Education for "sustainable jobs and careers" –Why? What? How?

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Introduction:

Those who are successful in any field today are all "IBMers" in our thoughts and action. This is what makes us connect and configure quickly and effectively on the problems we face in our jobs and careers. It is a passion to find a way to connect, define the "problem" and address it effectively, to make the world a "better place"!

I have worked in manufacturing sector for over 34 years, based in USA, but with world wide responsibilities. Much of my success and many of my models and inspiration come from the IT sector, even though I am personally IT challenged. I visited Almaden Research Center two or three years ago. Ever since that time, I have believed that there are many things we can do together, But, I had to wait for the right circumstances.

Three months ago, I quit my safe job in a large global company and started my own company in the field of Knowledge Management. Education and development of sustainable jobs and careers for "mid career professionals" is my current mission.

I acknowledge with gratitude the comment by Nicholas M. Donofrio
IBM Fellow Emeritus at the dinner session in a recent workshop on Life Long Learning Strategies. He said "if we are looking at the future, with a premise, that for every employee the work place will be a changing location every five years and the uncertainty associated with it, then we as a nation have a dark future". If I have captured these words correctly, then I could not agree more with it. The reason for such premise in my view is the emphasis on "evidences" rather than a focus on the causality behind the evidences/anecdotes. In essence while there is a general feeling, that LLL is important (i.e) the "What?" the specifics of "Why?" and "How?" are generally missing in our discussions in my opinion.

The case for education on "Transformational skills":

The author is a successful professional, with over 34 years of working in the heart of the manufacturing industry. After his advanced degree from MIT, the author has deliberately worked in the "brown collar" industry, but finding opportunities for its products and services in the high tech industry thanks to his academic education!. Based out of the USA, the author has traveled world wide and has implemented sector specific Manufacturing Process Technology Center, for his area of expertise in USA, Germany, China and India. He has also created and implemented industry/sector specific education for hundreds of manufacturing professionals in all these countries and many more across Europe, Japan, Brazil, etc.

Yet, in his years of experience in the past three decades, he has seen more individuals rise up to the top who are not the smartest (academically advanced in their education), or with extremely high industry/sector specific knowledge. Instead, he has seen those rise to the top, who have an uncanny ability to identify an "opportunity", frame it as a problem in a broader context (as a system) and arrive at their solution using resources readily accessible near by or at far corners of the globe. They are also able to implement such solutions of benefit for those who have the capacity and influence to reward such solutions. This observation seems to be valid for individuals as much as it is valid for organizations and enterprises.

Even in the larger world, every success cited – Google, Face book, Microsoft, etc. – are not always enabled by those who are the best in class in their academic education or industry/sector specific knowledge. But, invariably these are people endowed with a capacity to master certain transformative skills. They are the true "job creators", since their output and results enables employment for the many with sector specific skills and advanced academic education! If the organizations of the past enabled aggregation of such transformational skills, to day they have become more individual centric. While Digital Technology teaches "Watson" to configure the algorithms of thinking and problem resolution, every Tom, James, Jones, Jane and Lisa is required to find opportunities for such algorithms and their use – new solutions – that add tangible value for those who are willing to pay for it!

As the world moves on from Industrial Economy to Service Economy to Information Economy to whatever that will come in the future (Knowledge Economy?), it is clear that the transformative skills, which happened by chance for a selected few, need to become a natural order for individuals, organization, community or nation to thrive. Such transformative skills have to be followed by industry/sector specific skills. Those empowered with these two assets can readily acquire more academic knowledge or simply use the many people with such knowledge across the globe!

The above may be counter-intuitive to the current emphasis in education for higher degrees as the pathway for future success. Community colleges are encouraged to teach more "sector/industry specific" education. But in our opinion, neither of these will be adequate or sufficient, unless the transformational skills are taught and trained and the few successful among them lead the way for a higher rate of new solutions and their effective implementation. The chance and ad-hoc evolution in these transformational skills were adequate for a nation with constant infusion of skilled work force as immigrants seeking better opportunities and with a passion to create new solutions. The rate of such ad-hoc evolution was also sufficient for a nation with an economy insulated within its shores. Now, thanks to Globalization, both these forces in favor for USA are no longer there. Hence the case for the alternative (greater emphasis on "Transformational Skills Education" and a higher priority for it above the other two traditional pathways for education) can not be over stated!

If you believe or agree with the above point of view, please see the attached white paper which follows:

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The traditional approach leading to job success and career growth has been based on:

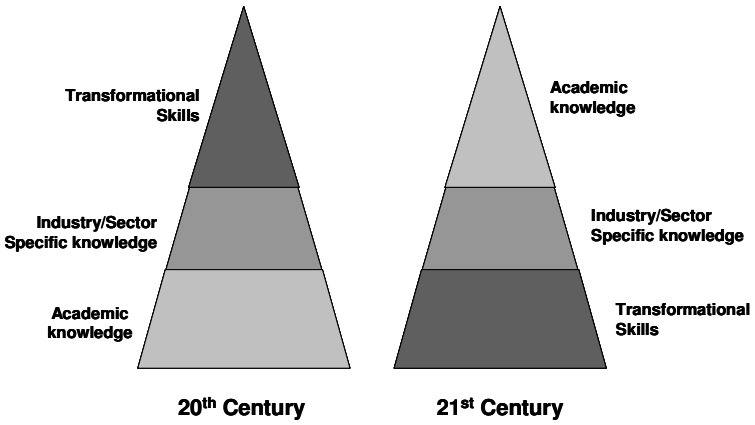
Sound academic education in a given discipline
Followed by industry/sector specific education, on an on-going basis

With the above as their strengths individual professionals could do well in jobs, which were available within the shores of any economically successful nation such as the USA. The above skills were adequate and sufficient to execute the tasks assigned to them (i.e) get their jobs done. This has been the basis for a large majority of the "middle class" professional jobs.

Few among these middle class professionals developed their own personal skills to identify and transform "opportunities" into "problems/projects". When carried out to the end, these resulted in problem resolution and accomplished the "impact/results". These were the "successful" or "high potential" employees, who also achieved impressive growth in their jobs, responsibilities and careers.

While there have been substantial rewards for those with the "transformational skills", they are not formalized or taught today at the colleges or in the work place in an organized manner to all professionals. They are seen as the magical power of the few, who gets things done and create results and thus make an impact for the bottom line!

Today – for reasons, very familiar to every one and well described under globalization – for every academically well trained professional, there are many more readily available and accessible from all nations, across the globe.



Three categories of knowledge and their hierarchy of needs.

Such readily available off shore professional resources, reduce the demand for professionals in the local job market with high unemployment as the result. Without a job or career on-hand, these professionals in USA, have less of an opportunity to acquire industry/sector specific skills, training or education! Many companies are eager to spend their few available dollars to educate and train their workers in lower cost over seas locations more readily, as these regions are seen as places of high growth and higher profits!

Then, what should the professional workers in the middle of their job and career do? What should the recent graduates, looking for a home to pursue their jobs and career do?

They should reverse their order of priority in their skills and education!

Instead of emphasizing on more college degrees, they should focus on "Transformational Skills" as their starting point.

Aided with this education, they should put it to use to learn specific industry/sector specific skills. In this process they will be engaged in more and more of projects and programs valuable to their employers. Their bottom line impact will be readily visible.

At this stage, if they need more academic knowledge – which they will invariably need – they can get it by "outsourcing" to others educated in the field or acquire some of it through their own education for higher degrees.

What are these "Transformational" skills and how to educate for them?

1. Ability to develop and foster a Common Language:

Words have meaning. In the day to day barrage of information, there is a tendency to lose sight of their meaning, which in turn creates a lack of focus on the basic skills these words stand for. Take for example the word "technology" This is a term used by almost everyone in many different context. However it is most frequently used today to refer to developments exclusively in digital technology and for IT solutions.

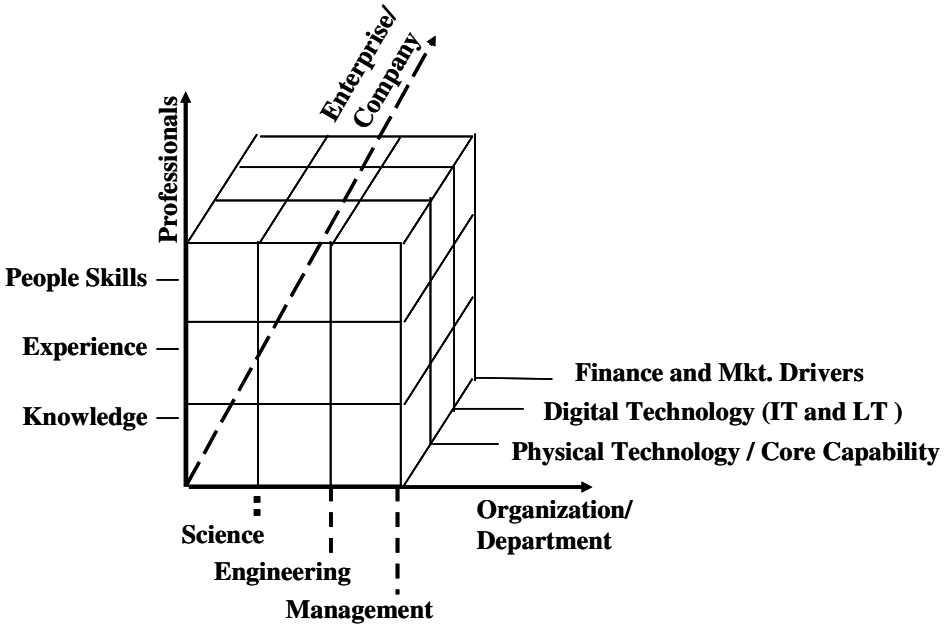
There are many such words frequently used in a company, industry or industry sector. Product, Process, Application, Supply Chain, Value Chain, System, Solution, Science, Engineering, Management and Globalization are few of the examples. These words have specific meaning for a professional and his/her field of work. Those who develop clarity in the meaning of such words are also able to develop natural alliances with others who work in that field.

Understanding the common language should help the professional reach farther and make alliances with many people across the globe. Recognizing new opportunities and creating new markets will be a natural for those who can develop a common language with their suppliers and customers and other industry partners. Inside the company such ability to foster common language helps the professional to work easily across the many business

functions – from sales, R&D, marketing, manufacturing, supply chain management, accounting, etc.

2. 3 D - view of the "job"

The 21st century professional should be capable of broadening the horizon of his or her job. Their job will not be merely a collection of tasks. It will not be simply doing what you are asked to do? Instead these professionals must start with the question "Why this job? Who needs its outputs?" "What is the "Product" pertinent to this job? Who is willing to pay for this "product" as the output of my job? This thought process will lead to the identification of a wider range of users, who are all impacted by the output generated by the employee, his/her group or department and his company as a whole. In this view, the job will not be seen as a random occurrence. Instead it will be seen as part of a well orchestrated stream of activities, each linked to the other as parts of a carefully assembled system. The larger this view, the greater the professional can see opportunities to create value through his/her job.



3D view of the job.

This comprehensive view of the job – like a Rubic's cube and how to manipulate it - will also help the professional to identify global resources available as inputs to enhance the job and its effectiveness. Such professional can also frame the outputs or solutions for larger range of users across the globe. The 21st century professional with a 3D view of the job, will find avenues to become the "global intellect" much sought after by every one who needs his/her knowledge from across the globe.

3. Knowledge Integration: System Approach for Industrial Processes

Industrial societies have evolved by dividing problems into tasks and sub-tasks and assigning those tasks and sub-tasks to individuals. "Don't ask why, but simply get the job done" has been the slogan, where the job is reduced to a mere task or series of tasks.

Thanks to globalization, organizations are evolving such that each employee is required to generate larger outputs while also covering a broad range of roles and responsibilities. In other words, incremental increase in output per employee is no longer sufficient. Instead what is needed is a quantum or large scale change in output. Despite long hours of work each day these output expectations can not be met, as long as the job is seen a collection of tasks. Instead what is required is a total shift in mindset to look at each job as an "Input/ transformation /output" system. In this approach, the basic skill is to configure the job as a system. Each job itself may be a "system" or part of a system. Each system is composed of a comprehensive and well defined set of inputs; transformation or value addition; and specific value or benefit as output. In this system view of the job, there are well identified users, who are ready to pay for the value received.

In the system approach science, engineering, and management skills of the professional are not three isolated silos. Instead they are interconnected pathways that utilize the creative ability of each professional as the situation warrants. Quantitative and scientific approaches to problem solving will be the natural order for these modern professionals. Rules of thumb, guidelines, and reference tables -- which were stable and usable over long periods of time in the past for the task oriented professionals -- will no longer be sufficient. Incremental or continuous improvements using statistical methods need to be supplemented with large scale or step change in the job outputs. The basic scientific principles and how to exploit them will be clear to these system-oriented professionals.

At the highest level, the system oriented professional will be capable of conceiving new solutions, which will be new configurations of the system. The three levels of system skills can be described as: awareness, analysis, and synthesis. Today there is an abundance of new job titles and careers in the IT sector. The jobs for professionals in all fields in the future will follow the same trend. Alternatively these professionals can configure their jobs and value additions in a proactive manner, thus facilitating their own pathway. The System Approach will serve as the useful methodology in this quest.
http://search.barnesandnoble.com/The-System-Approach/K-Subbu-Subramanian/e/9781569902554

4. Emphasis on the "Science": Process Diagnostics and problem Solving skills

The probing tools and analytical or problem solving skills will be unique to each industry and process. The ability to conceive and use sensors and such physical technology-based probing tools, integrated with digital data and IT solutions, will distinguish the successful professionals of the future. Using such tools and capabilities, their access to customer problems and an ever broadening customer base will increase.

Today, it is inconceivable to see any medical professional without a stethoscope and a thermometer! The professionals of the future in every filed should have access to and capable of using portable diagnostic tools unique to their jobs and profession.

5. Connecting the dots to see the big picture: System Thinking

We have already touched upon this above, but with emphasis on technical content. There is a need to focus on the "soft skills" pertaining to system thinking. Consider for example jobs and careers in a start-up operation. Contrast that with a job in a large company with highly standardized systems and practices. The professional of the future needs to be comfortable in both of these situations. This will require certain unique management skills and people skills in each case and flexibility to adapt from one to the other situation.

Jobs are viewed as part of a jigsaw puzzle. The roles and interconnectivity of the jobs is not clear. As a result, the professional becomes constrained in his/her skills and opportunity for growth. Self imposed constraints to work within the rules and the constraints of departments and business functions are the shackles holding back the progress of the many professionals today.

Instead each job should be seen as a small unit of a system that progressively grows with the group, department, or business unit. In developing strategies for the growth of a company, there are models already available to identify core technologies. Each axis of the core technology are used as pathways to identify opportunities for the growth of the company. A collection of such core capabilities are also used to identify opportunities for organic or granular growth. The same models which are used at the company level can also be adapted by individual professionals to identify and develop opportunities for their personal jobs and career growth.

6. End to End Innovation: The Innovation Culture

There is a lot written and taught on innovation. Such innovation has to be focused on achieving fully packaged or complete solutions or "end to end" innovation. Simply coming up with a new idea or a patent or a new way of doing the job in a local scale will be no longer sufficient. The innovation has to be in a complete package, ready for large scale replication at locations far from the original source of innovation, with minimal need for technical skills for follow up or maintenance work. Such end-to-end innovation will require a structure where traditional organizational boundaries are crossed at will. This is not the case with professional engineers' current understanding of their jobs. Today getting the job done and getting it across the line to the next department is the prevailing mind set. Even when inter-disciplinary teams are formed, the team members work to represent their "department" rather than engage as part of an inter-disciplinary though process. IT tools and standards from accounting, HR, cost allocation, etc. tend to foster such isolation more than they promote cross-functional thought process, a key element of Innovation Culture.

Innovation by its very nature requires change. Hence it challenges the status quo**.** Large organizations thrive by establishing standards and enforcing them. Current plug and play IT solutions are most effective when they are deployed to manage large, standardized operations such as Wal-Mart, FedEx, and UPS. Many functions such as budgeting, purchasing, order processing, and payroll processing become rigid and inflexible thanks to large scale IT systems introduced to achieve cost efficiency in processing information. To overcome such impediments the professionals of the future will require the skills of looking at the big picture, which has been described earlier under *system thinking*. Making it a natural part of working across teams of people will require a new culture.

7. Emotional Intelligence of Innovation and Entrepreneurship.

In a global economy, while individuals continue to work as part of team, members of the team are in different locations across the globe. They are connected only through their computers, networks, and other digital tools. Team members may never meet face to face, and if they do, it may only be in the virtual world! Taking all this into account, the professionals need to constantly think of "what is good for others, which can in turn benefit my work output as well". This will be the nature of Emotional Intelligence for the 21st Century professional.

Innovation by its very definition requires challenging the status quo. To make this change smooth and acceptable, professionals with technical backgrounds will need to cultivate specific aspects of emotional intelligence. Lean Processes, outsourcing, off shoring, Six sigma, are all tools for standardization and minimize variation.. These tools can be used for an increasing span of activities, but as long as variations are minimized and reproducibility and reliability are assured. In such a world of standards, an innovator wishing to introduce a new solution, a new widget or new way of doing things, will need to face and overcome the formidable resistance to change the standardized solutions already in place. This will require unique aspects of emotional intelligence needed for change management.

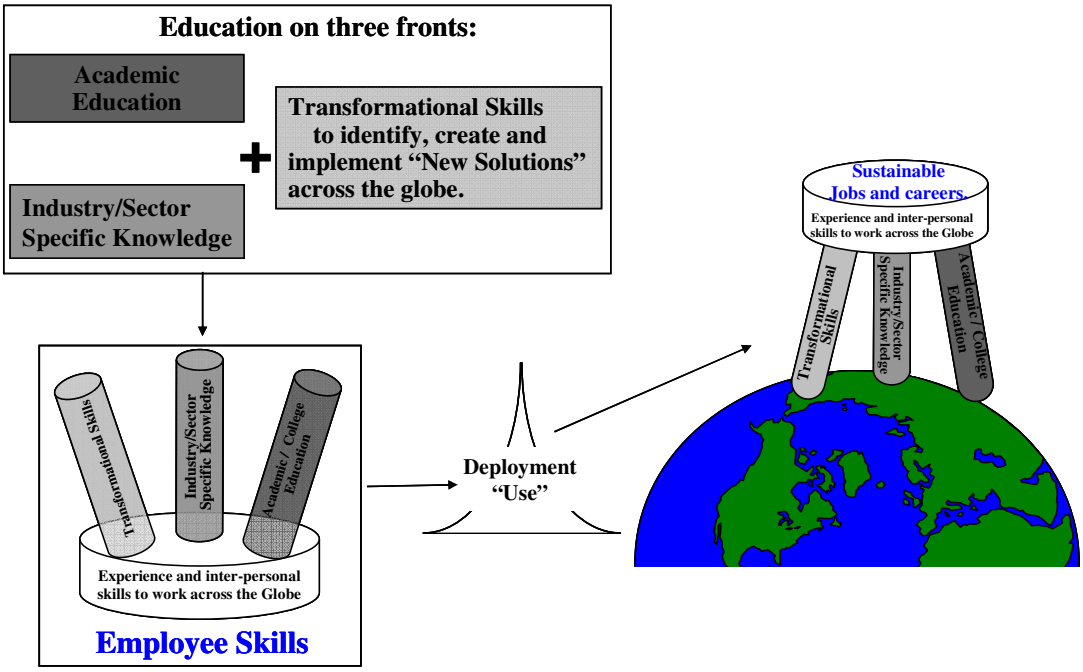
End-to-end innovation is the concept where an idea is transformed into usable result, which in turn is implemented to achieve the desired commercial impact. This will require migration from idea generation or discovery into the many functions involved in creating and validating new solutions, all the way through production, manufacturing, sales, and accounting. Working across these large range of business functions and with the people involved in them, will require emotional intelligence of the highest order. This need for EI will only be compounded when such end to end innovation will also require working across many cultures, geographies, suppliers and end users.

All of the above are a set of "Transformational skills". These skills can be taught in a structured and organized manner. Every professional needs to be trained for these skills.

Academic education, Industry/sector specific education and Transformational skills are like the three legs of a stool. The professionals of the 21st century will rely on all these

three and in some combination for their sustainable jobs and careers in the Global Economy. It is imperative that we focus on all these three components of education in an organized and systematic manner.

While Academic Education with a hierarchy of degrees awarded is reasonably well understood, industry/sector specific education is not as clear or well understood by every one. Clarification and formulation of the needs and how to educate for this will depend on the local industries and their specific work force requirements. As an example, when H1B visas are issued for certain industry segments, they illustrate the need for unique needs for industry/sector specific education for locally available workers.



Simultaneous education on all three fronts and their successful deployment are required for sustainable jobs and careers for the "Globalized" work place!

Implementation strategy:

- First we need a concurrence that it is indeed necessary for these three elements of education as identified above.
    - Organize a series of work shops for CEOs and influence leaders on this urgent need for the three elements of education.
    - Create a working team assigned by these CEOs and influence leaders that can identify (a) the employees to be trained and (b) their industry/sector specific educational needs.
    - CEOs and influence leaders who agree to the above need also find the means for the education critical to their employees.

- Conduct a series of work shops for the identified employees on the "Transformational skills".
- Utilize the stars among these employees – those who react positively and pro-actively to the Transformational Skills education – to identify the system oriented industry/sector specific educational needs and means to deliver such education:
    - Conduct a core capability boot camp to identify the sector specific educational needs (See appendix attached at the end).
    - Develop industry specific educational materials, relevant for their industry sector (and as identified through the core capability boot camp).
- Through a combination of the above teach and train employees on system oriented Industry/sector specific education. Utilize local area employees (stars), academic resources and global experts to deliver such sector specific education.
- Develop case studies that document the effectiveness of such education and as a means to validate future education efforts and initiatives.

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Appendix

Do you know your "Core" capability?

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Are you the owner of a small or medium sized manufacturing company? Are you the head of a profit center or a Business Unit that is part of a company group? If you are, it is very likely that you are one of the business leaders, trying to find ways to keep your business above water. Some of you may be concerned about growing your bottom line and in rare occasions seeking ways to further grow your business. But, no matter what your needs are, it is certain that you are facing the stiff winds of global competition, cost pressures, challenges from outsourced operations and above all a sense of uncertainty about the future.

We believe that such pessimism and the sense of gloom and doom about manufacturing industries and their future is not warranted. It is true that there are stiff head winds and it is also true that the waters are turbulent. But, you are not up the creek, with out a paddle!

Have you ever sat back and asked yourself, "How did we (your business unit) get here?" No, I do not mean, how you got into a situation of stiff competition and low profit margins and high costs. These are all obvious and readily known to every one. But, have you figured out how your business or operation grew from its beginnings to where it is today? It did not happen by chance or by some luck or through magic! It happened because you and your people along with your suppliers and your customers contributed their share of knowledge and know-how that resulted in the products you manufacture, the processes you use to make them and also the applications know-how through which your customers use your products. The "Products. Processes and Applications know-how" are your core capabilities. These core capabilities are embedded in the knowledge of many people connected with your company – through your employees, suppliers and customers and their customers.

You might say "It is indeed true that we did not grow out of thin air. We built our company, brick by brick though our products, manufacturing process capabilities and our know-how to help our customers use our products better. Then, whatever happened to my business or operation, over the years? Why are we struggling today with low profitability and shrinking margins and low to no growth?" One can ask such valid questions and wallow in misery or merely be nostalgic about the good old days for ever. Instead, you can muster the passion to dig deeper.

Your product is not any widget you put in your shipping box. It is not merely something you identify by a product number or a bar code. Product is something of value to some one (the user), who is willing to pay you (the manufacturer) something of value to you. Can you describe your "Product" using the above definition? Is there any one in your

sales, product design/development, manufacturing/production, tech-support or general management who can describe your product in terms of the value to your customer and the expected value for you in return? Do you know who they are? Do they all have the same understanding of the user value and manufacture's value or are they speaking over each other in different languages? Your journey for the future can start right here and now, by developing a common definition of your "Product" and developing a core team across the business functions that speaks the same language about your product.

How well do you know your Processes to manufacture your products? They are not "black box" that nobody knows anything about, after Joe Smith retires from the company! All processes in your manufacturing floor have well defined Inputs, which are converted into Outputs. All processes are "Input/Transformation/Output" system. No, we are not talking about Ph.D language. In the past years, few who knew about the process could tweak them and keep them going, while others were simply pairs of hands to help them out. We can not do that any more. All processes can be diagnosed (using proper sensors and IT tools for measurement), repaired, improved and in some cases changed dramatically. But, you can not do any of the above, if you think that the processes in your shop floor are merely "black box" put in place by some one who left the company years ago! Your journey for the future can start right here and now, by developing a common definition of the key "Processes" in your manufacturing floor and developing a system view of these processes across all the business functions that support such processes. You would not like to see any medical professional with out a stethoscope and a thermometer. Then, why would you not want all your manufacturing process professionals have similar capability to measure and diagnose and cure the problem with respect to your processes and their health?

How well do you know your customer's processes (Application) and how you can add value in their processes through your products? If software is the enabler of all the growth and success in the IT industry, you can make your AT (Applications Technology) as the enabler for your growth and success in the manufacturing industry. AT helps you to build alliances with your suppliers and customers towards building solutions of shared benefits. If you have treated your process as a black box, it is likely that your customers have done the same with their processes. It is about time, you helped them to do a "health check up" on their processes, while they use your product. After all, strong and healthy customer process is essential for your long term strength and success.

Product, Process and Applications know-how are your core capabilities, which got you where you are today! They are the bench strength of your team. You can do more or less with them enabled by all the plug and play IT capabilities. But, you can not build a manufacturing industry with out the brick and mortar (i.e) Product, Process and Applications Technology. Have you taken the time to cultivate them? If not, may be it is time for you and the key personnel in your team to go through the "Core Capability Boot Camp"?