Solutions"



Thank You