

MANUFACTURING Matters

Managing Globally Competitive Manufacturing

Ananth. V. Iyer
DCMME Director



Recently, we were hosted by Tom McDuffee from St Gobain Glass and were taken on a tour of their glass bottle manufacturing plant in Dunkirk, Indiana. The plant has been in existence since 1889 and makes over 4 million bottles a day today. Yet a walk through the plant reveals very little direct labor involved in manufacturing once the molten glass is generated. Such automation is the key to providing consistent quality and reliability.

Many manufacturing units see their cost of material, cost of logistics, cost of coordination to be significantly larger than direct labor involved in the manufacturing. If a high level of automation is a necessary ingredient of reliable manufacturing, then will such a mix of labor and capital will be necessary for effective manufacturing anywhere in the world? Recent research that we have been involved in show similar cost composition patterns in auto components, pharmaceutical manufacturing etc. What then does it mean to be globally competitive in manufacturing?

The ideal manufacturing should generate customized solutions to problems while being cost effective. For a multinational with access to global markets, an important question concerns how to manage globally competitive manufacturing at every location. How do we create manufacturing plants whose personnel understand that there are other locations in the world that can provide not just cheap labor but more effective management of automation, easier implementation of engineering change orders, faster solution of customer problems through design changes, a process based approach to adjust input costs in response to global price changes or exchange rate shocks? What are the international benchmarks for such performance?

These and many other yet unasked questions provide a reason for the existence of DCMME and GSCMI at Krannert. We hope you enjoy this newsletter and consider contributing to it in the future. We look forward to an effective dialog between our students, faculty and alumni as we endeavor to understand how to manage globally competitive manufacturing. Please visit our website for continued updates regarding current articles, communicate with us regarding your opinions using the blogging facility or just call or email us with your suggestions. Contact details are provided at the end of this newsletter.

Thank you,

Ops Club Schedule

October 3	Mfg/SCM Leaders Speaker – Peerless Pump
October 13	DCMME Partners' Meeting Poster Competition
October 21	Internal Operations Case Competition
November 4	Overnight visit to American Axle Manufacturing
November	Target Distribution – Panel Discussion
November 11	KOC team at Carnegie Melon
November 18	Visit to Accenture RFID Labs, Chicago, IL

Save This Date!

February 17, 2006

**Spring Supply
Chain Management
Conference:**

"Coordinating the
Global Supply Chain."

Global Focus:

Eastern Europe's Black Markets Become Hotbeds for Hi-Tech Crime

September 28, 2005

Brent Horrocks

MBA Class of 2006

Krannert School of Management

Purdue University

Countries that used to be behind the Iron Curtain once had to rely on underground black markets in order to get the goods that their citizens desired. However, as Communism fell, Western goods that were once forbidden by the government have flooded into Eastern Europe rendering the former illegal imports obsolete. Now areas that were once a hotbed for black market commerce have turned to a new way of generating revenues: cyber crime.

Using everything from phishing schemes to online identity theft, cyber criminal gangs can steal from \$100,000 to \$300,000 per month. One group of

criminals operating out of Russia recently arrested by authorities in the United Kingdom allegedly defrauded three separate banks for over £350,000. As more and more business is conducted internationally, the security of financial transactions becomes increasingly important. While most cyber-crime is directed towards fraud, some hackers have been able to successfully infiltrate internal networks belonging to NASA, the US Navy and the US Army.

Researchers suggest that Eastern Europe's roots in subverting harsh Communist regimes have left a well organized network for committing crimes. In addition, during the height of the Soviet era, the KGB actively recruited hackers and scientists to work for the government. After the collapse of Communism, these hackers were left without official jobs and have turned to crime.

There are some organizations that are trying to combat cyber crime. Big software manufacturers like Microsoft have created a market where hackers can sell software bugs to the software developers for cash. Some companies have been critical of such efforts, saying that they encourage hackers, but others assert that hackers will find bugs and that purchasing the knowledge prevents it from being used in a criminal way. International governments are also beefing up cyber crime units and establishing cross-border task forces. However, officials say that the best ways of combating cyber crime are to report any suspicious activities to the proper authorities.

Sources:

<http://www.crime-research.org/analytics/Thompson/>
<http://www.computerweekly.com/Article128242.htm>



Executive Interview

Mr. Denny Warner

*Vice President of Customer Operations
Rolls-Royce Corporation*

"take something positive from criticism."

Denny Warner, a DCCME Partner, for the 1st Edition of Manufacturing Matters! Mr. Warner is a Purdue Alum with his Bachelor of Science in Aerospace Engineering and Masters of Science in Mechanical Engineering. He was with Allison Engine Company before it was purchased by Rolls-Royce in 1994. During this time, Mr. Warner has won the prestigious Collier Award twice. He is most proud of his 2001 Collier Award where he was recognized for his work on the lift-fan for the joint strike fighter.

How are things in the aerospace industry? According to Mr. Warner the industry has been far more competitive with fewer players over the last 10 years. "Rolls-Royce must remain strategically prepared to play in this environment." With the escalation of fuel prices, his current challenge involves working with a smaller budget with conflicting needs. As industry operating costs increase, Mr. Warner says it is important to reduce the unit cost of systems and to attack life cycle costs associated with the systems.

During his combined time of 36 years with Allison Engine Company & Rolls-Royce Corporation, Mr. Warner has gained a breadth of experience we can learn from. When partnering with

Lockheed on the lift-fan for the joint strike fighter, he and his team were on the radar as they were racing against Boeing to bring their unproven concept to the table. However, in the face of such challenging moments, Mr. Warner remained motivated because his "Team had a single focus... and they knew they would be successful." He also states that it is important to "take something positive from criticism." When asked about advice for Krannert students Mr. Warner stated "Stay humble and have realistic expectations. Go into the workforce with a realistic expectation that you are going to forge a career and not that you are going to change the way industry works overnight."

By **Rasheeda Washington**

Why aren't you thinking about the 4 billion BoP customers?

By **Amanda Thompson** DCMME Assistant Director

On August 30, 2005, Dr. C.K. Prahalad wrote in the *Wall Street Journal*, "On a purchasing power parity basis, just 10 countries — China, India, Brazil, Russia, Turkey, South Africa, Mexico, the Philippines, Indonesia and Thailand — represent a GDP of more than \$15 trillion. This is a market that cannot be ignored." This is largely the market he refers to as the Bottom of the Pyramid (BoP) or the 4 billion people, making up the vast majority of the world's population, who live on less \$2 a day. If what Prahalad argues is true, that this is the market that will drive the next wave of innovation of growth, what is your company doing to prepare?

On September 1, 2005, I sat in Mexico City listening intently to Dr. Prahalad's vision of a new approach to poverty alleviation: profit. In the *WSJ*, at the conference and in his book "The Fortune at the Bottom of the Pyramid" (Wharton School Publishing, 2005), the message is clear, through "breakthrough" innovation of product and process, large and small companies alike are finding a way to improve the quality of life of the world's poorest people while making a profit that even the most critical investor would enjoy.

While this prospect may seem far-fetched, Prahalad begins by challenging basic assumptions about the poor, he asserts that BoP consumers (a) do have purchasing power (b) can be accessed with creative distribution solutions (c) are brand-sensitive (d) are connected and readily accept advanced technology. Given that the BoP market exists, where should you start? Innovation!

Approaching the BoP market often includes an uncomfortable realization that the management team has no concept of the characteristics and product requirements of the new target market, but Prahalad offers several principles of innovation to guide the novice MNC, below is a sample of these recommendations.

(1) Forget the current price/performance curve, a "quantum jump" is required

(2) Don't try to apply current products or old technologies as a "stripped down version"

(3) Large and culturally diverse markets require scalable and robust applicability in order to gain the scale required

(4) Functionality of products must take precedence over form, understanding the inconsistency of infrastructure in which the BoP operates daily must shape design decisions

(5) Product innovation isn't enough, rather conceiving and executing creative processes for accessing, distributing, servicing and selling where infrastructure is not a given, must complement the product

(6) Design the product to endure in hostile environments with inconsistent access to power, sanitary water, or sewer.



While developing the capability to deliver to the BoP market presents what may seem like an expensive and risky endeavor, Prahalad argues that "Global firms increasingly realize that the bottom-of-

the-pyramid markets are a source of innovation in business models — potentially, even, of "breakthrough" innovation." Thus firms should consider the portfolio of incentives for entry into the BoP market. Some of the markets (China, India) are of a size that the attractiveness is evident, but often it is leveraging local innovations within other BoP markets can create the scale needed. However, Prahalad's most important message is that the BoP is where companies in the future will find their product and service inspirations and innovations as well as develop new and efficient processes, systems and even business models to serve both the BoP and the traditional markets. In the process, Prahalad envisions a transformation of the global wealth distribution from a pyramid, to an economic and socially stable diamond dominated by a strong middle class. Now that's a future we can all understand the need to strive for.

Prahalad, C.K. Aid is Not the Answer *WSJ* 08/31/05
Prahalad, C.K. The Fortune at the Bottom of the Pyramid; Wharton School Publishing, 2005.

BoP Successes

Brazil: Casas Bahia – New approach to financing allows BoP to buy big ticket items (Microwave, Refrigerator, Televisions)

Mexico: Cemex – Develops DIY construction materials product and credit plan to encourage BoP customers to improve and expand their homes

India: Unilever – Alleviated Immune Deficiency Disorder through design breakthrough that allows salt to maintain iodine levels in harsh environments at a price comparable to traditional iodized brands.

India: Unilever – Develops product, awareness and distribution campaign to reach BoP consumers with soap, an effective preventive of diarrhea, a serious condition in India

India: Jaipur Foot – Developed more functional prosthetic feet and a very efficient fitting procedure available at low or no charge to BoP amputees

India: Aravind Eye – Specialized doctors and surgical processes allow for low-cost, world-class eye-care

India: ICICI Bank – Create financially viable credit and savings products for BoP customers

India: ITC e-Choupal – Empowers rural farmers with market-price information and best practice

Peru: Voxiva – Enables pay phone to enable critical infectious disease reporting and response instruction.

Student Involvement Opportunity

The Global Supply Chain Management Initiative is looking to sponsor a student team to complete a project in a BoP market. The following project has been selected (<http://www.new-ventures.org/eec.html>): Proteak: This company is dedicated to commercial plantation of teak, a tropical wood highly valued by international markets. Based in the Mexican state of Nayarit, they are looking for a MBA team to research international markets for their products and identify appropriate channels for distribution.

Please contact

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if you are interested in joining this team.



Rolls-Royce Wins Stealth Contract

By Ghazi Slaem

Rolls-Royce and General Electric have been jointly awarded a \$2.47 billion contract to build engines for the F-35 Joint Strike Fighter (JSF) Program. The new aircraft is designed to replace the AV-8B Harrier, A-10, F-16 and F/A-18 Hornet among others and potential F-35 production may reach as many as 5000 to 6000 aircraft over the next 30 years.

The F136 engine for the JSF will primarily be made and assembled in the United States, with responsibility for 60 percent of the components built by GE and the remaining 40 percent by Rolls-Royce. The F136 engine is expected to flight test in 2010, with production deliveries available in 2012.

Rolls-Royce was founded in 1904 by Henry Royce and Charles Rolls with a stated mission to build the best car in the world. Since then the company has expanded operations to include aerospace, marine and energy services to its line of products. Annual sales total nearly \$10.6 billion. Rolls-Royce has operations in 120 countries and employs roughly 35,000 people, including 8,000 in North America alone.

SOURCES:

BBC NEWS - Online
Tuesday, 23 August 2005

Rolls-Royce - Online
Tuesday, 23 August 2005

Morningstar - Online
Tuesday, 23 August 2005

In the News:

DCMME Students working with NIPTE to increase efficiency and cost-effectiveness of drug development and production

By Charlie Kuo

Joint effort of multi-university research to help US remain global leader in pharmaceutical industry

WEST LAFAYETTE, IN - SEPTEMBER 14, 2005

PROJECT UPDATE

Alberto Gonzalez and Jonathan Wang, both second-year Purdue MBA students, are working with NIPTE and talents from other universities across the America to improve nation's pharmaceutical products development and manufacture. The project, which began in May, is focusing on solving two current major problems: Long new drug development cycle and costly drug manufacturing.

Many pharmaceutical companies lack an effective transfer process to turn their research results into mass production, which will potentially benefit millions of patients suffering from various diseases. Many will be surprised to learn that most companies nowadays simply duplicate their laboratory process in larger scales and use exactly the same process for mass production, therefore a more cost effective approach is desired.

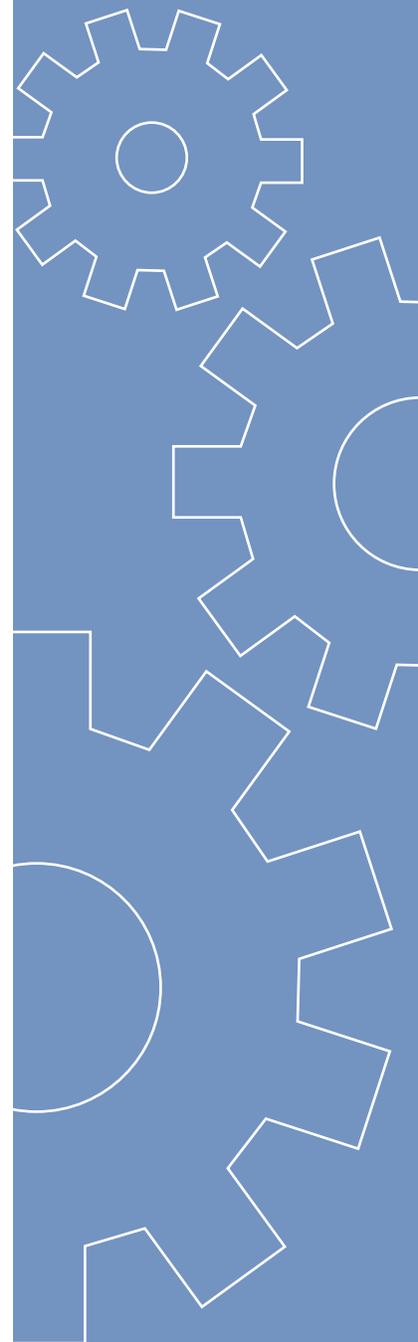
As Alberto and Jonathan have just completed data gathering stage and methodology definition, they will now proceed to analyze the data with predetermined criteria and

procedures. The biggest challenge they have encountered so far? "Problem statement took most of the time." said Jonathan. As comprehensive as the gathered data might be, some critical data could still be missing due to business-related issues such as patents and trade secrets. The real challenge lies in defining well-thought and accurate problem statements which are within logical and reasonable boundaries without complete data set.

The project is expected to yield preliminary results by end of the year.

About NIPTE

The National Institute for Pharmaceutical Technology and Education was founded to address the current challenges in pharmaceutical development and manufacturing through partnership with the FDA, the pharmaceutical industry and various higher education institutes. The goal is to leverage academic expertise to dramatically change the way in new drug research and productions.
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