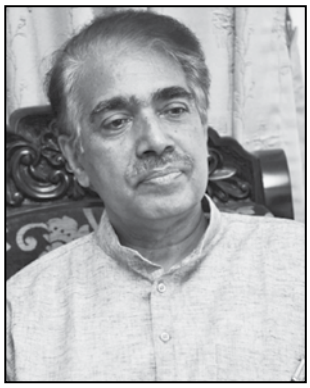

Global Excellence Through Quality, Technology And Ethics

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Changing Perspectives on Quality

For achieving global excellence in business we need to expand and redefine the concept of Quality from the traditional definition of conformance to specified and measurable requirements. Quality management as a process evolved during the Industrial revolution by standardizing the product quality requirements and by documenting the same as product specifications and by the methods of testing and ensuring compliance to specified values. Over several decades Industry defined and met the quality requirements by developing quality standards, quality systems and testing and certification procedures for each product. With the emergence of service industries, the same type of Quality assurance procedure was adopted for service also.

For achieving excellence, the meaning of quality must expand to meet the customer's requirements / expectations which keep on changing and become more and more demanding and thus has no finishing line. So the Quality has also no finishing line as in sports, whether we refer to product or service. An understanding of this aspect of quality and action to continuously take steps to meet the growing expectations of the customers is a must for achieving global excellence. It is not reaching one goal, but is a continuous journey.

Another aspect of quality is that it is no longer confined to products / services. It is all pervasive, covering all aspects of the enterprise and need to deal comprehensively all aspects of organizational performance. Quality standards, systems and processes need to look beyond testing and certification of product / service quality. Companywide Quality means quality in all functional areas of the enterprise for example; administration, finance, purchase, marketing and brand building, technical & human resource management and the likes. Globalization of business made it imperative

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that companywide quality management conforming to international standards need to be practiced to achieve global excellence.

Quality for Customer Delight

Concept of Quality for customer satisfaction must change from conformance to specified / advertised performance requirements to continuous customer delight by meeting the new and changing requirements and expectations of customers. With fast changing technology and fashion, people would like to change their utility items frequently in line with ever changing fashion, and add multi-functions to the products which new and emerging technologies are capable of providing. Another important point to note about customers is that people do not want the products to last a life time as in the past, even requiring higher capital investments, for example automobiles which most owners prefer to change in three / four years. They would like to change in line with the new culture of 'use and throw' disposables with respect to consumer electronics and such others. Let us consider for example television sets, mobile phones, watches, etc. People want smarter and smarter multi-utility multi-function products with more and more applications. We have now several such smart television sets, smart mobile phones and smart watches with many more 'apps' and all these are becoming smarter and smarter frequently. Shorter order to delivery time and lower costs are other important expectations to be fulfilled for customer delight.

Companywide Quality

Companywide quality management involves everyone in the company across all disciplines and departments in this journey to greater excellence through quality and technology to meet customer expectations and create an ever increasing ocean of delighted

customers. Quality is everybody's business in the company. Orientation of the entire human resource of the company is the key to achieve customer delight and global excellence.

Gandhiji's advice to treat customer as God must be accepted and practiced by all

A customer is the most important visitor on our premises.

He is not dependent on us. We are dependent on him.

He is not an interruption to our work. He is the purpose of it.

He is not an outsider to our business. He is a part of it.

We are not doing him a favour by serving him. He is doing us a favour by giving us an opportunity to do so.

Technology for Growth & Customer Delight

In house R&D for developing and acquiring new and emerging technologies and applications to upgrade current products / services and to innovate new products and thereby meeting the ever increasing expectations of the customers is the key to achieve customer delight. This will only enable the business (whether manufacture or service) to remain in business, enhance competitiveness and help to grow the business. There have been rapid developments in science

and technology. Industries must keep fully aware of these developments and continuously improve their products / services by effectively utilizing the same. It is important to take affordable risks and start experimenting with the application of even emerging (not yet fully matured) technologies, to keep ahead of the competition in the market. Those who do not follow this path will lose their customers and business eventually.

Several examples can be sighted. In one case a leader in manufacture of telephones did not take note of the emergence of mobile telephones and failed to develop its strategic plan suitably. It remained in the manufacture of conventional telephones and lost its chance to grow and eventually collapsed. In another case a high ranking Machine tool manufacturing company, a leader in conventional machines for machining, milling, grinding remained static with respect to technology. When the rest of the world moved to advanced technology - CNC machines, this company failed to introduce the new technology to design, build and market NC / CNC machines. The business collapsed in a decade.

Now there is a new / emerging disruptive technology challenging the CNC machining, in the form of 3D printing. Several variances of the technology & processes are being developed to make complex shaped components by wire fed - powder bed fusion - direct metal laser sintering, selective laser melting, electron beam melting and so on replacing 3 axis and 5 axis machines. This technology builds the component by adding the required material layer by layer, instead of machining and removing layer by layer from solid block of material. The process leads to considerable reduction in scrap. This technology enables manufacture of the component based on a computer generated 3D model straight to the 3D printing machine, enabling the designer to make the prototype in hours compared to several days / months as in the case of conventional drawing to conventional machining including CNC machining. The process enables quick design changes, making new prototype, trying out and optimizing the design in days. Many industries such as bio-medical implants, sports goods, automobile, and aircraft industries are experimenting with this technology to design and manufacture components and even large structures. The Machine building industries must make use of this amazing technology to build new and innovative machines to 3D print complex components instead of or in addition to multi-axis CNC machine. Some of the leading Aircraft engine manufacturers have already made several complex components such as turbine blades and waynes by 3D printing / additive manufacturing. Some have even 3D printed the entire jet engine, and the entire body of unmanned air vehicles ! Many shoe manufacturing companies around the world and sports goods manufacturers have taken to additive manufacturing. Smart phones are being developed with 3D scanning applications. One can 3D scan one's feet and send the 3D digital model to the shoe company and get the perfect shoe printed! Another important application, to highlight the capability of this technology, is 3D printing of spare parts for automobile, aircrafts and other such products. There will be no need to manufacture in bulk and export to different countries / destinations, store in warehouses and supply through stockists / distributers.

The spare parts supplier can take the order, 3D print based on 3D digital model and supply fast, without the cost of inventory holding as well as cost of logistics! If an aircraft is stuck in a remote airport, instead of waiting for days, to get the spare parts from a faraway stockist, it can be 3D printed and delivered in minutes / hours if such remote airports are equipped with a versatile 3D printing machine (still to be developed – but it is a possibility). But one thing that is going to happen soon is application of this in space. Space stations can be equipped with 3D printers which can manufacture spare parts as and when required, instead of stocking spares or waiting for the parts to be flown & delivered to the station from Earth. Additive Manufacturing associations across the World have forecast that 10 to 15% of all manufactured items will be through 3D printing by 2030!

People used to make photographs with cameras using films. Digital camera was invented and developed in the 70's (1975-80). In a few years the technology matured and replaced the film based cameras, which needed the photographer to use the film, develop, and print to get the pictures and there was no way of deleting and taking new pictures as is possible by the digital camera. The digital camera offered the feasibility and advantage of seeing the picture instantly, deleting it and taking new if the photographer/ customer is not satisfied with the quality. The digital image could be transferred to anyone, anywhere with ease by just a click using the digital data transfer available through internet and could be seen, stored, printed as one wished! It is said that M/s. Kodak was the market leader in photo film / paper prior to 2000AD, but their business in the field collapsed in just a few years.

Information Technology, tools and techniques have already revolutionized the design and manufacturing industries, reducing the cycle time from concept to market with tremendous savings in cost. CFD technology and 3D modeling of products and processes can now optimize the design and manufacturing processes through simulation without going through several physical trials. For example aerodynamic configuration in design of an aircraft involved repeated wind tunnel tests of physical scale models and taking the data from tests, modifying design, making new models and repeating the wind tunnel tests and repeating this process many times to finalize the design. This method used to take several months. However, now aircraft designers use Computational Fluid Dynamics and 3D modeling to test digital models by computer simulation optimizing the design and then fabricate physical scale down model and carry out final wind tunnel testing using the digitally optimized model. It is equally applicable in designing a process for making a casting. All the parameters, such as alloy composition, melting, temperature, cooling rate during casting, mould design and the like can be simulated and even the defects such as porosity, blow holes, shrinkage etc. can be seen in the computer model, enabling the engineer to optimize the parameters virtual casting through simulation and make only one or two physical trials to make the final product. If this technology is not used several physical trials involving several changes in the design, mould and process parameters and elaborate tests including non-destructive testing of the

casting each time would have been required for optimizing the process for an acceptable product. The time and cost saving is of the order of 80 to 90%.

Let us consider a service industry- say for example taxi services Uber worldwide and Ole in India do not have to own cars, and yet these are big taxi services companies. They use only software tools and liked to the smart mobile phones, they provide service in time, at affordable costs. The same is happening to the hospitality industry, Travels & Tours. It is said that 'Airbub' is the world's biggest hotel chain and yet the company do not own any hotels !

Automobile and Aircraft manufacturing industries have been under pressure from Governments and Societies across the globe to design and manufacture less polluting vehicles. Some industries are already leading in using latest technologies and develop electric vehicles and hybrids (electric, plus fossil / alternate fuel). It is expected that in twenty years majority of automobiles and aircraft engines will be solar / electric powered or hybrid and the fossil fuels may get replaced with Hydrogen and with zero air and noise pollution. Those industries which will not follow this customer-society & technology driven path will surely lose market share and collapse. Automation, Robotics and Artificial intelligence are bringing about a major industrial revolution. Unmanned air vehicles and undersea vehicles are already in use for military and civil / commercial use. Prototypes of autonomous (driver less) cars are already under trials. Companies which stick to manufacture of conventional cars will lose customers and market share to those who will use computers with artificial intelligence and robotics to design, build and market autonomous (driver less) or dual mode cars (which can be driven by driver manually and also switch to autonomous mode when required). Green energy (Solar power) is becoming cheaper and soon the cost will be less than that for electric power from thermal power plant using coal and other fossil fuels. Conservation of energy, water, materials, and recycling of scrap and the like falling under the general term 'Green'.

Multi-location component manufacture, and global sourcing through developing and sustaining cost effective, high quality supply chain are important to reduce costs and for faster deliveries of the final products or its spare parts to customers.

In this area new technologies are creating new ways of management for creating, sustaining and developing industry supply value chain. Digital platforms, 3D modeling and 3D printing combined with high speed digital data transfer are enablers of multi-source manufacturing and supply chain with high speed, higher quality and at lower cost.

Role of Human Resource and Ethics

Companies must understand customer expectations and needs, continuously be aware of advances in technologies and use these technologies to meet the requirements. Companies must innovate and improve products and services and delight the customers. Some companies resort to unethical aggressive advertisements to create artificially new needs and then exploit the customers by providing products / services for such needs. Some make false claims on the performance

of their products, and through aggressive false advertisement using celebrities in sports, cinema and the like as brand ambassadors, each vouching for the performance of the product based on their 'personal experience' (?), which is questionable and could mislead masses. Such false claims and results will be short lived, sooner or later, the truth will be revealed. Customer is not a fool, and although customer may be fooled once, cannot be fooled all the time. Companies which resort to such mal practices will eventually face their grave yards.

Developing and implementation of quality standards systems and procedures conforming to international practices, innovations, development of new products / services, adoption of emerging technologies and optimum utilization of resources and all such other activities in the company are done through its people cutting across all levels of employees and managers. Training and development of human resource to enhance their knowledge and skills in the relevant area should be complemented through inputs in ethics and values, pride in one's own job and in the organization and co-operative team work to create value for customers, for society, for themselves and for the shareholders and all other stakeholders.

Companies / organisations worldwide are responsible along with the Governments of all Nations to ensure reduction of pollution of air, water and ground, reduction of undesirable gaseous emissions by burning of fuels, and reduce global warming, conserve energy and materials for protecting Nature, environment and for sustainable development. Adherence to Ethics and Values is central to achieve these..

If you want to walk fast, walk alone.

But if you want to walk far, walk together!

Sometimes you're unsatisfied with your life, while many people in this world are dreaming of living your life.... A Child on a farm sees the aeroplane fly overhead & dreams of flying, but, a pilot on the plane sees the farmhouse & dreams of returning home. That's life! Enjoy yours.

If wealth is the secret of happiness, then the rich should be dancing on the streets. But only poor kids do that. If power ensures security, then officials should walk unguarded. But those who live simply, sleep soundly.

If beauty and fame bring ideal relationships, then celebrities should have the best marriages. Live simply, walk humbly and love genuinely..... All good will come to you....!

The greatest gift you can give someone is your time. Because when you give your time, you are giving a portion of your life that you will never get back.