Synchronizing Strategy to Prevent Brain Drain

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What are the Brain Drain issues?

- Brain Drain can profoundly affect the future advancement in science and technology in our society.
- Our leadership role in academic and industry will be compromised.
- The main contributors in this area are the slow-down in auto and auto-related Industries.
- Lack of focus and overall awareness among the stake-holders.
- Proper efforts based on ST are not in place to address the critical issue of Brain Drain.
- OEMs can no longer afford investment so the jobs are outsourced.
- Outsourcers-Outsourcing are the prime contributors to the shortcomings in the quality of the products due to the lack of experience.
- Government, Academia, and Industry are not working together to address this critical issue.
- It is costing our states substantially with no return on investments on edu.

Effectected Disciplines

- Auto—ME, EE, SE, SW-HW, ST, SA, IT
- Biomedical Eng.
- Managers and Developers
- Financial Institutions
- DOD
- IT
- Manufacturing
What are the areas of Sysn. and what do they have in common?

**General Area are:**
XDA (EDA, MDA, MCA, AXBE, XIT)
XSE (ESE, MSE, ISE, CSE, BSE…)
XST (EST, MST, IST, CST, BST…)

**Specific Areas are:**
- XBE
- CAD / CAM / CAE
- Modeling and Simulations
- SE, ST
- SW Security, SA (SW Assurance), and STDS
- Libraries of components, Subsystems, and Systems

Utilizing ST Processes and the *interdisciplinary* focus is common among the above disciplines, however:
- It takes 5-7 years to develop some of the expert skills
- OEMs and others have already invested in the expertise considerably

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**ST Definition**

**Systems Thinking**
A school of thought that focuses on recognizing the interconnections between the parts of a system and synthesizing them into a unified view of the whole.

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**ST Process**

- Systems thinking offers a powerful new perspective, a specialized language, and a set of tools that can be used to address the most stubborn problems in our everyday life and work.
- Systems thinking is a way of understanding reality that emphasizes the relationships among a system’s parts, rather than the parts themselves.
Importance of ST

- Systems thinking is valuable because it can help us to design smart, enduring solutions to problems.
- In its simplest sense, systems thinking gives a more accurate picture of reality, so that we can work with a system's natural forces in order to achieve the results we desire.
- It also encourages us to think about problems and solutions with an eye toward the long view—that, how might a particular solution we're considering play out over the long run? And what unintended consequences might it have?
- Finally, systems thinking is founded on some basic, universal principles that we will begin to detect in all areas, once we learn to recognize them.

General Requirements of ST

- Multi-Disciplinary Expertise Requirements
- Real Field (Internal and External) Awareness
- Value of Intellectual Contribution and Knowledge
- Multi-Disciplinary Approach for effective Linkage between Academia, Industry, and Government
- Development of effective models (Internal and External)
- Utilizing the Analytical, Experimental, Simulation Setting up the Benchmarks
- Implementation of ST Concepts
- Dynamic and Adaptive Process (Recognizing Shortcoming and Adjusting) – A Closed Loop Approach

ST Core Disciplines

- Dealing with today's complex issues lets us focus on the practice of five core Disciplines, or capacities, of which Systems Thinking forms the cornerstone:
  - Systems Thinking Discipline
  - Team Learning Discipline
  - Shared Vision Discipline
  - Mental Models Discipline
  - Personal Mastery Discipline
The Fifth Discipline

- These five disciplines were originally outlined in 1990 in *The Fifth Discipline* and are core to many organizational learning efforts. We also believe there are many other disciplines that support and expand on the above five, including:
  - **Culture, Social Responsibility, Dialogue, Leadership, and Sustainability**

Conclusion

- To address the issues of Brain Drain a Joint Government, Industry, and Academia Task Force Must be formed.
- Membership in the Task Force requires Expertise in SE, ST, and Multidisciplinary with proven records and broad knowledge in those areas.
- Task Force must be supported by affected agencies in Government, Industry, and Academia.
- Task Force must have a complete awareness of the effects of the Brain Drain on society and must be prepared to develop specific guidelines along with solutions to overcome the problems associated with Brain Drain.
- Task Force responsibilities must be considered of urgent nature and its recommendations for execution must be mandatory.