

Importance of Teaching Automation as an integral part of Engineering at Educational Institutes

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Abstract

Technological developments are global phenomena happening all over the world. This is mainly due to the large pool of scientists and Technologist working in Research and development programs taken by the Developed world. India is promoting large scale manufacturing in Agriculture, Textile, Steel, Electronic Software etc. Application of the software and IT knowledge in above field is requirement of the country. India needs huge number of Technical personnel's who are able to work in present technology. India needs to associate with modern Industries to build this Multi-Tasking ability by Establishing Knowledge Centers in Institutions to give practical exposure in each of the technological practices present in various Engineering field.

I. Introduction

Necessity is mother of Invention; Man is trying to manufacture another Brain. ie use of Electronic /computer and IT services in Automation. Following are the important field in which automation is taking place rapidly all over the world. India is far behind in adopting the Technology. Following are the important fields it needs to adopt on urgent address

1. Communication :- Postal, Networking
2. Transportation :- Road, Rail, Surface and Sea
3. Infrastructure :- Building, Industry , Building Infrastructure
4. Manufacturing :- Products, Machineries, Textiles, electronics
5. Finance & Services :- Networking, Supply chain management, logistics etc

Rapid application of Technological developments in all the above field is need of the hour to progress and to be competitive in the world. This can happen only when we deploy pool of Scientist to do adoptive research. Transfer of Technology from Lab to land (TOT) to suit region wise in all the states has to be planned by Industry participation. Following are important areas in which all the R and D Institutions are innovating regularly all over the developed world. Continuous improvement has been seen by the Human kind since it evolution on the earth.

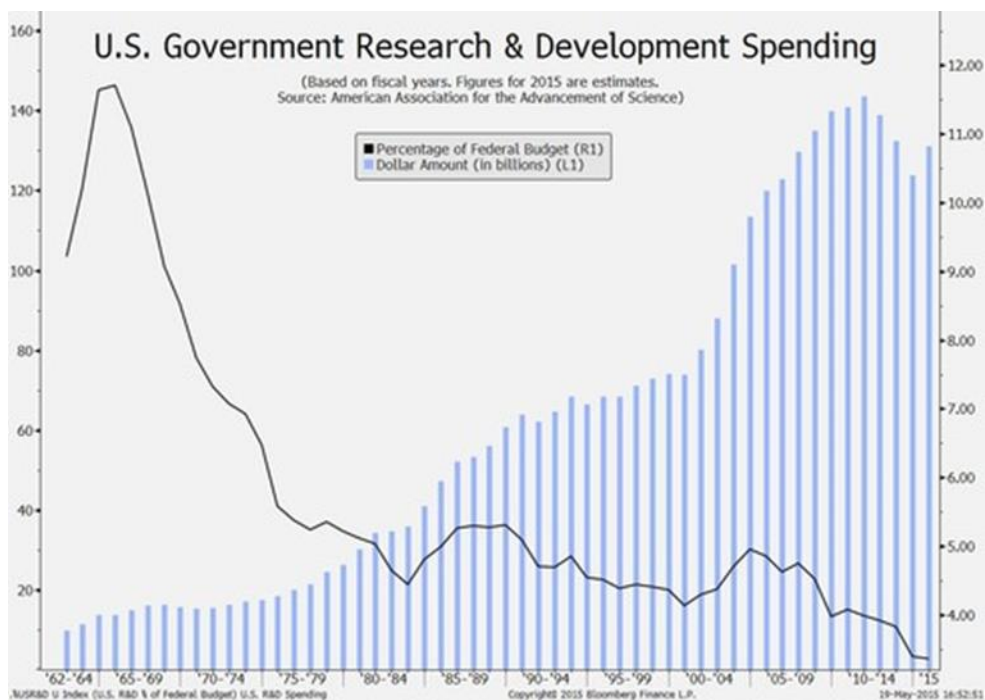
1) Automation

2) Green Technology

3) Improvisational utility of Energy in manufacturing

4) Minimization of waste & effective utilization of waste for productive purpose.

Whole world is talking about Automation, Sustainability, Large scale manufacturing and concentrating on developing innovative new products market for India and china because of large population. Even though we have large pool of scientist and engineer coming out of the university systems, Skills and ability required donot match the expectations of the present Industry requirements. Hence, there is need for Industry tie ups in different Engineering field. Major contribution is from American Institutions. The investmentTrend in R and D is regularly decreasing in US Institutions (Fig 1) America is short-changing its future by forgoing outlays in basic research and development," Quinlan wrote. He referred to this shift as the answer to a question he's often asked by clients: "So what keeps you awake at night?"



This is a panic button for the whole world but China, Korea, and Japan have increased their budget for basic and adoptive research. They are the leading countries in Asia who have emerged as leading contributors to the present technological developments by good investment in R&D. Engineering Industry in India is second largest in the world with poor technological practices needs modernization and automation. Industry needs to go in for technology up gradation in decentralized sector. Direct Foreign investment in Auto, Steel and Chemical Industries is picking up. The development of the cotton value chain processes like Cotton growing, Ginning, Bale management, Spinning, Weaving, processing and garmenting in India needs to be automated. This has been achieved by Shri Amrish R Patel Chancellor NMIMS Deemed to be university. He has successfully developed cotton value chain in Shirpur. Important Value chains are Home textiles, Knitted products yarn to final garments, Yarn dyed shirtings and latest Technical Textiles Automotive etc. Centre for Textile Function is integral part of this socio-economic development program under taken by the university was initiated in the year 2007 in Shirpur MPTP campus has produced 200 diploma graduates in association with Industry Mentors and Industry participation in Training and practical's. The capacity building to work in the present technology in corporate textile Industry is boon to the technical personnel's trained in this center. Hence, Students are preferred for employment in different specialization such as Spinning, Weaving, Knitting, Wet processing salary ranging from 2 to 6 lakh per annum. Similarly, large pool of electronic Engineers are seeking employment only in service and application sector. They do not have support of large scale electronic goods manufacturing sector. But electronic and Mechatronics application which are required in the Textile Industries are practiced and preached are demonstrated in textile Industry in PSSGL group of Institution. Effective technology demonstration is being done in Bosch Rexroth Laboratory, Robotic, PLC, SCADA etc. Technology that are required in automation of the textile Industry. These multi-tasking abilities in Engineer is need of the hour. Practical ability development is possible by Industry participation in education.

II. Automation need engineering industry

Any Engineering industry is a sub-set of product-based industry. Important Industry in the country which are making rapid progress in the growth of India are Viz , Steel, Auto, Textile, Chemicals and fertilizers, Cement, Pharmaceutical and Medical Instruments, Electronic Goods mfg.,

Hence, it will have all the ingredients of a product based industry, namely:

1. Product development/R&D/Design
2. Process engineering/Pre-production/Process development
3. Production/Manufacturing
4. Testing/Final Q.C/
5. Maintenance of Capital equipment used in Production
6. Servicing

Each of the above has its own uniqueness for an upcoming engineer.

1. R&D requires use of simulation packages from E&C engineers to simulate how engine noise creates EMC and affects the electronic circuits (e.g. valve-timing). How to eliminate such EMC is the main focus and use of simulation packages assist in such work.
2. Process engineering involves assisting the shop-layout designers in creating effective work-flow of material (engine assembly or door assembly, etc.) on a transfer line, which uses extensive automation and automation circuitry. Assisting in creating cost effective transfer lines is the main effort by using hardware/software/pneumatics/hydraulics etc.
3. Production involves giving output as required in terms of numbers per shift. Effort required is to assist in creating monitoring network for measuring output of various parameters. Toyota at Japan measure 24,000 parameters daily. Even trending software makes monitoring simpler.
4. Testing at the end of production is to ensure that output is meeting expectations. Hardware/software is required to measure only selected parameters independently (other than that done by Production) to assure quality to the end customer.
5. Maintenance of all above equipment is a job by itself where an engineer learns the essentials of all the above equipment.
6. Servicing an automobile at a service center is getting highly automated today. Simple example is tire wheel-balancing and then wheel-alignment equipment which car-owners are familiar. Similar equipment is required for many other parameters at a service center.

An inquisitive mind of an electronic engineer will assist in learning all facets of the automobile industry in a career-life-time and enable the engineer to learn, grow and earn respect in the industry. He will gain recognition in industry forums due to his knowledge and contribution and be valued by society (e.g. Mr. Wagh, Design Head, for Tata's Nano-model is known world-wide).

III. Opportunity for India

Human capital is required to work in automation in large scale manufacturing activity in India. Large Industry up gradation in India due to shift in mfg base from developed world to developing world. Large number of youth available in the country. Need to manage technological developments required in application of automation in each and every aspect of the developments required in the country. We need to provide and create service providers

- 1) IT based Logistics to all the Industries
- 2) Drive and control
- 3) Design and Developments
- 4) Test and analyze
- 5) Health care products

Effective utilization of IT sector skills to support Engineering, Manufacturing, and Infrastructure Industries prevalent in large manufacturing Hub being created in India for mass production. Viz Major Engineering graduates from Mechanical, Mechatronics, Textile, and Auto & Civil to be supported by Technological developments with IT component. Intellectual ability development in engineering graduates to have some basic knowledge of IT as applied has to be taught/practiced during graduation so that some application in Industry could be understood in proper perspective. And they can have practical ability to develop few technical applications to perform on production floor.

IV. Mandate of MPSTME: Industry- Institute linkage

Mandate of MPSTME MPTP Group is to provide basic Engineering education to Diploma and Degree students. By developing laboratory practices in Engineering colleges to teach fundamentals of the Engineering in Textile , Mechanical, Mechatronics, Auto, civil, Electronics and computer science.

V. Conclusion

A RURAL SCHOOLS that runs on labs instead of classes? I Visited a reputed rural schools to study their best practices on behalf of my ROTARY club. It is at Wai, a rural area 60 km from Pune city. The Wai School is run by none other than Mr. Arun Kirloskar, Read. Chairman MD of Kirloskar Cummins. He has started this post retirement with corporate funds (perhaps of CSR). But what is amazing is the Vision with which he runs it personally. His personal founding philosophy is that the school shall EDUCE (draw out /blossom) the learning of the students. Thus instead of conventional classroom teaching he has laboratories of each subject including History, Geography, Science, Music, Languages etc. and students move from lab to lab exploring the lessons and subjects in a creative manner. The icing on the cake is that the school admits only the poorest of poor children from the surrounding rural areas and no fee is charged and the result: smart turn out of kids with world class education. Ultimately Laboratory practice and Practical Exposure in the present Technology is need of the Engineering education should be linked and initiated from the primary education to Technical education each chain development is very essential to technical ability to work in Innovate Research and development leading to Automation in large scale manufacturing

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