www.industry20.com
A 9.9 MEDIA PUBLICATION ▪ VOLUME 12 ▪ ISSUE 12 August 2013 ▪ PRICE ₹100

INDUSTRY 2.0

TECHNOLOGY MANAGE ION-MAKERS

Cover Story

MAKING EFFECTIVE DECISIONS

A big change in the thought process is required

Pg 26

Supply Chain

5 STRATEGIES FOR LEAN THINKING

Lean can generate positive results across the value chain

Pg 36

QUALITY & INNOVATION

INDIAN AUTO COMPONENTS INDUSTRY NEEDS TO LOOK MORE OUTWARD

"MORE INNOVATION WITH HIGHER DEGREE OF ENGINEERING AT EACH STAGE IS REQUIRED" Pg 32

Dr. Dhananjay Kumar
CEO & Global Head
(Engineering, Project & Business Dev.)
KLT Automotive & Tubular Products Ltd.

Twice the virtualisation. Lower management costs. None of the compromises.

You've been looking for IT solutions that meet the increasingly sophisticated demands on your infrastructure. IBM Flex System,™ featuring **Intel® Xeon® processors,** provides simplicity, flexibility and control in a system that doesn't require compromise.

It supports up to twice the number of virtual machines as the previous generation of blade servers.[1] And IBM Flex System Manager™ can help reduce management costs by providing visibility and control of all physical and virtual assets from a single vantage point.[2]

You can select individual elements and integrate them yourself or with the support of an IBM Business Partner. Or you can choose an IBM PureFlex™ System and leverage IBM's expert integration for an even simpler experience. Learn more at **ibm.com/systems/no_compromise/in**

Learn why Clabby Analytics says IBM Flex System is the best blade offering in the market. Download the paper at ibm.com/systems/no_compromise/in

OEM88R

[1] Based on IBM testing and documented in IBM System x® Virtualisation Server Consolidation sizing methodology. IBM Flex System x240 supports 2.7X more Peak Utilisation Virtual Machines (VMs) than previous generation BladeCenter® HS22V.

[2] Based on IDC white paper "The Economics of Virtualisation: Moving Toward an Application-Based Cost Model," Michelle Bailey, November 2009, http://www.vmware.com/files/pdf/Virtualisation-application-based-cost-model-WP-EN.pdf

iNDUSTRY 2.0
TECHNOLOGY MANAGEMENT FOR DECISION-MAKERS
VOL. 12 | ISSUE 12 | AUGUST 2013

P. K. Chatterjee (PK)
editor@industry20.com

Fostering Innovative Minds

When the US president Barack Obama proposed a (US) national network of manufacturing innovation institutes last year, he called for "a smart manufacturing infrastructure and approaches that let operators make real-time use of 'big data' flows from fully-instrumented plants in order to improve productivity, optimise supply chains, and improve energy, water and materials use."

Many of the Indian manufacturing innovation institutes realised the need for working together years back to complement each other's work. Moreover, in India, the government's outlook on 'innovation' is much wider and more open – as it tries to set up a logical link between social, commercial and technological innovations that form the pillars of true manufacturing innovations.

We have institutions, like National Innovation Foundation, which are working based on the Honey Bee Network Philosophy, and provide institutional support to grassroot innovators and traditional knowledge holders from the unorganised sector of the society.

However, we are still far away from fishing the national talents for true innovation. Those who are reaching the institutions or big manufacturing organisations through formal education or training are being groomed for further development. But there is hardly any efforts focusing on grooming the natural talents, which are abound in India. For example, in July 2013, many newspapers and news portals reported the invention (basically it is an 'innovation,' but newpapers called it 'invention') of a generator that does not run on fuel by Aniket Damania, a Nalasopara (Maharashtra) resident who did not even complete his higher secondary education. There are many such examples.

To a great extent, our education system, non-conforming to the target of building innovative citizens, is responsible for this. Our system builds science graduates, technical scholars etc., but we hardly foster innovative minds. Hardly any of the Japanese manufacturing innovators had any university education, so is often true for the great inventors in Europe.

We need to come out of the traditional idea that 'innovation' occurs only inside the four walls of a big factory or R&D laboratory or educational institute. Our city-based institutes need to be more penetrative at every nook and corner of the country. Finding out the true talents in the country, and grooming them for manufacturing innovation is the need of the hour. ■

OFFICE ADDRESS
Nine Dot Nine Interactive Pvt Ltd
Office No. B201-B202, Arjun Centre B Wing,
Station Road,Govandi (East), Mumbai 400088.
Board line: 91 22 67899666
Fax: 91 22 67899667

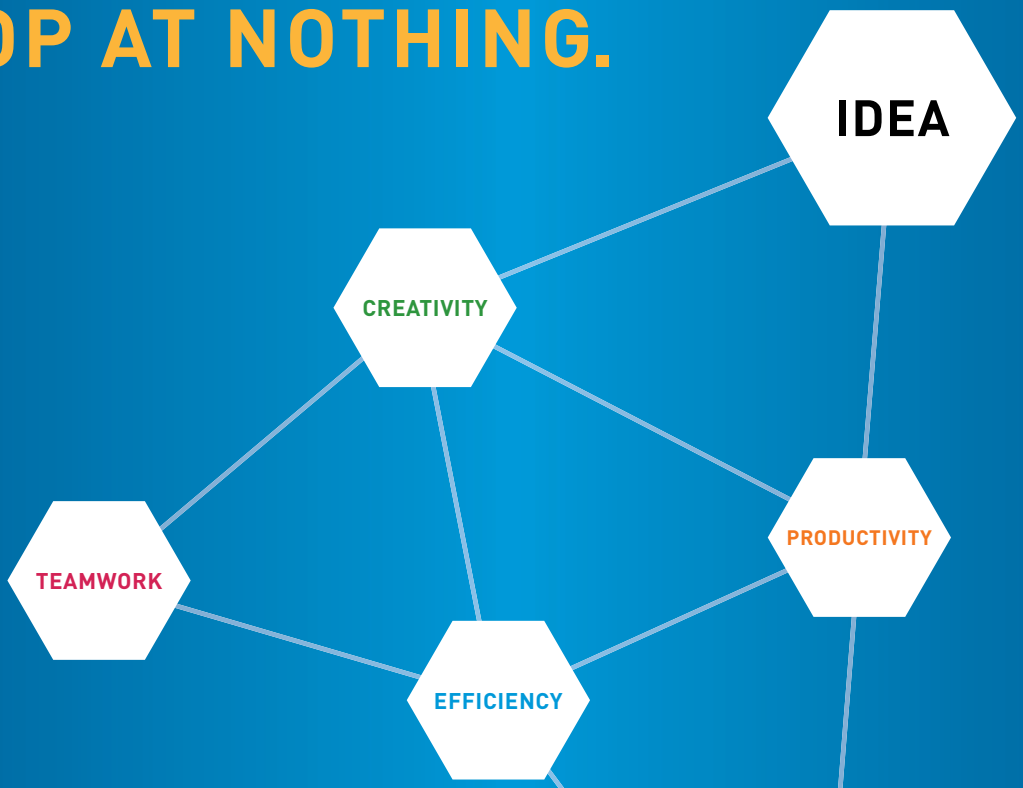
For any information, write to
info@industry20.com
For subscription details, write to
subscribe@industry20.com
For sales and advertising enquiries, write to
advertise@industry20.com
For any customer queries and assistance, contact
help@9dot9.in

Printed and published by Kanak Ghosh for
Nine Dot Nine Interactive Pvt Ltd
Plot No. 725 GES, Shirvane, Nerul,
Navi Mumbai 400706.
Board line: 91 22 67899666
Fax: 91 22 67899667

Editor: Anuradha Das Mathur
Plot No. 725 GES, Shirvane, Nerul,
Navi Mumbai 400706.

Printed at
Tara Art Printers Pvt ltd.
A-46-47, Sector-5, NOIDA (U.P.) 201301

START WITH PTC Creo®. STOP AT NOTHING.



Learn how the *CNB 76* became a reality at **www.ptc.com/go/sail**

Ideas are your product team's most valuable asset. Unleashing those ideas into real products that set your company apart is where PTC Creo comes in. As the world's most scalable and easy-to-use suite of design software, PTC Creo maximizes every aspect of the design process. From creativity to productivity, teamwork to efficiency. All of which helps deliver the **powerful product and service advantage you can expect from PTC.**

PTC Creo®

CONTENTS

COVER STORY

Cover Design: *Peterson PJ* Cover Photo: *Jiten Gandhi*

DEPARTMENTS

ADVERTISERS' INDEX

BLOG

OPINION

BUSINESS TRENDS

FACTS & PREDICTIONS

MARKET SCENARIO

QUALITY & INNOVATION

CONTROL & AUTOMATION

SUPPLY CHAIN

MANAGEMENT & STRATEGY

ENGINEERING | EVALUATION | DESIGNING | MANUFACTURING | TESTING | EXECUTION | POST SALES & SERVICE


AIR COOLED ROOTS BLOWERS


GAS~BIOGAS ROOTS BLOWERS


WATER COOLED ROOTS BLOWERS


EXPO SERIES ROOTS BLOWERS


TRILOBE ROOTS BLOWERS


TRILOBE WATER COOLED BLOWERS


VERTICAL TRILOBE ROOTS BLOWERS


PACKAGE BLOWER SYSTEMS


ACOUSTIC HOODS


MECHANICAL VACUUM BOOSTERS


CANNED MOTOR MECHANICAL VACUUM BOOSTERS


MECHANICAL VAPOR COMPRESSORS

Solvent Recovery


INDUSTRIAL VACUUM SYSTEMS

Vacuum Distillation


INDUSTRIAL VACUUM SYSTEMS

Waste Oil Rerefining


INDUSTRIAL VACUUM SYSTEMS

Solvent Recovery


DRY SCREW HIGH VACUUM PUMPING SYSTEMS

For Semiconductor & FPD/Solar Application

DRY VACUUM PUMPS

Exploring Heights
Setting Benchmarks
To Become World Class

In Pursuit of Excellence

EVEREST
PRESSURE & VACUUM SYSTEMS

Roots Blowers | Mechanical Vacuum Boosters | Dry Screw Vacuum Pumps
Acoustic Hoods | Industrial Vacuum Systems

For Semiconductor & FPD/Solar Application

DRY VACUUM PUMPS

We don't just **offer blowers, boosters and systems** we **offer solutions**

ISO-9001 REGISTERED
DNV
MGMT. SYS.
RvA C 024
DNV Certification B.V., The Netherlands

Innovative Engineering Solutions

Our technology is so flexible, we can custom manufacture **Special Blowers, Vacuum Pumps & Systems** by alloying and cross linking diverse designs to suit individual requirements and import substitutes.

EVEREST
PRESSURE & VACUUM SYSTEMS

EVEREST PRODUCT RANGE Roots Blowers | Mechanical Vacuum Boosters | Dry Screw Vacuum Pumps | Acoustic Hoods | Industrial Vacuum Systems

Corporate Office B-44, Mayapuri Industrial Area, Phase1, New Delhi 110 064, India | Tf: +91 11 4545 7777 | E: info@everestblowers.com

Group Companies Everest Blowers | Everest Transmission | Everest Blower Systems

Linked in

www.everestblowers.com

Corporate Communication | Revision 3 | October 2012

Siemens bags major order in Russia

Siemens will deliver the key components for a power station that is going to supply the future Yamal LNG (Liquified Natural Gas) production plant in Northern Russia with electricity and heat.

Siemens' scope of supply comprises the design, manufacture, factory testing, delivery, installation and commissioning of eight SGT-800 industrial gas turbines as well as nine step-up transformers. Four of these turbines will additionally be equipped with waste heat recovery units.

The power plant will have an electrical output of 376 Megawatts (MWe). Located onshore, in the Arctic area of the Yamal Peninsula in the North of Western Siberia, the Yamal LNG project is to develop the wet gas resources of the Yamal-Nenets region. The order has been placed by the Russian engineering company Technopromexport (TPE), which is a wholly owned subsidiary of Rostec State Corporation. TPE is an EPC company, which is recognised as the winner for the above project based on the results of the tender.

The picture shows the Siemens gas turbine SGT-800

The Siemens SGT-800 industrial gas turbine combines a robust design with high efficiency and low emissions, and is qualified especially for such harsh climate conditions. ■

Cairn to invest in Rajasthan

Cairn India has planned to invest $3 billion over the next three years in finding more oil and raising output from its Rajasthan oilfields. Cairn will raise crude oil production from Rajasthan fields by as much as 23 per cent by March 2014.

The company's Chief Executive, P Elango, said, "We've planned for a net capital investment of USD 3 bn in a 3-year period from FY2014 to 2016. We're focused on realising the full potential of our world-class Rajasthan assets through a combination of aggressive exploration and fast-track development.The Rajasthan block's current production is around 175,000 bpd. We expect to exceed it (in) FY-2014 with a production in the range of 200,000-215,000 bpd." ■

Waaree Group acquires Cesare Bonetti

Waaree Group, headquartered in Mumbai, has acquired 100 per cent stake in Cesare Bonetti, a world class manufacturer of critical valves and level gauges.

According to Waaree Group sources, this acquisition has brought in a fresh wave of transformation and global synergies, combining the manufacturing and innovation excellence of Cesare Bonetti with the customer reach, diversity and global reach of Waaree group.

Hitesh Doshi, Chairman WAAREE Group, and **Giuseppe Dalmasso,** Former Director Cesare Bonetti S.p.A

This development is significant and in line with Waaree group's constant endeavour to bond with the best in the world in terms of engineering and manufacturing excellence, and channelise the technological edge thus available to make it more available and affordable to the customer. It also marks a paradigm shift in manufacturing, sourcing and service philosophy of the group that'll be closer and more accessible to customers. ■

TPS bags NTPC's largest solar power project

Ajay Goel, CEO, Tata Power Solar (TPS)

Tata Power Solar has won a 50 MW solar photovoltaic project from NTPC. The new project, at Rajgarh, Madhya Pradesh, will double NTPC's solar capacity. Once commissioned in March 2014, the project is expected to generate 78.66 million units (KWh) of energy each year for MP Power Trading Company.

"We are proud to be partnering with NTPC on this flagship 50 MW solar project to bring much needed peak power to MP. This project brings together two of our core strengths in solar – market leading solar module manufacturing and, competitive, high-quality Engineering, Procurement and Construction (EPC) capability," said, Ajay Goel, CEO, Tata Power Solar.

"NTPC plans to broad-base generation mix through conventional and nonconventional sources of energy to ensure long term competitiveness and mitigate fuel risk. We are committed to the principles of sustainable development encompassing the environment, society and corporate governance," said A K Jha, Director Technical, NTPC. ■

L&T receives award for good design

The solar lantern from L&T Electrical & Automation - D.VA has won the India Design Mark Award (IMark), presented by the New Delhi based India Design Council for its exceptional design. D.VA is a solar-powered portable light fixture, which offers significant advantages over conventional solar lanterns.

The India Design Council grants IMark after evaluating designs through a systemised process. It is initiated in cooperation with Good Design Award, Japan. Through IMark, the India Design Council seeks to inspire Indian manufacturers to bring out well-designed products in the market that enrich the lives of people.

D.VA, the newly launched solar lantern in the Indian market, was conceived by the in-house design team in L&T's Switchgear Design & Development Centre. Based on ergonomics and durability, D.VA is compact, sturdy and embodies contemporary styling.

The D.VA Solar Lantern with IDm Mark

The lantern is a rechargeable off-the-grid device that provides clean, 'green' power. L&T has filed design and trademark applications for many of its features. D.VA provides glare free and soothing 360 degrees light output equivalent to that of a 5 Watt CFL. It's definitely a boon for all villages and towns having uncertain power supply. ■

EPJL inducts new MD

Essar Power Jharkhand Limited (EPJL), part of Essar Energy plc., has appointed BH Ravindra as Managing Director.

The company is now setting up a 1,800 MW pit headed coal fired independent power plant at Tori in Latehar district of Jharkhand.

Ravindra, with over 24 years of multi-dimensional experience in power and infrastructure sector, has rejoined Essar Power from the GVK Group, where he was Director and Head – Business Development. ■

Punj Lloyd wins new project

Punj Lloyd has been awarded a contract worth Rs. 358 crores by Chennai Petroleum Corporation Ltd (CPCL) to build the 'slphur block' of Resid Upgradation Project at its Manali refinery near Chennai.

The company's scope of work includes residual basic and detailed engineering, procurement, construction, installation, pre-commissioning, commissioning and project management for the 'sulphur block' comprising 2 x 100 TPD Sulphur Recovery Units including Tail Gas Treatment Unit, 60 m^3/hr Sour Water Stripper and 250 TPH capacity Amine Regeneration Unit on a single point responsibility basis.

The project is expected to be commissioned in Dec 2015. With this contract, the order backlog for the Punj Lloyd Group on a consolidated basis has gone up to Rs. 21,226 crores, reflecting the total value of unexecuted order as on June 30, 2013 and the orders received after that. ■

Daimler reshuffles its top management

Daimler India Commercial Vehicles (DICV, a wholly owned subsidiary of Daimler AG) has recently made some changes in its top management roles. The new Daimler Trucks Asian Business Model has integrated certain key areas. The first integration involves the R&D of DICV with that of MFTBC (Mitsubishi Fuso Truck & Bus Corporation, Japan).

Accordingly, Aydogan Cakmaz, who was until now Head – Research & Development at DICV and instrumental in the development of the BharatBenz range of trucks building, takes over as Head – R&D for Trucks Asia, and will be based at the MFTBC Headquarters at Kawasaki, Japan.

Hidekazo Kanno, who was Head – Product Lifecycle Management at MFTBC, Japan, takes over as Head – R&D for DICV, at Chennai. He will now report to Aydogan Cakmaz.

In another change, which is not related to the Asian Business Model, Sanjiv Khurana, who was CFO at DICV has taken over as President – Remanufacturing Division, Daimler Trucks North America at Portland, Oregon, USA. Khurana contributed immensely to DICV's establishment in India as a key member of its Executive Committee and several core teams.

Aydogan Cakmaz

Sanjiv Khurana

Also, Parthasarathy Thota, who was hitherto Head – Light/Medium-duty Trucks Project for BharatBenz at DICV, has taken over as the CFO of DICV. Thota, as Head of the L/MDT project, established the BharatBenz portfolio of L/MDT Trucks right from the beginning until its launch in February this year. Earlier to his stint at DICV, he handled several responsibilities in the areas of Finance & Controlling in USA. ■

Mayekawa to use Intergraph's soln.

Mayekawa Manufacturing Company, one of the most advanced companies in manufacturing industrial refrigeration compressors, has selected Intergraph CADWorx Plant Professional for 3D piping design of the refrigeration packages and gas compressor units it manufactures.

Mayekawa has expanded the introduction of CADWorx worldwide to ensure consistency of design and better meet the needs of global projects.

The company's previous 3D engineering design system had severe limitations in operability and processing speed, which was slowing its production. ■

ELCOMA members elect new president

Nirupam Sahay, President, Philips Lighting India

The Electric Lamp and Component Manufacturers Association of India (ELCOMA) has appointed Nirupam Sahay as President of ELCOMA for two year tenure, effective from July 27, 2013. Sahay, President, Philips Lighting India, comes with a vast experience of over 18 years across industries – such as consumer durables, telecom and financial services. He has been the President of Philips Lighting India since May 2011.

Commenting on his new role, Sahay said, "I take up this role with immense pride, and look forward to driving the lighting industry's growth and success. In this new role, I aim to work in synergy with the industry members towards promotion and betterment of the Indian lighting landscape and furthering the agenda of energy-efficient lighting."

Owing to the factors like huge infrastructure growth, the lighting industry in India has been growing in double digits for the last five years – and will continue to grow between 8 to10 per cent in the next 3 to 4 years. ■

Commerce ministry to conduct road shows

The Ministry of Commerce and Industry is planning to take up road shows across India – to attract units and promote Special Economic Zones (SEZs) along with the Export Promotion Council for SEZs and EOUs (Export Oriented Units).

"We have calculated the availability of vacant spaces in SEZs and along with the Export Promotion Council for EOUs and SEZs (EPCES), we are planning to take up road shows in different parts of the country so that units are attracted," said Rajeev Arora, Joint Secretary, Department of Commerce, Ministry of Commerce and Industry while inaugurating the '9th International SEZ Convention,' organised by ASSOCHAM.

The ministry has asked the Indian Council for Research on International Economic Relations (ICRIER) to conduct a study on various facets of SEZs, informed the senior official from commerce ministry.

"We have asked the ICRIER to examine various issues like what are the existing schemes which are there for export promotion and where does the SEZ scheme stand vis-à-vis those schemes, we have also asked them how does India's FTAs (Free Trade Agreements) with various countries is affecting the SEZ environment – and we also want to know whether emergence of SEZs have lead to any kind of diversion of land by promoting lot of activity in the real estate sector. These're some of the things that we do at our own level to see to what extent we can tweak the policy to make it more suitable for developers and units simultaneously – and to see how SEZs in India can continue to flourish and contribute extensively to India's exports," he added. ■

Magna opens new centre in China

Magna International's Magna Steyr operating unit has recently opened a new engineering centre at Tiexi District of Shenyang, China. At full capacity, the new 1,050 square-metre Shenyang engineering centre will accommodate more than 100 engineers. With this new location, Magna Steyr will be able to assist automakers' vehicle engineering projects with speed and efficiency.

Karl-Friedrich Stracke, President, Fahrzeugtechnik & Engineering, Magna Steyr, said, "This centre demonstrates the execution of our global growth strategy, and is an important step to position Magna for further expansion with customers located in the northern part of China." ■

PLUSS Polymers ties up with TESSOL

PLUSS Polymers, the company which recently raised Rs.15 crore equity capital from Tata Capital Innovation Fund, has partnered with TESSOL – a technology-based startup.

The systems on offer under this partnership are ideally suited for Commercial Offices and Shopping Complexes operational for 10 - 12 hours during the day essentially. These energy storage systems enables the building to generate and store cool energy at night, and use when there is a shortage during the day. They will help State Electricity Boards meet the huge demand – supply gap.

Most of us, especially in North India, know and use battery inverters to fight the frequent power outages at home. These are energy invertors for larger commercial buildings. "PLUSS Polymers and TESSOL are working to create revolutionary products using phase change materials – specially crafted materials to store energy like your inverter batteries do," said Rajat Gupta, Director at TESSOL, Mumbai.

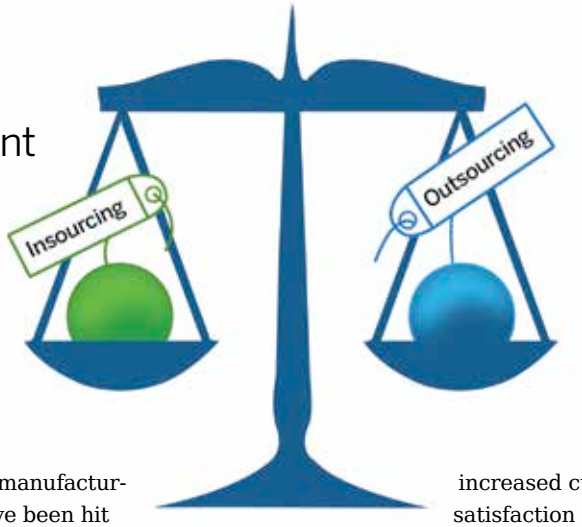
Samit Jain, Managing Director at Pluss Polymers

Samit Jain, Managing Director at Pluss Polymers added, "We are delighted at the immense opportunity that 'thermal energy storage' provides for an energy deficit country like India. The combination of R&D expertise in materials; polymers offered by PLUSS and the application development team of TESSOL will collectively allow us to roll out products besides the conventional ice storage systems that the country has seen so far. We are enabling storing of the cool energy that is freely available at night for desert regions and warm energy freely available during the day in cold regions of the country."

One of the most widely used applications of energy storage is in comfort cooling for process cooling for industrial setups. More than 1/2 of the energy spent in a commercial building is for air conditioning. When all these units start together at 9am, it creates a huge surge in the need of power. By 7pm, these units close and load goes back to normal. The huge demand and supply mismatch leads to a shortage during the day, while often creating surplus power at night. So, there's a huge interest of the govt to implement demand response schemes and implement time of day tariffs for power. ■

Localisation of Supply Chains

Although, manufacturers get many advantages from sourcing raw materials or components from different parts of the world, considering the risk factors associated with that, now they are focusing on the local suppliers. By SPS Chauhan



Most of us are familiar with the phrase: 'think globally, act locally.' Though it might be popularly thought of in terms of food sourcing, the manufacturing industry is also adopting a local mindset. A recent survey by EEF, the manufacturers' organisation, found that 40 per cent of U.K. companies are bringing production back in-house, while 25 per cent have increased their use of local suppliers, with factors ranging from the recession to the disruption(s) caused by natural disasters – such as the Japanese earthquake last year.

Bringing it back home

Evidently, for a significant portion of the respondents to the EEF survey, re-shoring operations and using local supply chains are significant components of their risk mitigation plans. EEF's Chief Economist Lee Hopley stated, "Supply chains have become increasingly globalised for manufacturers. This brings a range of benefits, but there are risks attached when things go wrong. In recent years, manufacturers have been hit by a host of unforeseen events, which has seriously tested their supply chain monitoring and business continuity planning."

U.K. businesses aren't the only ones going local. The U.S. firm Caterpillar – the leading manufacturer of construction and mining equipment, diesel and natural gas engines, industrial gas turbines, and diesel-electric locomotives – has more than 2,000 suppliers in its home state of Illinois. Caterpillar chooses to seek out local sources in each of its territories, realising benefits such as – the ability to respond quickly with product changes and services, while spending less on transportation and energy.

According to the EEF survey, local sourcing benefits also include:

- Better supply chain relationships
- Improved inventory management
- Greater supply chain visibility
- Decreased costs and increased customer satisfaction

In an effort to reduce costs to customers and enhance processes, it is important to investigate the benefits of sourcing materials locally or from nearby regions. Take for example, during a project in India, we altered the architecture of a control panel and saved nearly 40 per cent, a savings benefit that was passed on to the customer.

Reducing costs and risk is a top priority for logistics and supply chain professionals. By striking a balance between global and local, supply chain managers have an opportunity to enhance their operations in a variety of ways, with one of the benefits being decreased risk. And by using the right tools, manufacturers can improve warehouse processes, and achieve their goals in the marketplace. ■

The author is the Director of Business Development for Bastian India. He may be contacted through e-mail: spschauhan@bastiansolutions.com.

WHEN NOT AT WAR...

In this age of fierce competition, as organisations always remain busy to fight the external issues to attain fast growth, the area of internal honing remains neglected. Global slowdown is the right time to focus on this area, to build the internal capability for the next growth phase.

By Pinak Kulkarni

In the current state of environment, it is apparent that the economies across the world are experiencing a demand side slow down, almost a contraction. The rate of growth has significantly come down leading to lowering the pace at which organisations need to work. Many companies have taken actions to close down a few shifts, some have closed down their plants, a few also have laid off people, and some have postponed their capital expenditures. It almost is like passing through a phase of industry cycle where you actually have spare capacity in almost everything. It is similar to an 'army' which is not at war.

Arguably 'army' represents one of the early formal organisational structures of work. It is of interest to explore 'when not at war, what does the army do?' It seems that army views this period of time to be the most appropriate phase to sharpen its weapons, plan new strategies, improve skills, think of buying ammunitions, and conduct training on new weapons etc. 'When not at war' is the time of thinking and gearing up with planning for the next phase.

Industry cycles turn. Organisations too sooner or little later will experience a turn-around in the phase from low growth to high growth, which I like to call 'from not at war to being at war.' Organisations who use this period of time to invest in resources, which will support the phase of 'war' would be the real beneficiaries of the current phase. In my opinion, this is the ideal period of time for the industry to make investments in people skills, redesign new processes, challenge the existing strategies, frame new policies and so on. For example, some organisations may find human resources reasonably free to upgrade their technical skills, some may find time to solve problems those otherwise cannot be solved due to scarcity of time....

In short, smart organisations need to use the 'not at war phase' to sow the seeds and nurture the organisation to be ready to fight the war. Otherwise, once the great opportunity is wasted, it may not come back soon, and in the 'war' phase the organisation will gasp for breath. ■

Photo Credit: *www.photos.com*

The author is a Supply Chain focused Business Performance Improvement Coach and Trainer. He is the founder of SPARK, an organisation focused on releasing and igniting organisational potential for Sustainable Excellence. Contact: pinak.k@think-spark.com.

An Admirable Action

Expected duty on foreign solar panel manufacturers is a boon to the Indian manufacturers. By Puneet Mehrotra

Photo Credit: www.photos.com

The 'solar power generation industry' has evolved in last five years and the unpredictability and decline has been exciting and challenging. New companies have appeared and disappeared in a very short span of less than 10 years. With technology in its next stage of breakthrough, new efficiency barriers are being broken every day. The tariff's downslide has been unpredictable with new bids hovering around Rs. 6 / per unit, reaching grid parity much faster than expected.

EU Countries such as Germany, Italy and Spain have certainly taken a lead. Germany currently has an installed capacity of around 25 GW of Solar – and aims towards reaching an installation of 66 GW. Japan followed soon and has reached an installed capacity of nearly 5 GW in 2011. But these countries are now more matured markets.

The last few years have been an unpredictable ride for the 'solar industry.' With the slowdown in EU, discoveries of shale gas in the US and over capacity

in 'solar panel manufacturing,' it's been a race for survival in the industry. Big names like Siemens and Bosch have exited the solar business. Recent news of Suntech filing for Bankruptcy is not music to years for solar industry. Having said that, we are seeing a consolidation in this industry.

What is emerging clearly is that 'solar generation' is here to stay. It has become more and more viable as an energy source. As new economies emerge and demand more energy, there is intense pressure to reduce the carbon emissions.

Let's look at what are the challenges for India from an energy perspective. Total power generation installed capacity (including all sources) is 211.7 GW as on 31st Jan, 2013', out of which, thermal generation still accounts for 67%. There is still a deficit of 9.3% and peak deficit of 10.6%. Our current per capita electricity consumption stands at 813 KWH for 2010-11 (Source CEA: Power Scenario). The per capita electricity consumption for China was 2944 KWH and for Japan was 8394 KWH in 2010 (Source World Bank). If our aspirations are to grow the economy at 8+ per cent, then power consumption has to go up in the country, and for that we have to look at alternative energy like solar to generate power, which can reach every nook and corner of this country.

It is evident that the current mix of thermal energy is not sustainable. The impact on environment, the challenges on coal availability and rising prices is here to stay. But unfortunately, despite these facts, solar manufacturing in India is still at a nascent stage, the local manufacturing capacity being around 2 GW per year. Many of the manufacturers in the past were driven around global markets.

Driven by the pressures, many panel manufacturers reinvented themselves, focusing on reducing costs, bringing in efficiencies in manufacturing and looking at new products and markets.

The plant sizes were smaller compared to global scales and many have manual assembly. The efficiencies and quality offered do not match the global standards. Protection offered to the solar panels will raise the input costs for developers and thus resulting in increased tariff bids. Because of these reasons, most of the solar manufacturers have suffered badly – driven by the global impact and have been running panel manufacturing at 40% capacity.

The onslaught of cheaper imports from China and other countries at more competitive prices has further compounded the problem, and is having a hard impact on their financial viability.

Driven by the pressures, many panel manufacturers reinvented themselves, focusing on reducing costs, bringing in efficiencies in manufacturing and looking at new products and markets. Some started focusing on Indian market. Till Sept 2012, close to 1.1 GW of Solar generations capacity has been created. However, in last 3-4 months, many states have announced new bids. These announcements are expected to generate new generation capacity of 4 GW in next few years. The national solar mission has target to reach capacity of 4 -10 GW by 2017. The Phase 2 of National Solar Mission will be a big boost to the solar generation capacity in India.

However, the ecosystem in India comprising 'developers, EPC and panel manufacturers' is still not in place that support local manufacturing, and the industry is seen as a risky proposition for investors to invest in. Bankers need to believe that this industry is a secure investment.

The current consolidation of the solar industry is a little less clear, the per unit bids still seems to be coming down, as evident in recent biddings in some states. The developer and EPC expect to bring down these costs by reducing costs, using panels and other systems that bring in better energy efficiency. At less than Rs.6 / per unit of electricity, we are nearly at grid parity level.

The duty on foreign manufacturers is a welcome move, as the government has realised that our dependence on China for solar panels is definitely not a good bet. If solar energy is our future bet, then developing a thriving eco system for the Industry is a must. The starting point is giving a level playing field to the Indian solar manufacturers to compete locally. There should be an increased focus on encouraging investment in R&D, and new developments in solar generation. This step is also important to showcase India's commitment towards growing manufacturing industry in India and putting policies to practice. ■

The author is the Country Manager, Industrial Solutions – TE Connectivity, India.

BYOD Programmes to Gain Prominence

With growing adoption of 'Bring Your Own Device (BYOD)' strategy in enterprises, the challenge of the CIO community is also increasing. Will BYOD pose a great threat to corporate data security soon, or IT is catching up with it?

Bring Your Own Device (BYOD) strategy is an alternative strategy that allows employees, business partners and other users to use a personally selected and purchased client device – to execute enterprise applications and access data. It typically spans smartphones and tablets, but the strategy may also be used for PCs. It may or may not include a subsidy. As enterprise BYOD programmes continue to become more commonplace, 38 per cent of companies expect to stop providing devices to workers by 2016, reports a global survey of CIOs conducted by Gartner's Executive Programs.

"BYOD strategies are the most radical change to the economics and the culture of client comput-

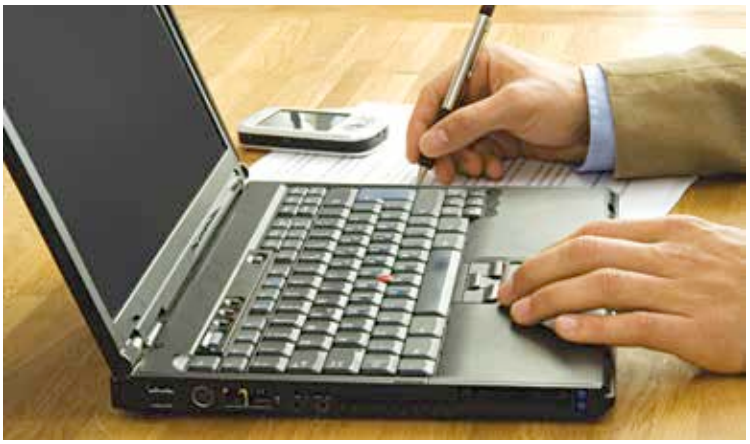
Photo Credit: *www.photos.com*

ing in business in decades. Benefits of BYOD include creating new mobile workforce opportunities, increasing employee satisfaction, and reducing or avoiding costs," said David Willis, Vice President and Analyst at Gartner.

BYOD drives innovation for CIOs and the business – by increasing the number of mobile application users in the workforce. Rolling out applications throughout the workforce presents myriad new opportunities beyond traditional mobile e-mail and communications. Applications such as time sheets, punch lists, site check-in/check-out, and employee self-service HR applications are just a few examples. Expanding access and driving innovation will ultimately be the legacy of the BYOD phenomenon.

"However, the business case for BYOD needs to be better evaluated. Most leaders do not understand the benefits, and only 22 per cent believe they have made a strong business case. Like other elements of the Nexus of Forces (cloud, mobile, social and information), mobile initiatives are often exploratory and may not have a clearly defined and quantifiable goal, making IT planners uncomfortable. If you are offering BYOD, take advantage of the opportunity to show the rest of the organisation the benefits it will bring to them and to the business," said Willis.

While BYOD is occurring in companies and governments of all sizes, it is most prevalent in midsize and large organisations ($500 to $5 bn in revenue, with 2,500 to 5,000 employees). BYOD also permits smaller companies to go mobile without a huge device and service investment. Adoption varies widely across the globe. Companies in the US are twice as likely to allow BYOD as those in Europe, where BYOD has the lowest adoption of all the regions. In contrast, employees in India, China and Brazil are most likely to be using a personal device, typically a standard mobile phone, at work.



BYOD strategy may span from smartphones to PCs.

How a well-managed BYOD programme subsidises the use of a personal device is critical, and can dramatically change the economics. Today, roughly half of BYOD programmes provide a partial reimbursement, and full reimbursement for all costs will become rare. Gartner believes that coupling the effect of mass market adoption with the steady declines in carrier fees, employers will gradually reduce their subsidies and as the number of workers using mobile devices expands, those who receive no subsidy whatsoever will grow.

"The enterprise should subsidise only the service plan on a smartphone. What happens if you buy a device for an employee and they leave the job a month later? How are you going to settle up? Better to keep it simple. The employee owns the device, and the company helps cover usage costs," said Willis.

BYOD does increase risks and changes expectations for CIOs. Unsurprisingly, security is the top concern for BYOD. The risk of data leakage on mobile platforms is particularly acute. Some mobile devices are designed to share data in the cloud – and have no general purpose file system for applications to share, increasing the potential for data to be easily duplicated between applications and moved between applications and the cloud.

However, in general, IT is catching up to BYOD. More than half of organisations rate themselves high in security of corporate data for enterprise-owned mobile devices. This new confidence in the security posture to support BYOD is a reflection of more-mature tools and processes that address myriad needs in the security area.

"We're finally reaching the point where IT officially recognises what has always been going on: People use their business device for nonwork purposes. They often use a personal device in business. Once you realise that, you'll understand you need to protect data in another way besides locking down the full device. It is essential that IT specify which platforms will be supported and how; what service levels a user should expect; what the user's own responsibilities and risks are; who qualifies; and that IT provides guidelines for employees purchasing a personal device for use at work, such as minimum requirements for operating systems." said Willis. ■

Steel Vision

Besides achieving the rank of the fourth largest global crude steel producer in 2012, India has also made a mark globally in the production of sponge iron. The future of Indian steel industry is definitely optimistic.

By M.V.S. Prasad

At the time of Independence in 1947, India had only three steel plants – the Tata Iron & Steel Company (Jamshedpur), the Indian Iron and Steel Company (Burnpur) and Visveswaraya Iron & Steel Ltd (Bhadravathi), besides a few electric arc furnace-based plants. The period till 1947 thus witnessed a small but viable steel industry in the country, which operated with a capacity of about one million tonne and was completely in the private sector.

From the fledgling one million tonne capacity status at the time of independence, India has now risen to be the fourth largest crude steel producer in the world, and the largest producer of sponge iron. The Indian steel industry is now globally acknowledged for its product quality. During the first three Five-Year-Plans (1952-1970), in line with

the economic order of the day, iron and steel industry was earmarked for state control. From the mid-50s to the early 1970s, the government set up large integrated steel plants in the public sector at Bhilai, Durgapur, Rourkela and Bokaro. The policy regime governing the industry during these years involved licensing of capacity, dual-pricing system and control of imports and exports.

Globalisation benefits industry

The large-scale capacity creation in the public sector during these years contributed to making India the tenth largest steel producer in the world. Crude steel production grew markedly to nearly 15 million-tonnes in the span of a decade. Economic slowdown adversely affected the pace of growth of the steel industry. However, this phase was reversed in 1991-92 with the advent of globalisation and opening up of our economy. Control regime was replaced by liberalisation and deregulation. The provisions of the New Economic Policy initiated in the early 1990's impacted the Indian steel industry in many ways. Large-scale capacities were removed from the list of industries reserved for the public sector. The licensing requirement for additional capacities was also withdrawn subject to locational restrictions. Private sector came to play a prominent role in the overall set-up. Pricing and distribution control mechanisms were discontinued. Iron and steel industry was included in the high priority list for foreign investment, implying automatic approval for foreign equity participation up to 50 per cent. Freight equalisation scheme was replaced by a system of freight ceiling. While export restrictions were withdrawn, quantitative import restrictions were largely removed.

Photo Credit: *ESSAR STEEL*

The system, thereafter, underwent rapid changes. For steel makers, opening up of the economy opened up new channels of procuring their inputs at competitive rates from overseas markets – and also new markets for their products. It also led to greater access to information on global operations or techniques in manufacturing. This, along with the pressures of a competitive global market, increased the need to enhance efficiency levels so as to become internationally competitive. The consumer, on the other hand, was now able to choose items from an array of goods, be it indigenously manufactured or imported. This freedom to choose established the sovereignty of the consumer and galvanised steel producers to provide products/service levels in tune with the needs of the consumers.

Slow-down and turnaround

Large integrated steel plants were set up in the private sector, while the already existing plants expanded their capacity. This has resulted in the emergence of private sector with the creation of around nine million tonnes of steel capacity based on state-of-the-art technology. Tariff barriers were either reduced or dismantled while partial float of the rupee on trade account, access to best-practice of global technologies and consequent reduction in costs – all these enhanced the international competitiveness of Indian steel in the world export market.

After 1996-97, the Indian steel industry's pace of growth slowed down with the steady decline in the domestic economy's growth rate. Production, consumption and, exports fell below average. Indian steel was also subjected to anti-dumping or safeguard duties as most developed economies invoked non-tariff barriers. Economic devastation caused by the slowdown of the global economy, Asian financial

◀ Aerial view of the Essar Steel complex at Hazira, Gujarat, India

crisis and the impact of glut created by additional supplies from the newly steel-surplus countries pulled down growth levels.

However, from the year 2002, the global industry turned around. The situation was no different for the Indian steel industry, which by now had acquired a degree of maturity, with emphasis on intensive R&D activities, adoption of measures to increase domestic per capita steel consumption, and other market development projects, import substitution measures and thrust on export promotion.

National steel policy

The rapid pace of growth of the industry and market trends called for certain guidelines and framework. Thus was born the concept of the National Steel Policy, with the aim to provide a roadmap of growth and development for the Indian steel industry.

The National Steel Policy (NSP) was announced in November 2005 as a basic blueprint for the growth of a self-reliant and globally competitive steel sector. The long-term objective of this policy is to ensure that India has a modern and efficient steel industry of world standards, catering to diversified steel demand. The focus of the policy was to attain levels of global competitiveness – in terms of global benchmarks of efficiency and productivity.

The policy sought to facilitate: removal of procedures, increased investment in research and development, and creation of road, railway and port infrastructure. Not only it focused on the domestic sector, but also envisaged a steel industry growing faster than domestic consumption – to enable export opportunities to be realised.

Sponge and pig Iron

India is also a leading producer of sponge iron with a host of coal based units, located in the mineral-rich states of the country. Over the years, the coal based route has emerged as a key contributor and accounted for 75 per cent of total sponge iron production in the country. India is also an important producer of pig iron. Post-liberalisation, with setting up several units in the private sector, not only imports have drastically reduced – but also India has turned out to be a net exporter of pig iron. The private sector accounted for 91 per cent of total production for sale of pig iron in the country in 2011-12.

Indian steel industry is now recognised for its product quality.

Photo Credit: *www.photos.com*

Besides achieving the rank of the fourth largest global crude steel producer in 2012, India has also made a mark globally in the production of sponge iron or Direct Reduced Iron (DRI). Thanks to mushrooming growth of coal-based sponge iron units, domestic production of sponge iron increased rapidly, enabling the country to achieve and maintain the number one position in the global market. With a series of mega projects and the domestic economy carrying forward the reform process further, the future of Indian steel industry is definitely optimistic. A new 'Steel Vision' for the next 20 years is also under finalisation. ■

The athor is the Joint Director, PIB, Chennai.

Stay ahead of your peers. Grab this unfair advantage

IT NEXT THE POCKET CIO PROGRAMME

GET IT NOW!

The CIOs of tomorrow are expected to be outstanding business leaders, not just good technical experts, who can collaborate and communicate in their professional environment ITNEXT invites you to participate in the 2-day Pocket CIO programme to equip yourself with strategic, technical and soft-skills needed for senior management roles. The training sessions will be hosted by experts, and will feature eminent CIOs.

SESSIONS WILL COVER

- Contemporary trends in a current technology area
- Delivering innovation or improving business outcomes through IT solutions
- Best practices for installing, operating and improving enterprise services/infrastructure
- Thinking strategically about IT
- Leadership in the corporate context

REGISTER THROUGH MOBILE APP

ANDROID APP ON Google play | BlackBerry App World | Available on the iPhone App Store | Windows Store

Download the NEXT100 app on your phone or tablet, and register for Pocket CIO program. Access the latest white papers and case studies, and watch videos

CITY & DATE

DELHI NCR
20th–21st SEPTEMBER

MUMBAI
4th – 5th OCTOBER

BENGALURU
25th – 26th OCTOBER

APPLY NOW!

WWW.ITNEXT.IN/NEXT100

PLATINUM PARTNER: vodafone

PREMIER PARTNER: JUNIPER NETWORKS

PRINCIPAL PARTNER: WIPRO Applying Thought

TECHNOLOGY PARTNER: HCL

NEXT100 BOOK PARTNER: arkadin COLLABORATION SERVICES

EVENT BY: IT NEXT in association with vodafone PRESENTS INDIA'S FUTURE CIOs NEXT 100 2013

Rising Demand of Tablet Panels

Owing to the growing popularity of the tablet devices, global demand for their panels is exceeding expectations. Unbranded tablet makers have purchased 40% of all tablet panels in April 2013.

As far as tablet panel shipment is concerned, information and analytics provider IHS expects 69 per cent growth in 2013 from 155 million in 2012. Totally 262 million displays for tablets are forecast to be shipped this year, compared to the previous forecast of 246 million, according to the May Edition of the "LCD Industry Tracker—Tablet" report (Figure 1).

"Competitive dynamics in the tablet market has changed dramatically this year as Chinese white-box smartphone makers have entered the tablet market in droves. These companies are producing massive quantities of low-end tablets that appeal to consumers in China and other developing economies. Because of this, the white-box manufacturers are driving up demand for tablet panels, particularly smaller displays using the older Twisted Nematic (TN) technology, rather than the newer screens using In-plane Switching (IPS)," said Ricky Park, Senior Manager for large-area displays at IHS.

Unbranded tablet makers purchased 40 per cent of all tablet panels in April, up from just 17 per cent in the first quarter of 2012, as presented in Figure 2.

Partly because of the rise of white-box makers, shipments

Photo Credit: *www.photos.com*

of smaller 8- and 9-inch tablet displays will rise by nearly 200 per cent in 2013. In contrast, larger displays in the 9-, 10- and 11-inch range will suffer a 5 per cent decline.

The boom in white-box tablets is being driven the introduction of turnkey designs offered by processor makers. The designs make it easy for new, inexperienced market entrants to offer tablet products.

The Chinese white-box manufacturers hold certain advantages over the major incumbent tablet manufacturers. The white-box manufacturers are able to produce tablets at lower cost, more quickly and with greater flexibility in production. These companies also have the capability to manufacture both unbranded tablets, and make products for the major brands on a contract manufacturing basis.

Such white-box players also have been agile enough to take advantage of the current high availability and low-cost of tablet panels. Makers of displays for the shrinking PC market have switched over to the tablet market, spurring a glut that has depressed pricing. As prices have fallen, the white-box makers have demonstrated enough flexibility to boost production of low-cost tablets.

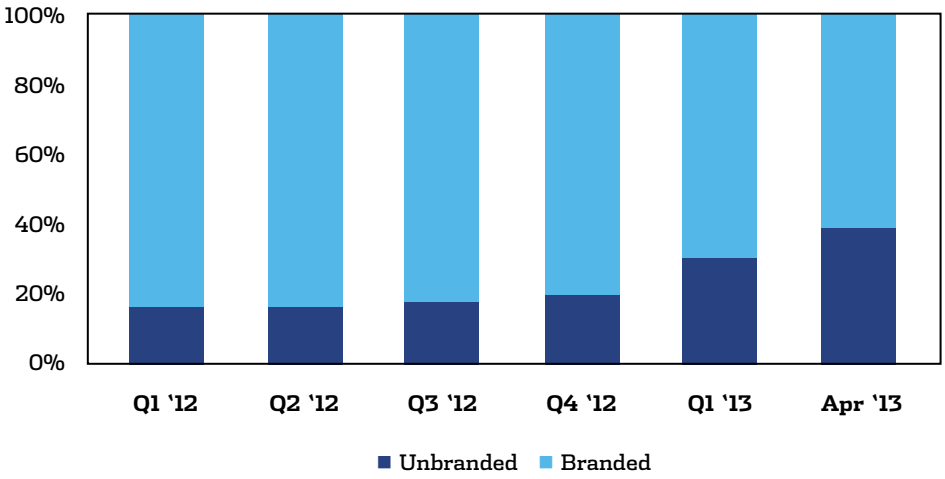
"Playing to their strengths, the white-box manufacturers are set to continue to increase their presence in tablets, and propel the expansion of the overall tablet market," Park said.

IHS believes the strong growth of tablet panel demand continued in the second quarter. The arrival of more turnkey tablet design solutions will drive up demand for 7- and 8-inch panels throughout the year. The 8-inch panels are becoming an increasingly large segment of the tablet market, with a display area more appealing to users than the 7-inch size. In all, the 8-inch panels accounted for 11 per cent of panel shipments in April, with Samsung and Acer having recently launched new tablets in that size. With more introductions likely coming in the third quarter, IHS expects a substantial market share for the 8-inch by the end of this year.

The market for larger-sized, 10-inch and bigger tablet panels may begin to enjoy a recovery in shipments with the launch of the new Intel Corp. Atom microprocessor, code-named Bay Trail. This new device could help reduce the cost of x86 microprocessor-based tablets and improve battery life. Bay Trail also could generate opportunities for hybrid-form tablets that include keyboards.

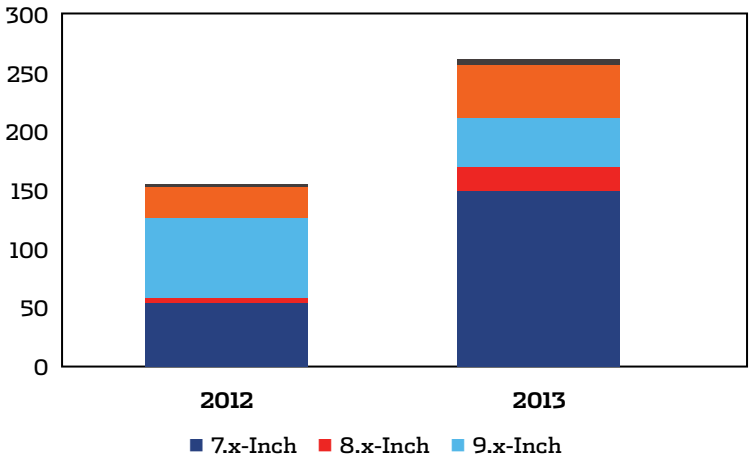
The x86 tablets, with Microsoft Corp.'s new Windows 8 operating system, would have functionality better suited to the needs of the commercial and business worlds than either the Google Android- or the Apple iOS-based tablets, which are designed with the consumer in mind. ■

Figure 2: Percentage of worldwide tablet panel purchasing by branded and unbranded buyer (shae of unit purchases)



Source: IHS, June 2013

Figure 1: Worldwide tablet display panel shipments in 2012 and 2013 by size (in millions of units)



Source: IHS, July 2013

Build A Strong Strategy

Supply chain leaders will play a crucial role as companies capitalise on the explosive growth in emerging markets, predicts Gartner.

Emerging markets have been identified as the primary business growth area for the next century, and Gartner says that organisations with strong demand planning capabilities and segmented supply strategies are better positioned to capitalise on market opportunities, as well as to mitigate risks.

"Emerging markets present huge opportunities but come with unique characteristics and challenges due to the constant thrust for business growth, volatile demand and low maturity of supply chain processes. The ability to plan demand better is a tremendous advantage, as accurate demand plans help supply chain leaders align end-to-end supply chains correctly, and forecast predictable outcomes and profitable responses to demand.," says Mike Burkett, Research Vice President at Gartner.

"Businesses are positioning to take advantage of the most explosive growth opportunity since the industrial revolution. That growth won't come from existing developed markets but from expanding into less-developed emerging markets. Defining the source of future growth was reflected in a recent worldwide Gartner survey of more than 390 CEOs and senior business executives. Respondents indicated concern about a continued recession in advanced economies. As business executives look to emerging markets for opportunity, the supply chain organisation will be tasked with serving that growth," says Burkett.

While CEOs recognise the critical nature of the supply chain to this global expansion, they are split on their view of its readiness. Fifty-one per cent of executives surveyed see globalised supply chains as more complex and brittle now, with the balance feeling that they are more resilient than at any time in history. Gartner believes the solution in both cases is to develop supply chains that can achieve global scale – while reliably serving the unique needs of both developed and emerging nations.

Although the emerging-market opportunity is compelling, the challenges are daunting to the supply chain organisation, and dealing with the risk of uncertainty is a common theme. A survey of 35 of the 100 companies listed by Gartner as among the top global supply chains found the most-cited supply chain challenge in emerging markets is dealing with changing rules, including regulatory or tax requirements. This was followed by building local talent or teams and adapting supply chains to local market needs.

Demand in these markets is often highly fragmented, with customers spread across many rural and urban locations. The infrastructure required to support both physical product and information flows is often unreliable, with poor transit systems hindering transportation, limited technology a barrier to communication, and local supply capabilities inconsistent. Political and regulatory instability impact market access and make long-term supply chain investment and partnering strategies a risky task.

Photo Credit: *www.photos.com*

Emerging markets present huge opportunities but come with unique challenges due to the constant thrust for business growth, volatile demand and low maturity of supply chain. processes.

Scarcity of both material and nonmaterial resources is a global concern, reinforcing the importance of sustainability and social responsibility in these supply chains.

A Gartner survey of chief supply chain officers identified the nonmaterial resource of human capital as their top long-term resource risk concern. The ability to understand and manage local culture is a major challenge for most companies, with talent shortages and retention being significant concerns in the emerging markets.

Despite all these challenges, supply chain organisations are responding to the opportunity afforded by emerging markets – by first working closely with their sales and product teams – to understand the differentiated product and service needs of these markets. Expert leaders are designing the right supply chain organisations and networks to best serve these needs – within a broader global supply chain strategy. ■

Researchers to Develop Technology to Reduce Carbon Dioxide Emissions

BASF, the Linde Group and Thyssen-Krupp plan to develop an environmentally friendly and competitive basis for utilising the climate gas carbon dioxide (CO_2) on an industrial scale.

They aim to employ an innovative process technology to use carbon dioxide as a raw material, with positive effects on climate protection.

Together with BASF's own subsidiary hte AG and scientific partners VDEh-Betriebsforschungsinstitut, Düsseldorf, and TU Dortmund University, the companies are now developing a two-stage process.

In the first step, an innovative high-temperature technology will process natural gas to obtain hydrogen and carbon. Compared to other processes, this technology produces very little carbon dioxide.

The hydrogen is then reacted with large volumes of CO_2, also from other industrial processes, to give syngas. A mixture of carbon monoxide and hydrogen, syngas is a key raw material for the chemical industry and is also suitable for producing fuels. The German Federal Ministry of Education and Research (BMBF) is subsidising the project within its "Technologies for Sustainability and Climate Protection – Chemical Processes and Use of CO_2" scheme. The aforesaid project started on July 1, 2013, and is expected to last three years.

"Together with our project partners, we aim to develop a technology that will open up innovative ways of producing the basic key chemicals

hydrogen and syngas on an industrial scale from natural gas, a resource that will be available for the long term. In hydrogen production alone, we expect carbon dioxide emissions to be about 50 per cent lower than in current standard processes. At the same time, this process produces hydrogen at particularly competitive costs," said Dr. Peter Schuhmacher, President, BASF SE Process Research & Chemical Engineering.

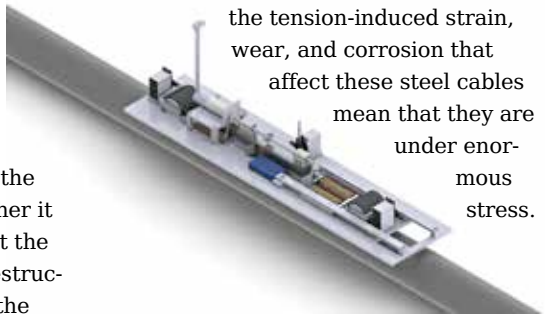
The project's approach has several advantages:

- Natural gas is a plentiful resource with a more favourable content of hydrogen and carbon than biomass, for example.
- Natural gas decomposition is achieved thermally only, without any addition of oxygen or water.
- This enables the production of hydrogen and solid carbon; the latter may potentially be used to replace hard coal in the coke and steel industries.
- In an additional innovative catalytic process step, carbon dioxide is combined with the hydrogen obtained from natural gas decomposition to produce syngas.
- With the process operating at very high temperatures, the innovative reactor design ensures that the correspondingly large amounts of waste heat are recycled immediately into the process.
- The technology is suitable for industrial production. ■

Robot Inspects Cables

The bearer cables and tethers of bridges, elevators, and cable cars are exposed to high levels of stress. For this reason, their functional reliability must be monitored on a regular basis. A new robot recognises fissures before they pose a danger leading to accident.

Very slowly, the robot climbs up the wire cable. As it crawls upward with caterpillar-like movements, it scans the steel surface and detects whether it has any defects. Researchers at the Fraunhofer Institute for Nondestructive Testing IZFP have named the system FluxCrawler. It is designed to monitor the quality of stay cables and wire ropes on a regular basis. Such cables are common features of bridges, elevators, cranes, cable cars, and ski lifts. And these checks are vital, as the tension-induced strain, wear, and corrosion that affect these steel cables mean that they are under enormous stress.



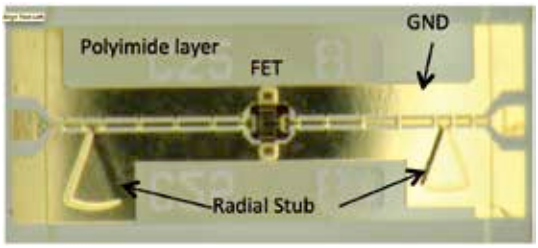
By conducting a magnetic flux leakage test, the robot not only identifies tiny fissures in the cable surface, but also recognises deeper cracks.

This process exposes the cable to a magnetic field that is 'disrupted' in the event of a defect.

A measurable leakage field is created wherever defects are located. "If such micro-fissures are not discovered in time, the steel can break. This is why material checks are absolutely vital to avoid deadly consequences or even catastrophes," says Dr. Jochen Kurz, an Engineer and Department head at IZFP in Saarbrücken. ■

New Technology Demonstrated in IMS 2013

HRL Laboratories' scientists have demonstrated the world's first InP-based millimeter-wave flexible electronics technology. "Flexible and printable electronics have received a great deal of attention in the past decade mainly at frequencies below 1 GHz for consumer electronics and RFID products. The main attributes for the technology include low-cost manufacturing through roll-to-roll processes, lightweight, mechanical reliability and bendability for irregular surfaces. High frequency flexible/printable electronics technology is a key enabler for many demanding electronic systems – such as conformal phased array radars. In order to address the paradigm shift specifically for microwave and millimeter-wave frequencies – and to get similar circuit performance as a bulk semiconductor material, HRL has developed the novel technique to fabricate flexible or printable circuitry," informed HRL Senior Research Staff Scientist Hasan Sharifi.



InP-based millimeter-wave technology Credit: HRL Laboratories

InP HEMT technology was utilised to demonstrate the first W-band completely flexible Low-Noise Amplifier (LNA) with 10dB gain per stage. The researchers' finding was presented at the IEEE International Microwave Symposium. ■

High-tech Welding Process Deployed in Batteries

Ultrasonic welding, a high-tech manufacturing process used in the aerospace and medical industries, is helping ensure high quality for the new Cadillac ELR extended-range electric luxury coupe that goes on sale in North America in early 2014.

Ultrasonic welding's key advantage is exceptional and predictable quality and performance from one battery pack to the next.

Every ELR battery, for example, has close to 200 ultrasonic welds. Each is required to meet stringent quality requirements, enabling Cadillac to offer an eight-year/100,000-mile battery system warranty.

Short cycle times, low capital costs and manufacturing flexibility through the use of automation are other advantages of ultrasonic welding.

"Ultrasonic welding is a far superior joining technology in applications where it can be deployed. Cadillac's innovative process will produce batteries with superior quality compared with traditional methods – and do it more efficiently. This is one example of technology development that is becoming pervasive in today's world class vehicles," said Jay Baron, President and CEO of the Center for Automotive Research in Ann Arbor, Mich.

General Motors' Brownstown Battery Assembly plant near Detroit, uses ultrasonic welding to join metal electrode tabs on ELR's advanced 16.5-kWh lithium-ion battery system, and does it with a proprietary quality monitoring process. Brownstown uses an automated system to execute millions of these welds each year.

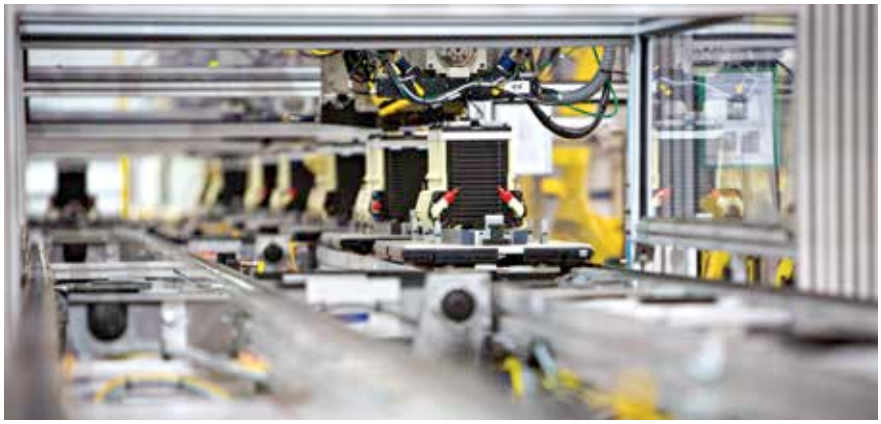

Ultrasonic welding, a high-tech process typically used in the aerospace and medical industries, helps ensure high quality for the new Cadillac ELR extended-range electric luxury coupe going on sale in North America in early 2014. General Motors' Brownstown Battery Assembly plant near Detroit uses ultrasonic welding to join metal electrode tabs on ELR's lithium-ion battery with precision accuracy and quality. The Brownstown battery plant uses an automated system to execute millions of these welds each year. (Photo by Jeffrey Sauger for General Motors)

Photo Credit: ©General Motors.

Ultrasonic welding uses specialised tools called an anvil and horn to apply rapid mechanical vibrations to the battery's copper and aluminium electrodes. This creates heat through friction, resulting in a weld that does not require melting-point temperatures or joining material such as adhesives, soldering or fasteners. An integrated camera vision system is used to shoot a reference image of the weld area prior to the operation to achieve pinpoint accuracy. Quality operators check electrode tabs before and after welding, and the system monitors dozens of signal processing features during each weld. GM first applied the process on Chevrolet Volt – its extended-range electric vehicle – and then refined it for ELR. ■

MAKING EFFECTIVE DECISIONS

Our ability to create a perfect narrative story of cause and effect in the hindsight for an observed major event or a crisis, after it has happened, makes us believe that with more information, collated from different sources, we can easily predict it in future. Is that the right approach? Read on... **By Satyashri Mohanty**

With cloud computing and ever reducing prices of storage systems, the available capacity to store data has gone up exponentially. At the same time, data sets, collated from varied sources, are also growing at an ever-increasing pace to the size of petabytes. As experts put it, this combined effect is a huge opportunity. With right technological support to store and analyse petabytes across sources, one can gain new insights in the field of business, medicine, e-commerce, intelligence gathering etc. There are many anecdotal evidences from data rich industries to back up the claim. This definitely sounds exciting.

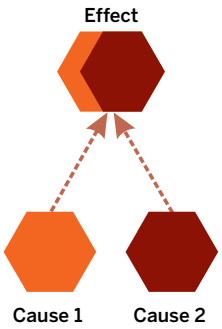
But before jumping into the bandwagon, we need to ask a few critical questions:

- With increasing data over the years, have we been able to improve our decision-making in the field of social science?
- Can the ability of 'big-data' technologies to provide new insights, eventually, replace the need to rely on human intuition?

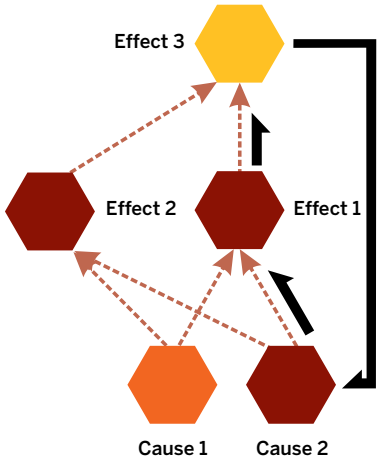
If efficacy of data driven decision-making is proven by anecdotes, let us try to look for counter examples. Nassim Taleb, in his latest book 'Anti-Fragile' highlights how US government was unable to predict the Arab Spring revolutions or even the financial crisis of 2008 – despite investing billions in predictive analytics.

He argues that, in a physical world, we may be able to predict the trajectory of a rocket's flight – but it is difficult to predict the rare events (he calls it the black swan types) in a non-linear complex system (where cause may not have proportionate effect due to feedback loops). The mathematical models will fail regardless of the sophistication or multiplicity of data that are used in the model.

The way to test this claim is to use the predictive models in retrospective i.e., predict a past social event with information obtained from periods pre-



Linear Relationship between Cause and Effect
- Cause has a defined proportionate effect



Non - Linear Relationship between Cause and Effect, with a feedback loop
- Cause can have a disproportionate or a multiplier effect

The mathematical models will fail regardless of the sophistication or multiplicity of data used in the model.

ceding the event. Most demand forecasting tools fail this test.

If this is the case, why do we feel so sure about our ability to predict – which movie will be a super hit or which product will be the next hit big in the consumer market?

This is because of the hindsight bias.

Our ability to create a perfect narrative story of cause and effect in the hindsight for an observed major event or a crisis, after it has happened, makes us believe that with more information, collated from different sources, we can easily predict it in future. If we analyse every major terrorist attack, in hindsight, the indirect signals leading unto the attack seem to be obviously predictable and signalling the attack. Hence, we feel a sense of frustration with 'incompetency' of the people who were in charge.

But if we look at data as it is arriving, much of it is contradictory and full of noise. As the historian Roberta Wohlstetter once remarked "After the event, of course, a signal is always crystal clear; we can see what disaster it was signalling. But before the event it is obscure and pregnant with conflicting meanings." In his book 'The Drunkard's Walk' (regarded as one of the 10 top Science books of 2008), physicist Leonard Mlodinow, remarks, "The crystal ball of events is possible only when the event has happened. So, we believe we know why a film did well, a candidate won an election, a new product failed or a disease turned worse. But such expertise is empty in the sense as it is of little use in predicting when a film will do well, a new product will fail or a team will lose."

Randomness, contradiction, irrelevance in the data make it difficult to pick up signals. At the same time, our biases and prejudices in thinking can act as another blinding force for detecting the signals, when they are distinctly present in the data. We can, at times, ignore what does not fit our thinking paradigms – 'the confirmation bias!'

In 2001, Cisco, one of the most 'wired' supply chains announced to the stock market about writing off $2.5 billion of excess raw material. Was it the problem of huge errors in the forecasting software? The answer is 'No' – as the number involved was almost half of typical quarterly sales. The real problem was suppliers of Cisco producing in anticipation of future consumption. So, when demand dropped with recession, the suppliers kept on producing at the older rate, leading to gradual build-up of excess components over a period of 18 months – leading to an eventual catastrophe of write-offs. Was the data of increasing inventory at suppliers not visible to planners in Cisco? Or, is it a trap of local optima paradigms?

Not many supply chain managers would bother about inventory levels of suppliers; when they are more driven by the need to meet their local need for fast supplies. It is a paradigm by which they look at data around them. If local optimum is the predominant paradigm, one is blinded to signals of potential problems at global level until the mess hits the global picture. In India, almost the entire Auto supply and Consumer Goods supply chain go through a similar 'bullwhip' effect at monthly horizon – a heavy month-end skew followed by a dip in first two weeks even though actual end consumer demand variation has no such trend.

After the event, of course, a signal is always crystal clear; we can see what disaster it was signalling.

This way, working has a major havoc on working capital and stock availability at point of sale as space and capital is locked up in slow or non-moving items, while others are stocked out.

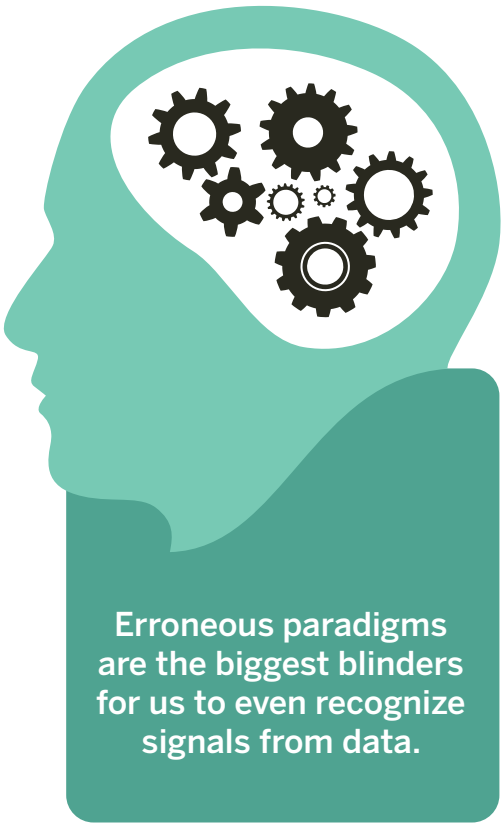
Initially, the problem was attributed to lack of easy access to important data like the actual sales at different levels of distribution. Over the last few decades, supply chains are more connected than ever before. Lot of investment has gone into various enterprise software and connectivity to gather all possible data points. But the problem of monthly 'bullwhip' effect (also called the hockey stick effect) remains at the same level over the last many decades, without any decisive improvement. This is because the paradigm of management has remained unchanged. The entities in the distribution chains continue to work towards meeting their planned target numbers, which are obviously very static over a year (and ambitious) in nature, which results in push of inventory even when actual consumption trends at the point-of-sale is different. The data point of actual consumption information of the end consumer, even when it is available, will not be of any use to anyone in the organisation – who is driven by the target-driven behavioural problem or the paradigm of 'push.'

Erroneous paradigms are the biggest blinders for us to even recognise signals from data. Paradigms in our mind controls the way we look at data and convert it into information. The hypotheses (or paradigms) are formed in our minds based on experiences around us and the way we perceive it.

To solve the problem of erroneous paradigms, one can approach data with blank mind - use good computing power with statistical tools to search for correlations from vast data collected across various sources – the big data approach.

This approach also has a problem; two pieces of data can be accidentally correlated, but assuming them to be cause and effect would be grossly wrong. The data of cancer-related deaths could be highly correlated with the fact that most of them who died also paid their taxes on time. But, our intuition tells us that this is not cause and effect.

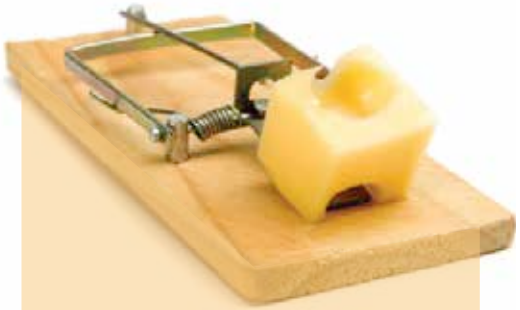
Initially it was thought that the disease malaria was associated with damp air of night. Two data sources highly correlated. Later on it was found that malarial cases were found in dry environments and also absent in places where air was very damp. The control on the disease was not greatly enhanced by this correlation knowledge. Our ability to control malaria was enhanced when we understood, after many controlled experiments, to eliminate irrelevant associations (or correlations) to identify the root cause of how malaria spreads – when a female



anopheles mosquito bites an infected person, it becomes a carrier of the bacteria and the same bacteria is transferred when the mosquito bites a healthy person. This insight not only opened up new possibilities to control malaria, it also helped understand the correlation of damp air with malaria. Every deeper effect-cause-effect understanding opens up new possibilities for more inventions and better understanding of existing knowledge. A correlation between two variables (random associations) provides limited help, unless one is in the business of classifying information like Google.

Even when we are in an era of petabytes, many times it is impossible to 'observe' and count the cause directly. In organisations, it may not be possible to get direct data on entities like the 'disinterested distributor' or 'not so aggressive sales man' or 'committed employee.' So, many times, we use other 'observable' data points (effects) to validate the existence of causes. But, this translation can be erroneous.

It is not uncommon for consultants to show data to clients to provide a 'surprising insight', and in the end clarity of information from clients surprises the consultant. In one case, consultants evaluated products of a fashion company on various parameters of market share and market growth and sug-



Clearly, we cannot do without intuition but how do we train ourselves to not fall into the trap of our biases?

gested some products to be trimmed, as they were the 'strangers or the slow runners.' It so happened that in the next season, the products, which were on the trimming list, suddenly became high sellers. The field people provided the intuition for the erroneous analysis – the data of 'sales' was being used to depict demand, but since placements of the product was not good in the first season, the sales data is not reflective of true demand. The resultant effect was a reversal of decisions. Clearly, we need help of intuition, as some entities can never be observed directly with data.

But we also discussed that looking at data with intuition can be a signal blinder (because of biases), but at the same time, looking at data without any intuition can lead to a blunder of assuming signals – when there is none at all. We seem to be caught between the rock and the hard place.

Clearly, we cannot do without intuition but how do we train ourselves to not fall into the trap of our biases?

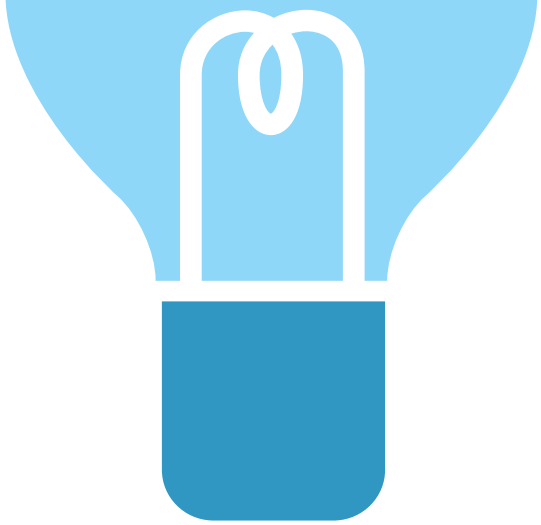
The typical approach of proving a hypothesis is to look for instances, which support the hypothesis – the process of inductive logic where the mind generalises, based on specific instances. I have seen many white swans – so all swans are white (See that white swan, I had told you before!!). This way of inductive reasoning has been widely accepted by some as a scientific approach. A hypothesis is formed and proved by data of observation.

But there is a problem in this approach as highlighted by philosopher David Hume – how does one distinguish between incorrect inductions? One can always find a way to prove one's point. This opens a Pandora's Box of clear demarcation between what can be considered as 'science' and 'non-science.' Palmistry can also be proven by inductive method and so are Newton's Laws of Motion. The problem of induction is at source of the confirmation bias.

Karl Popper, one of the greatest (and most controversial) philosophers gave a way out of this problem of induction. He argued that 'science' has progressed by 'falsification' or test of failures. So, any subject can be called as scientific only if it is 'falsifiable' or in other words, one can set up an objective test in which the hypothesis can fail. So, by definition, a scientific statement should clearly indicate what it clearly debars. For example, Law of Thermodynamics states that it is impossible to have a perpetual motion machine. It is a scientific statement because it clearly sets up a close case – where it can be falsified – if somebody invents a perpetual machine, the theory stands falsified. Only when a hypothesis stands tests of failure by subjecting it to different testing scenarios, we can say that theory is 'corroborated' (not true). If it fails a test, it is still a scientific statement. But we have to either drop the hypothesis or modify it for further testing.

Let us check if palmistry is falsifiable. Let us check the hypothesis; if a lifeline is short, a per-

Falsification is a difficult process; it requires a different thinking approach - the deductive logic as opposed to inductive logic.



son will die a premature death. The test of failure would be to look at all cases of premature death – and see if most of them had long lifelines. If data shows that actually most of them had normal lifelines, the palmists will not agree to the falsification of the hypothesis. Post facto, they will bring about other hypothesis to support what they are observing and if you further test, and find contradictions with new modified hypothesis, it will be further modified post facto and so on. Hence, a test of failure cannot be decided upfront – every observed case can be 'explained' post facto.

This makes palmistry a 'non-science,' because there is no way to objectively set up a test upfront. Same is the case of a Management Theory, which describes 10 prescriptive ways to be a great company. The theory is built around 'research' of great companies. But if one shows many cases to the guru (of the above theory) where companies followed all 10 prescriptive ways but died in the process, the guru will try and 'explain' the cases, which do not match his hypothesis. So, like palmistry, there is no objective way to agree on a falsification test upfront with the proponent of the theory. 'Falsifiability' of a theory is decided, if a theory can be called scientific because that lays the foundation for two experts to argue and build on the theory.

Inventors love their inventions. They like to see confirmations. Falsification is a difficult process; it requires a different thinking approach – the deductive logic as opposed to inductive logic.

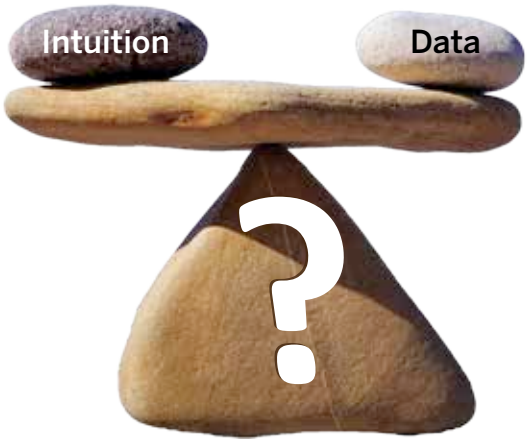
Deductive logic is a way to challenge the generic statement by observing the specifics. All swans are white (a generic hypothesis) can be falsified by one observation of a black swan. Such deductive logic can be used to set up test of failures under different conditions – does it stand good under different conditions?

Does it contradict with another observation of an existing theory? Does it contradict with itself under a different scenario?

In an interconnected system, a cause is bound to have multiple, different effects. A problem in one organ will lead to effects on other organs due to connectivity between them.

So, any actual effect, which is contradictory to the predicted effect, will force us to either drop or define the limiting conditions for hypothesis.

This approach gives us a way forward. If there is no way to observe without bias (we will collect data to prove our point) then the best way is to expose one's hypothesis to repeated test of failure by arguing with another person – who has exactly an opposite point of view around the same topic – a process of Collective Confrontation of Intuitions (CCI).



Our ability to see reality as it is (or see it objectively) is more constrained by our mental models than data availability.

For example, if the head of production claims that he has improved his operational performance significantly (or even has data to prove his point); the best person to falsify it is the sales team. Are the sales experiencing an improved delivery? Has the number of expediting requests from customers come down dramatically? Have the last moment emergency shipments come down? If the answer is 'No' to any of them, then hypothesis needs to be questioned. Such an approach requires one to think like a scientist and focus on erroneous assumptions, which falsifies the hypothesis without feeling insulted or falling into an acrimonious debate of blaming each other. This is how quantum physics evolved. When there was no apparatus to directly observe the quantum particles, scientists resorted to thought experiments (imaginary experiments) to test the predicted effects. The arguments between Einstein and Bohr around thought experiments to disprove each other's hypothesis created significant progress for quantum physics.

The way we think has a significant impact on the way we visualise the world around us. Our ability to see reality as it is (or see it objectively) is more constrained by our mental models than data availability. We have an ability to see data the way it suits our opinion. So, the way out is an objective confrontation (checking for erroneous assumptions) with contradictory intuitions about reality (process of collective confrontation of intuitions). Success of the hard sciences is because of this method. This requires not 'Big Data,' but a 'Big Change' in the thought process. As Einstein once remarked, "Not everything that counts can be counted. Not everything that can be counted, counts." ■

The author is a Founding Director of Vector Consulting Group.

QUALITY & INNOVATION

Dr. Dhananjay Kumar
CEO & Global Head
(Engineering, Project & Business Dev.)
KLT Automotive & Tubular Products Ltd.

"More innovation with higher degree of engineering at each stage is needed"

KLT Automotive & Tubular Products is one of the leading Indian manufacturers of automobile spare parts. In an exclusive interview with **Industry 2.0, Dr. Dhananjay Kumar, CEO & Global Head** (Engineering, Project & Business) of the company expresses his views on the status quo and potential of the Indian 'auto components industry' to **P. K. Chatterjee**. Excerpts...

What is your comment on the competitiveness of the Indian 'auto components industry' globally?

Indian 'auto components industry' is very much competitive – in terms of material; it is cheaper by almost 40% to Thailand and 50% to South Africa. Similarly, labour is almost 1/3rd to Thailand and 1/6th to South Africa. Technologically, we are at par with the best in the world. What is required and what is missing (according to me) are that 'auto components' suppliers should have more global visibility in terms of participating in R&D, 'system engineering;' participating in conferences and joining the global programmes. Also, some kind of consolidation is needed – as some strong 'tier-1' suppliers should have pan global view, and they are required to be a bit more aggressive.

How is the growth potential of the Indian automotive products manufacturing segment now?

Global economic turmoil is in a way good for Indian 'auto components industry' – as they require to look more outward following global practices in terms of quality, cost and development along with logistics and processes. Also, there will be more opportunity to participate in global programmes with greater emphasis on development and efficient supply chain.

To what extent high quality and low manufacturing cost will help the segment sustain in today's situation?

Manufacturing cost is bound to increase with improved system engineering and quality, yet it is 20% cheaper, and we are bound to remain competitive considering the highly competitive nature of this business. Both in terms of end products and processes: JIP quality management process with higher consistency is absolutely necessary to have a global product at local cost. Also, more innovation with higher degree of engineering at each stage – with backward integration with institutions will further streamline the process at reasonable cost.

How much supportive is the domestic market at this moment?

With poor IP protection and high handed approach of the OEMs and least regards to innovations and original ideas, we are still at a low ebb. But increasing participation in the global programmes, when auto OEMs are themselves hard pressed to have globally competitive products (in terms of quality, cost and performance), they are bound to have efficient component suppliers with capability to system engineering. Also, they will increasingly be bound to give not only a better price, but also an improved IP protection, which will be sustainable in the long run.

What should be the focus of the players in this industry now?

They are required to focus on quality, engineering processes and global presence. Also, they need to invest in R&D – and increasingly participate in collaborative innovation – with OEMs, other peer groups and institutions of repute – to improve tooling and other engineering processes. ■

Photo: Jiten Gandhi

Boosting Efficiency

An efficient Enterprise Asset Management (EAM) application can not only increase manufacturing and maintenance efficiency, but also helps in reducing costs. Let us see how a well known food manufacturing company has benefited from it...

When Heinz Frozen Food Co. set its sights on improving its manufacturing and maintenance process efficiency with leading-edge technology, the company knew that implementation of a new system would require a monumental change in culture for its employees. After careful analysis of several competitive applications, Heinz chose an Enterprise Asset Management (EAM) application by Infor for several reasons. Milton Slagowski, Maintenance Manager at Heinz Frozen Food Co., explains, "It was not only a web-based enterprise system that met all of our maintenance function needs, but, more importantly, it was the most cost-effective solution."

As manufacturing and maintenance employees began using Infor EAM after implementation, the company gained better visibility into its processes – and realised that more progressive 'lean manufacturing and maintenance' practices would enable more significant efficiencies.

Getting business specific

The company began incorporating 'lean manufacturing and maintenance' practices that brought improved results in a short time. "We started to identify maintenance waste elements – those that didn't add value – and to use Infor EAM as it was meant to be used: in concert with 'lean manufacturing and lean maintenance.' And we started to understand change enablers such as awareness of what needs to change, understanding of our goals and objectives, and engagement by everyone from top management to those performing the tasks," says Slagowski.

Once all of the change enablers aligned to achieve the targeted results, the company began realising efficiency improvements. "What we learned was that lean practices are instrumental in implementing an EAM application to achieve excellent results quickly and cost-effectively, and that asset reliability is a key tool for successful 'lean manufacturing' operations. They have a mutual relationship. And Infor helped us understand the

process to achieve our goals and get consistent results," Slagowski emphasises.

Seeing results

Through Infor EAM built-in configurability, Heinz was able to continuously adapt the system and incorporate lean maintenance processes in a timely and cost-effective manner. As the company began removing common maintenance waste from the process, it began an integrated approach to designing and improving manufacturing and maintenance work toward the ideal internal customer-focused state. Slagowski says, "As a tactical approach, we looked for everyone's input with an emphasis on quality and safety the first time, and incorporated lean practices as a comprehensive business strategy. We saw lean maintenance as the way to preserve assets in good operating condition and improve reliability in both the short term and the long term."

The primary lean tools that the company adopted were Infor EAM, maintenance planning, preventive maintenance, total productive maintenance, reliability-centered maintenance, and reliability engineering to eliminate failures. Other lean tools it used were 5S, to keep things in order; 5 Whys, to ensure ease of use; Kanban, to provide a visual representation of progress in the work cycle; Hansei, to enable reflection upon errors and correction of them; Genshi Genbushu, to allow seeing the work to spark ideas on how to improve; and Kaizen, to review four-hour progressive manufacturing tasks to eliminate waste. Slagowski notes, "We used Infor EAM features such as KPI (Key Performance Indicator) inboxes and reports to see our hours worked per month, rework hours, overdue PMs, and planned-hour ratios. Then we tweaked our processes to achieve our efficiency goals."

"Reactive maintenance amounts to huge waste, whereas planned maintenance enables 30 per cent more actual work to be completed. Using Infor EAM and lean practices, we can verify that working out a maintenance plan ahead of time saves three to five times the total time invested," he adds.

Additional and unnecessary maintenance time also translates to astronomical cost increases. Slagowski opines, "Reactive maintenance costs $400 per hour, and corrective action costs $200 per hour. But with planned maintenance in which we incorporate lean practices with Infor EAM, the cost is only $75 per hour. Infor EAM Enterprise is designed to enable changes that will upgrade with new releases, saving IT costs."

New maintenance practices that resulted in culture changes at Heinz proved positive in many ways. Slagowski says,"Our maintenance planners now interact with our maintenance-performing professionals. Together we've documented and sustained best practices, and gained employee involvement and communication with the aim to help each other reach common goals. We all feel like we have a vested interest. These are all important ingredients to sustaining success in any operation."

Benefits at a glance

- 10 to 11 per cent efficiency improvements in areas such as maintenance stores and production
- 5 to 10 per cent reductions in maintenance costs
- World-class levels of maintenance inventory management – one per cent of estimated replacement value
- Low total cost of ownership

Heinz has claimed considerable gains in process efficiency. "Following our use of Infor EAM and lean practices, we've realised 10 to 11 per cent efficiency improvements, and our maintenance costs have dropped by 5 to 10%. Efficiency has grown in various areas, such as work done by technicians who don't need to hunt for parts because they're kitted, and in maintenance stores and production. We've also reached world-class levels of maintenance inventory management: one per cent of estimated replacement value," informs Slagowski.

On its journey to optimally streamline its manufacturing and maintenance processes toward its production-focused ideal state, Heinz embraces continuous improvement.

In the words of Slagowski, "Time invested in planning with EAM, lean maintenance practices, and a focus on continuous improvement pays more than for itself. We had to adapt our operations and systems to reach our short and long-term goals, and Infor EAM's agility and built-in best practices guided us in the process. We now get optimum life out of our profit-making and profit-supporting assets."

Doing business better

Heinz Frozen Food Co. affirms that its future will remain with Infor. Slagowski declares, "Repeatable success is a lean activity, and continuous improvement with lean principles creates the opportunity to stay ahead of the competition. We believe Infor understands and follows these principles, which is why we'll continue to rely on Infor for our future technology needs." ■

5 Strategies For Lean Thinking

Lean is not just about production any more – it can generate positive results across the value chain and have a profound effect on the long-term sustainability of any enterprise. In a successful next-generation lean initiative, operational efficiency drives increased productivity and better operating margins, leading to increased revenues.

1 Commit to lean on an enterprise-wide basis

The primary goals of traditional lean manufacturing – drive out inefficiencies, reduce costs and waste, increase value and decrease variability – remain the same today. Only now these goals need to be embraced across the extended enterprise – both internally and externally with supply chain partners.

In today's dynamic business environment, virtually all operation processes are interrelated and disruptions along the extended supply chain need to be responded to quickly and in real-time. Confining lean to a single manufacturing facility or production area is not sufficient. Lean initiatives cannot work – if done in isolation because changes made in siloed functional areas, such as manufacturing, distribution or transportation – or even at the local, regional or country level – can have unintended consequences that can lead to increased costs in other areas.

Most effective lean initiatives focus on the extended supply chain. Thus, companies are deploying advanced modeling tools that can consider all costs.

2 Understand what drives your supply chain

Understanding the variability of demand is very essential for removal of waste or 'Muda' – a Japanese term for wasteful and unproductive activity.

Today's variability is very different – it is often powered by economic and market forces outside one's own control. These include consumers opting for more value-priced products, a need for more product innovation, competition on a global scale, seasonal variations and increased promotional activity.

In tough times, it's very important to reexamine your enterprise's forecasting and demand planning processes – and challenge past assumptions to better see what's driving demand.

Lean manufacturing initiatives have a much better chance of delivering the expected benefits by enterprises that are able to quickly and profitably respond to changing demand patterns. This needs a demand management and shaping process – statistically sound and collaborative across the planning, sales, marketing, product management and financial organisations.

Photo Credit: www.photos.com ContentSource: JDA Software Group, Inc.

3 Tie demand signals tightly to manage supply

Once demand drivers are clearly understood, the next step is to use the demand to drive the development of a connected supply chain plan from distribution to production, to raw materials to optimised sourcing. An optimised and connected plan can eliminate the significant levels of waste – Muda – that exist in most supply chains.

Waste comes in many forms, including: high production change over cost and excessive down times due to inefficient scheduling, excessive materials and finished goods inventories that build over time in an attempt to keep service levels high and supply chain risk mitigated, as well as high logistics costs which are associated with unnecessary expediting and inefficient loads.

With one synchronised view of demand, companies can transition from push-manufacturing to pull-manufacturing driven by consumer demand, customer orders and accurate forecasting. Two critical keys to success are the ability to determine the optimum inventory policies and the ability to continuously optimise sourcing plans based on the most current demand.

4 Leverage the power of IT for global visibility and flexibility

The time, when companies could effectively manage their demand and supply chains using traditional Manufacturing Resource Planning (MRP) principles to drive a site by site production plan based on a simplified view of constraints, is over.

Manual lean methods of the past have also proven to be inconsistent and inadequate. With complex global supply chains, enterprises need solutions that solve complex optimisation problems that are simple to use, easy to deploy, and capable of responding to real-time information. They must also provide the collaboration required to drill down into demand drivers at a granular level, as well as integrate and align internal and external supply chain partners.

Today's robust supply chain software solutions integrate industry best practices, which are designed to help users manage even the most complex enterprises at today's rapid speed of business.

Global visibility and the flexibility to respond to economic and market changes in real time are among the most strategic initiatives any company can deploy to remain competitive.

5 Align the lean initiative closely to operational plans and corporate financial goals

One of the most critical elements of an effective lean strategy is to tightly align demand and supply chain operations with the enterprise's strategic business plan.

The role of financial performance management is to plan, direct and oversee capital expenditures, monitor and control cash flows and invest as appropriate to ensure profitability and revenue goals are met.

Thus, it is essential that financial management be an integral participant in the lean initiative and be a key part of the information flow, transparency, visibility and critical decision-making processes. To maximise operational efficiencies, enterprises should incorporate Sales & Operations Planning (S&OP) processes into their lean manufacturing initiatives on an enterprise-wide global scale to enhance supply chain visibility, eliminate performance surprises and achieve more integrated business planning and management. ■

SHADOW OF UNCERTAINTY

Cargo shift to incumbent non-major ports continues as capacity constraints at major ports undermine favourable growth potential: finds a recent ICRA survey. Also, tariff related uncertainties continue for the sector.

Cargo growth at Indian ports continued to be moderate in FY 2013 with a 2.4% yoy rise in throughput to 935 mn tonnes. Major ports experienced a 3% de-growth in cargo handling during FY 2013 to 546 mn tonnes, as iron ore volumes continued their slide; cumulatively, the major ports registered their lowest cargo volumes in the last four years during FY 2013. Moreover, fertiliser raw materials and finished fertilisers imports saw sharp decline due to lower demand. Non major ports, on the other hand, by virtue of a more diversified cargo mix and higher efficiency standards gained 13% in terms of cargo volumes year on year and offset the decline in major port volumes. As a result, in market share terms, major ports accounted for 58 per cent

Photo Credit: www.photos.com

of total throughput in FY 2013 compared to 61 per cent in FY 2012, while the share of non major ports was up at 42 per cent in FY 2013, increasing from 39 per cent during the previous year. During the first three months of FY 2014, the cargo throughput decline in major ports continued, with a 1.0 per cent reduction in volumes over that in the corresponding period of previous year.

Cargo growth outlook

The cargo growth outlook for the Indian port sector continues to be strong over the medium to long term – driven by the domestic requirements of coal (for power) and other sectors; crude oil, for meeting domestic petroleum requirements; and containers, given the cost and logistical advantages associated with containerisation.

Some near term uncertainty may, however, be associated with particular cargo categories like imported coal, due to uncertainties plaguing the power sector and persisting delays in execution of greenfield power projects; iron ore, due to unresolved policy issues; and containers, due to the weak global environment affecting exim trade.

New capacity additions

With respect to new capacity additions, progress on the award of projects at major ports, including Public Private Partnership (PPP) projects, was better in FY 2013 as compared to the previous year. A total of 32 projects could be finalised and awarded in FY 2013 as compared to 3 projects in FY 2012, though this fell short of the planned target of 42 projects. Despite the uptick in project awards, implementation of these projects could see further delays, as seen in the case of projects awarded during the previous years at major ports.

The progress in terms of capacity creation by way of greenfield non major ports also continued to be slow with very few of them moving from proposal to implementation phase – owing to a host of issues including problems in land acquisition; environmental and other statutory clearances; issues in financial closure etc. Given that no near term resolution of these structural problems appears to be in sight, the capacity addition at Indian ports is likely to fall short of envisaged targets and demand requirements. As a fallout, the major ports, most of which are already operating at peak capacity, are likely to continue facing capacity and efficiency constraints while the new non major ports, by virtue of their superior cargo handling infrastructure, investment in large capacity creation and high operating efficiency, would be well placed to wean traffic away from major ports as well as garner a larger proportion of the incremental cargo generation.

Tariff related uncertainties

Tariff related uncertainties continue for the sector – with litigations initiated by several private sector companies operating at major ports against the tariff cuts set by the Tariff Authority for Major Ports (TAMP) yet to see any culmination. In March 2013, the Ministry of Shipping (MoS) circulated new draft tariff guidelines for private terminal operators at major ports, which offer some upside as compared to extant regulations including flexibility to set market based tariffs, though certain irritants remain. However, as the new guidelines would be applicable only to new private projects at major ports – (whereas) the existing players continue to be regulated under the earlier TAMP guidelines; this would lead to anomalies in tariff setting and an unlevel playing field. Nonetheless, as per recent announcements, the MoS plans to de-regulate tariffs for the existing players at major ports in the near future as well, to boost investments and efficiencies in the sector. Tariff risk, however, continues to be a key event based risk factor for the port sector entities. ■

Changing Priorities

Lloyd's Risk Index 2013 (run in conjunction with Ipsos MORI) provides a picture of how global business leaders prioritise and prepare for major risks. Excerpts...

Richard Ward, Chief Executive, Lloyd's

High taxation is now seen as the number one threat to global business according to the 3rd Lloyd's Risk Index. Survey of more than 500 of the world's most senior business leaders suggests executives are focusing on more pressing problems including cyber-attacks and increased material costs, rather than longer-term strategic decisions. Major findings are:

- 'High taxation' is identified as the biggest risk faced by leaders after prolonged public and political exposure and debate. It has soared up the Risk Index ranking from 13th to 1st place.
- 'Cyber security' now sits squarely towards the top of the agenda for boards around the world with cyber risk moving from 12th to 3rd place in the index. In 2011, cyber risk was in two separate categories – Cyber Attacks (which was 12th) and Cyber Risk (which was 19th).
- 'Loss of customers' has slipped to second place, down from the no.1 risk two years ago – as firms struggle with the continued effects of economic turbulence.

In response to the findings, Lloyd's Chief Executive, Richard Ward, is warning that focusing on near-term issues at the expense of longer-term 'strategic decision making' can leave organisations over-exposed to future business challenges.

Richard said, "With business tax in the spotlight and rising up the political agenda, executives are understandably concerned. Yet the danger is that an emphasis on near-term, operational issues comes at the expense of significant, strategic decisions that have previously exercised business leaders. With the timetable for global economic recovery likely to be much longer than we hoped, a focus on long-term sustainability and effective risk management should be a priority for boards across the world."

The Index reveals how the relationship between preparedness and prioritisation of risks has changed in recent years, and the diverging approaches taken by large and smaller companies.

Over the last five years, business leaders have developed a more sophisticated and proportionate approach to risk management. In 2013, across the 50 key risks, those given a higher priority score are also given a higher preparedness score, while risks ranked lower in priority are ranked lower in preparedness.

In 2013, company size is the biggest differentiator in risk perception and management. In 2009, large and small companies had a more comparable view on priority and preparedness across all risks than in 2013. Now, smaller companies give all risks lower priority (10 per cent below average) compared to larger companies (8 per cent above average). ■

The Risk Index highlights some notable changes

2013 top five risks	2011 top five risks
Taxation (up from 13th in 2011)	Loss of customers/cancelled orders
Loss of customers/cancelled orders (down from 1st in 2011)	Talent and skills shortages
Cyber risk (up from 12th in 2011)	Reputational risk
Price of material inputs (up from 7th in 2011)	Currency fluctuation
Excessively strict regulation (up from 10th in 2011)	Changing legislation

ADITYA BIRLA
FINANCE

presents

The 4th Annual
CFO Leadership CONCLAVE

Conversations. Connections. *Change.*

"Where Finance meets Innovation"

September 13 - 15, 2013 | Marriott Resort & Spa, Goa

For CFOs With CFOs By CFO

Meet and connect with:

- **Mr Jamling Norgay,** Everest Mountaineer
- **Shri Shakti Sinha, IAS,** Principal Secretary, Govt. Of Delhi
- **Dr Subir Gokarn,** Former Deputy Governor, RBI
- **Dr Ajay Shah,** Professor, NIPFP
- **Shri Vinod Rai,** Former CAG
- **Dr Shubhro Sen,** Director, Tata Management Training Centre & Founder, Conscious Capitalism Institute
- **Mr Joy Bhattacharjya,** Advisor, Kolkata Knight Riders (IPL Auction)
- **Dr Pramath Raj Sinha,** CEO & Group MD, 9.9 Media

finthinkers
the universe of ideas

THOUGHT LEADER
Deloitte.

FinThinkers
A pioneering initiative to identify and recognise the leading 'thinkers' in finance.

Highlights:

Tech Gallery
Gain exposure to cutting-edge technology solutions that impact your business and function!

'Unconference'

IPL Mock Auction

CFO Policy Forum

Innovation Workshop

75+
CFOs and senior finance professionals representing top, influential companies of India

5 compelling reasons to join us in Goa...

- *Imagine possibilities and ideas for the future with dynamic speakers and like-minded peers*
- *Create the future and problem solve with senior members of the community*
- *Engage in conversations and meaningful exchange, not monologues*
- *Learn, challenge and be challenged in an informal, interactive and friendly setting*
- *Experience the perfect mix of work and fun!*

TECHNOLOGY PARTNER	BANKING PARTNER	INNOVATION PARTNER	KNOWLEDGE PARTNER	VIRTUALISATION & CLOUD COMPUTING PARTNER	RISK MANAGEMENT PARTNER	BUSINESS DISCOVERY PARTNER	TECH GALLERY PARTNER	PARTNER
vodafone	kotak Kotak Mahindra Bank	Canon Delighting You Always	TOWERS WATSON	vmware	EMC² RSA	QlikView	AASHNA AASHNA CLOUDTECH YOUR CLOUD AGGREGATOR	SKP

For more details on registration, please write to Nisha Anand on **nisha.anand@9dot9.in** or call **+91 98117 99248**

Indian Hydrocarbon Sector Needs to Attract Investors

ASSOCHAM recently organised a seminar titled "Indian Economy in the Context of Global Energy Scenario," focusing on the hydrocarbon sector, in New Delhi.

Rajkumar Dhoot, President, ASSOCHAM, is greeting Dr. M. Veerappa Moily, Union Minister for Petroleum & Natural Gas. Also seen in picture: (LtoR) P. Elango, Chairman Designate, ASSOCHAM National Council on Hydrocarbon; Vivek Rae, Secretary, Ministry of Petroleum & Natural Gas; Sudhir Vasudeva, CMD, ONGC; and D. S. Rawat, Secretary General, ASSOCHAM

Rajkumar Dhoot, President, ASSOCHAM is sharing light moments with Dr. M. Veerappa Moily, Union Minister for Petroleum & Natural Gas and Vivek Rae, Secretary, Ministry of Petroleum & Natural Gas in the seminar.

High levels of crude oil imports have adversely effected India`s current account position. At present crude oil is the single largest in India's import basket. The weakening of the rupee vis-a-vis the dollar has landed the government in a difficult situation.

While the crude oil import bill is rising, it is a difficult task to benchmark domestic fuel oil prices with international rates considering its widespread impact. In the prevailing situation, the losses for the oil marketing companies due to under recovery is expected to be around Rs. 1.2 lakh crore.

Challenges of rising oil and gas consumption and relatively flat production have left Indian economy increasingly dependent on import of hydrocarbon requirement.

With the share of imports set to rise from 75 to 80 per cent by the terminal year of twelfth plan, global energy pricing and supply will have a deep impact on the Indian economy.

Supply disruption due to geopolitical issues have become relatively frequent events, causing significant price spikes. Issues in the Middle East, in particular, have a large influence on oil prices because of the region's massive reserve.

Adding to this, R. N. Dhoot, President, ASSOCHAM said, "Interestingly India is the fourth largest country in terms of energy consumption, where it roughly imports 75 to 80 per cent of energy requirements from countries like Saudi Arabia, Iraq, UAE etc. Looking at the scenario, the importers will have to pay extra for the same quantity of crude."

The International Energy Agency (IEA) expects India's new gas pricing regime to boost investment in exploration and production, which will enhance energy security and help consumers, including gas starved power plants.

The reality is that current gas price is not economic, that is why Indian Hydrocarbon Sector isn't able to attract investment in upstream production. But Dr. Moily assured that the govt is committed to deal with the energy security issues. It is in this context that the gas pricing formula (effective from 01-04-2014) was recently revised based on the recommendations of Rangarajan Committee. ■

finthinkers

the universe of ideas

A pioneering initiative to identify 'thinkers' – those with the 'new' on various aspects of finance. Through this programme we will engage 'thoughtfully' with the CFO community and catalyse new ideas.

"If you think, ink your thoughts"
& to know more about FinThinkers
Contact: Ashutosh Sinha | M.: +91 95 6005 9349
e-mail: ashutosh.sinha@9dot9.in

Thought Leader: Deloitte.

Stop being consumed by where you are...

...focus instead on where you want to be.

Are you at that stage in your career... when you start looking for something more. It could be a new direction, fresh focus or the next mountain to climb.

You've already come a long way, but it's time to aim for the top - the pinnacle.

But scaling the next mountain is a big stretch. You need new skills. You require new perspectives. You want to be a stronger leader.

The Pinnacle Programme will help you do all this - and more.

WE DON'T BELIEVE IN ORDINARY. WE BELIEVE IN YOU.

THE LEADERSHIP INSTITUTE

www.theleadershipinstitute.in

9.9 Mediaworx, B-118, Sector 2, Noida – 201 301, India Tel: +91 120 4010999

Supply Chain 2020

CII's recent two-day conference attracted end users and senior business executives from the Manufacturing, Telecom, Retail, FMCG and other sectors.

The economy is becoming increasingly globalised with fierce competition. To adapt to this dynamic environment; modern companies are actively managing their supply chains utilising strategic and operational levers at their disposal – to transform vulnerabilities into competitive advantage. Against this background, in New Delhi, CII- Institute of Logistics organised a two-day conference on Next Generation Supply Chain. The conference was inaugurated by Sathyanarayana Sarvey, Minister of State for Road Transport and Highways. Also, in the same event, McKinsey released a paper on the sector.

In his inaugural speech Sarvey said, "India is emerging as one of the world's leading consumer market and is expecting to sustain a strong growth over the coming years and strives to become one of the top three economies in the world by mid-century. The logistics sector plays a major role to support this cause, the connectivity and the convenience in operations is the key for sustaining the global trade growth."

"Currently India's logistics sector is valued at around $125 billion, and is likely to cross the $200 billion by 2020. Government's increased spending on infrastructural development; encouraging involvements of private players in key projects through Public-Private Partnership (PPP) are catalysing the growth," he added.

The conference aimed at exploring the changing Supply Chain Management (SCM) landscape, and the changes needed to meet the evolving requirements of the future. The next generation supply chains have to address five key dimensions. Cyrus Guzder, Chairman, CII Institute of Logistics Advisory Council, said, "It's important to focus on the key challenges to help industry leap into the next generation of supply chain. To tackle these challenges, CII has taken up a series of initiatives like – Supply Chain Strategy to align with corporate strategy, Logistics Network (Re)design, Logistics Cost Optimisation, Supply Chain Responsiveness – Availability and Agility and Supply Chain Operation Excellence to reduce the working capital."

R. Dinesh, Co-Chairman, CII Institute of Logistics Advisory Council, said, "The logistics and supply chain management industry in India has been receiving greater attention in the last few years. The focus is actually on how we can together enhance our knowledge on the supply chain management and explore opportunities to work together with the government and prepare ourselves for the forthcoming challenges of today's dynamic business environment. Reduction of costs, supply chain strategy and availability, and logistics design are the top three priorities, which the Indian companies should look at today and explore this opportunity – given the huge investments and developments that is seen in this industry."

Sathyanarayana Sarvey, Minister of State for Road Transport and Highways, is releasing the publication in the CII event.

Sharing a brief note on the publication, Knut Alicke, Master Expert, Supply Chain Germany, Mckinsey and Company, said, "The publication released gives in the five key trends that can shape the supply chain innovations in businesses; uncertainties together with shorter and tougher business cycles; expanding and demanding consumer base; converging wages and increasing costs; and the evolution of big data. Each of these will have a significant bearing on the way today's supply chains operate, and will drive the next generation supply chain." ■

UPS

Delta Group has launched its new Ultron HPH Series UPS. As per the manufacturer, with power ratings of 20/30/40kVA, the Ultron HPH Series offers true online double conversion UPSs that provide best-in-class power protection with a combination of maximum available power, unbeatable energy efficiency and superior power performance.
The series is ideal for small datacenters as well as different industries.

Delta Power Solutions (India)
Tel.: +91 124 4874900
Website: www.deltapowersolutions.com

ACTUATORS

Belimo announces the release of KR actuator on the Pressure Independent Characterized Control Valve (PICCV), a multi-patented, rugged actuator, which offers 18 in-lbs (2 Nm) and is designed for motorising open-close applications – to ensure optimal valve design and absolutely reproducible control quality. The actuator is available on PICCVs, and features a simple, manually adjustable angle of rotation limiting device with a flow rate scale.

Belimo Americas
Tel.: +1 800 543 9038
Website: www.belimo.us

US Cleaning Machine

The ultrasonic cleaning machine offered by Sharang has a SS 304 (16G) tank, Its encloser and basket are made of SS 304. Imported PZT (sandwich type) is bonded at the bottom of the tank. It has high frequency built in MOSFET / IGBT based SMPS. Pulse sweep power provides for uniform distribution of ultrasonic energy for the USC tank. Also, it features a timer having 0 to 99 minutes digital count down with display. Auto degassing presents 5 minutes for ultrasonic tank. Its temp controller digital display is available with 60°C (settable).

Sharang Corporation
Tel.: 91 20 32417448 / 49
Website: www.sharang.co.in

Valve Actuators

Smith Flow Control offers a tool for companies in the power industry to safely and economically control valve operations. The Easi-Drive portable valve actuator securely operates valves in power plants. One user can easily operate multiple high-torque or high-turn valves with a single torque driver – while reducing risk of injury caused by fatigue or valves located in hard-to-reach areas.

According to the manufacturer, it is a lightweight, portable tool that can be powered by air, electricity or battery and costs less than a dedicated actuator. Unlike an impact wrench that can damage a valve, the Easi-Drive is a continuous drive system.

Smith Flow Control
Tel.: +44 (0) 1376 517901
Website: www.smithflowcontrol.com

Dose Pumps

Ingersoll Rand has rolled out its new ARO air operated diaphragm dose pumps. The new product line expands Ingersoll Rand's existing ARO positive displacement pump portfolio that includes peristaltic hose pumps and piston pumps enabling high level of reliability, efficiency and productivity. The new PD01 series 1/4" pump is designed for dosing applications in the commercial laundry, car wash, wastewater treatment, paint, inks and packaging markets, and many other applications – where accurate and repeatable dosing is integral to the process being performed.

The new 1/4" series pump comes with a solenoid-actuated valve option to electronically control the volume of fluid dispensed, which allows the 1/4" diaphragm pump to operate with accuracy.

Ingersoll Rand
Tel.: +91 124 672 9051
Website: www. ingersollrandproducts.com

VIOLET FLASHLIGHT

Spectronics Corporation has introduced the Spectroline OPTI-LUX 400 — a powerful, rechargeable violet light LED leak detection flashlight. As per the manufacturer, it emits less visible light than standard blue light inspection lamps, so refrigerant leaks are easier to spot. This saves valuable diagnostic time and money. The product features a high-output, violet light LED that causes dyes to fluoresce more brilliantly and with greater contrast. It has power comparable to high-intensity 150-watt lamps and works with all popular universal/POE dyes.

Spectronics Corporation
Tel.: + 516 333 4840
Website: www.spectroline.net

Surge Arresters

Mecol Industries manufactures 'polymer housed zinc oxide surge arresters,' to protect indoor and outdoor electrical equipment like; motors, generators, capacitors, furnaces, all types of transformers and all equipment in the switch-yards. The company has a well-equipped manufacturing and testing facility.

As per the manufacturer, its surge arresters are rugged and known for their reliability. These are manufactured on field proven design. All components used to manufacture these are of very high quality – and assured of lifelong operation with better protection. These can also be customised as per specifications.

MECOL INDUSTRIES
Tel.: +91 020 24482025
E-mail: mecol@ssmktg.com

Brake Motor

Avantha Group Company CG has released its new brake motor called 'Kibosh.' As per the manufacturer, its design is a performance-matched motor brake package utilising CG's proven motor technologies. 'Kibosh' is a power saver that comes with an enhanced liner life and ensures low heating of the brake thereby extending its life.

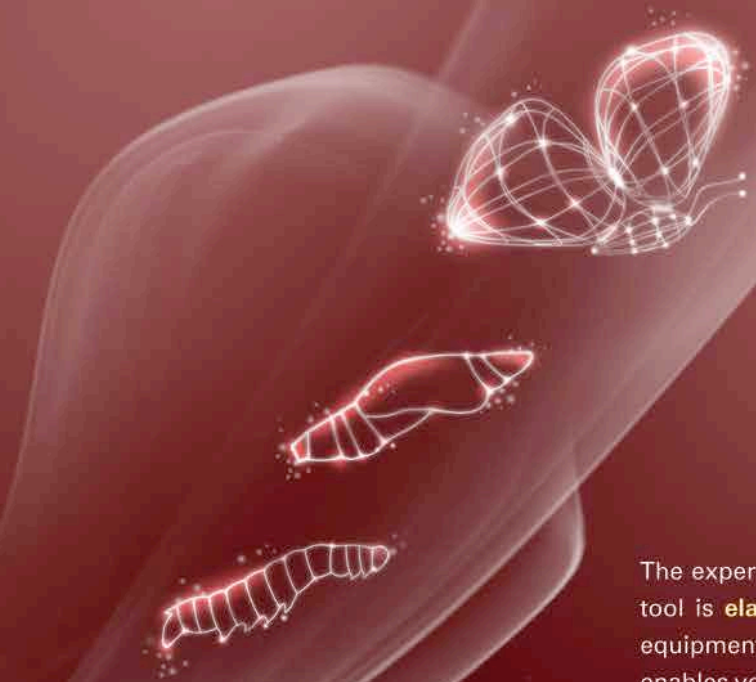
It is ideally suited for various braking applications like crane movement, hoists, rolling mills, windmills, elevators and other applications requiring frequent starting and stopping. Its ruggedly constructed cast iron or aluminium body is built to provide long life and quiet, trouble-free, safe operation. The brake interface is a combination of an AC induction motor and a disc type 'fail safe' electromagnetic brake unit, with an output ranging from 0.75 kW to 30 kW in frame sizes ND80 to ND200L.

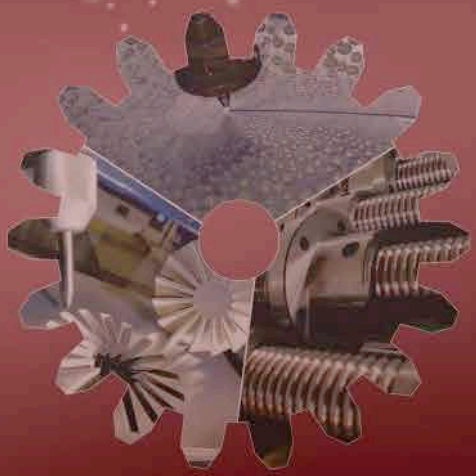
CG
Tel.: Tel : +91 11 23460700 - 999
Website: www.cgglobal.com

BUSINESS INDEX

OMRON

Transforming
Machine Tools through Automation





The expertise of **precision engineering** at Omron ensures that every machine tool is **elaborately & meticulously crafted,** required to design machine tool equipments of **cutting edge technology** and **stringent quality process,** which enables you to run your business effectively and efficiently transforming it from a mundane caterpillar to a flawless butterfly.

www.omron-ap.co.in

realizing

Over 300% growth in Asia Pacific and a mountain of success for Caterpillar.

Caterpillar, the world's largest manufacturer of construction and mining equipment, wanted to speed up production in order to meet the demand from China, India and other growth markets. We helped them develop common processes supported by a single ERP platform to simplify their business and position them for expansion. Since 2005, Caterpillar has grown its business in Asia Pacific by more than 300%. That's high performance, delivered.

High performance. Delivered.

accenture

consulting | technology | outsourcing

The world of synthetic lubricants just took three giant leaps forward.

Challenging times and changing technology call for forward-thinking solutions. That's why we've taken our proven Mobil SHC™ synthetic lubricants — the standard-setting oils and greases for more than 40 years — into the future, unleashing the next generation of productivity with three new advances. Each delivering overall balanced performance with substantial energy-efficiency benefits.

Mobil SHC 600 – The enhanced formulation improves viscosity and low-temperature properties as it delivers outstanding performance across a wide range of circulating and gear applications.

Mobil SHC Gear – This supreme gear oil was reengineered to deliver optimum equipment oil life in gearboxes, even under extreme conditions, with significant reduction in energy consumption.

Mobil SHC Gear OH – Our customized formulation for the Off-Highway sector features dependable technology with excellent low-temperature performance.

Discover the advanced technology of Mobil SHC. To see how four decades of synthetic innovation just jumped a generation ahead, visit **mobilindustrial.com**

Mobil SHC™

energy efficiency

Energy efficiency relates solely to the fluid performance when compared with conventional reference oils of the same viscosity grade in gear applications. The technology used allows up to 3.6% efficiency compared with the reference when tested in circulating and gear applications under controlled conditions. Efficiency improvements will vary based on operating conditions and applications.