MANUFACTURING INSIGHTS EXCERPT

Automotive Manufacturing: Critical IT Deployment Case Study — Maruti Udyog Limited

June 2007

Adapted from, "*Automotive Manufacturing: Critical IT Deployment Case Studies*," by Debashis Tarafdar and Ng Buck-Seng (Manufacturing Insights # AP664110P, May 2007)

In This Excerpt

This Manufacturing Insights Excerpt is taken from the Manufacturing Insights Customer Needs and Strategies study *Automotive Manufacturing: Critical IT Deployment Case Studies* (Manufacturing Insights # AP664110P, May 2007), by Debashis Tarafdar and Ng Buck-Seng. In this Excerpt, Manufacturing Insights presents a case study of critical IT deployment at Maruti Udyog Limited (India). It explores the business challenges and opportunities that the company faces, as well as the key business and IT priorities that are adopted to address them.

For this case study, a recent critical IT system/solution deployment was identified and profiled. The profile includes details regarding needs assessment, solution selection, implementation, and post-implementation phases of the deployment. Issues and challenges encountered, and the strategies used by IT and business executives to address them, are also covered. The case study concludes with a discussion of the outcome, lessons-learned, and best practices from the deployment. All or part of the following sections of the case study featuring Maruti Udyog Limited are included in this Excerpt: Manufacturing Insights Opinion, Situation Overview, Company Background, Future Outlook, Essential Guidance, and Methodology. Also included are Figure 1, Table 1, and Table 2.

Manufacturing Insights Opinion

Automotive manufacturing represents one of the key sectors of growth in Asia/Pacific in recent years, fueled by a surge in global demand, booming macroeconomic factors, increasingly affluent middle-class population, and low-cost manufacturing. However, both OEMs and component manufacturers in the automotive industry need a clearly defined strategy, to take advantage of this growth and maintain sustainable profitability. This study reveals the challenges that the automakers in Asia/Pacific are facing in highly competitive markets, and how they overcame several growth-inhibitors in their respective business segments with the help of critical IT solutions and streamlined processes. Typical challenges that Asia/Pacific automotive industry face are slow time to market, lack of innovation to satisfy sophisticated customers, inventory buildup and incorrect inventory mix in the distribution channels requiring additional sales incentives that erode margins, and long and inflexible lead time for parts, among others. Key findings from the study indicate that automotive OEMs and component manufacturers need to align demand and supply to gain customer loyalty by:

- Integrating business processes and management of information across the entire value chain to improve visibility, control, and business intelligence (BI)

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- Collaborating with dealers and suppliers through real-time systems to serve their customers better, and to minimize inventory and production cost
- Continuously innovating new products, with up-to-date information on customer preferences and buying behavior
- Investing in IT systems as a competitive tool, with strong management support and excellent project-execution capability.

Situation Overview

Introduction

Asia/Pacific manufacturers enter a new year with a mixed bag of prospects in the face of an upbeat economy and uncertainty in business due to a myriad of factors. Automotive manufacturers are not an exception. While the global demand for vehicles shows an upward trend, an increasing competition, and a price-sensitive market, sophisticated consumers demanding innovative features in every product present new challenges to every automaker in Asia/Pacific. In pursuit of building customer loyalty and increasing profitability, typical challenges that Asia/Pacific automotive industry faces are:

- Slow time to market, with inefficient response to customer preferences and buying behavior
- Lack of innovation to satisfy sophisticated customers due to insufficient customer knowledge and relationship management, thereby eroding customer loyalty and business growth
- Inventory buildup and incorrect inventory mix in the complex distribution channels requiring additional promotional efforts and sales incentives that shrink margins
- Long and inflexible lead time for parts, to support a traditional build-to-stock strategy, contributes to higher safety stock and often overcapacity at the production plants
- Disconnected value chains with little and no integration between demand and supply, resulting in poor planning and optimization

In addition, country-specific issues eliminate a one-size-fits-all approach to these problems. Coupled with this, internal and external pressures to deliver customer and shareholder value, requires every manufacturer in the automotive industry to relook at their business models and implement processes and systems to manage their operations in the most efficient way, and to ensure agility and profitability. This study deep-dives into the challenges faced by Maruti Udyog Limited, and how the company addressed these challenges in its respective business segments with the help of critical IT solutions and streamlined business processes.

Case Study: Maruti Udyog Limited

Company Background

Maruti Udyog Limited (MUL) was established in February 1981 through an Act of Parliament, to meet the growing demand of a personal mode of transport in India caused by the lack of an efficient public transport system. Suzuki Motor Company was chosen from seven prospective partners worldwide. This was due not only to their undisputed leadership in small cars but also to their commitment to actively bring to MUL contemporary technology and Japanese management. A license and a joint venture (JV) agreement were signed between the government of India and Suzuki Motor Company (now Suzuki Motor Corporation of Japan) in October 1982.

The objectives of MUL then were:

- Modernization of the India automobile industry
- Production of fuel-efficient vehicles to conserve scarce resources
- Production of large number of motor vehicles that was necessary for economic growth

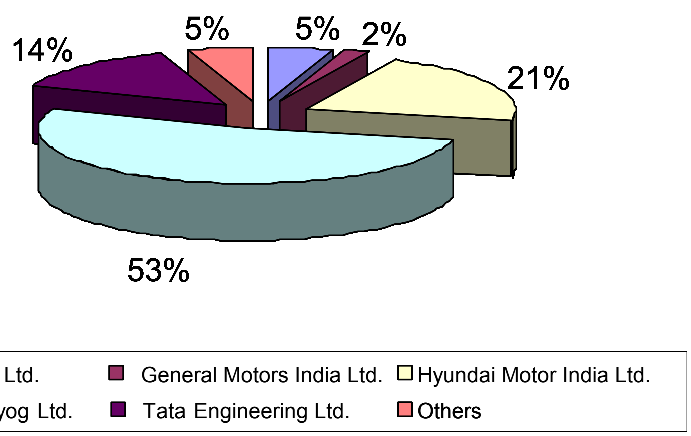
The company has an unwavering commitment to upholding sound corporate governance standards and highest business conduct. This is aptly reflected in its vision statement "The leader in the India automobile industry, creating customer delight and shareholder's wealth; A pride of India." Over time, MUL has been accredited with the creation of new segments in India and has been rated number 1 in customer satisfaction by JD Power for seven consecutive years.

The company has a wide geographical presence throughout the country with 16 regional sales offices. The company has its headquarter in New Delhi, with an existing production plant in Gurgaon, and inaugurated two new plants (a new assembly plant and an engine and transmission facility) in Manesar, Haryana in February 2007. The company's main line of business is production of passenger cars, multi-utility and utility vehicles. In addition, the company is involved in related lines of business including motor insurance and financing, spare parts, and accessories supply, fleet management, pre-owned cars, and driving school. The company is listed in both the National Stock Exchange of India (NSE: MARUTI) and the Bombay Stock Exchange.

MUL has been the leader of the India car market for about two decades now with more than 50% market share in the year 2004–2005 (See Figure 1). Its Gurgaon plant is spread over a sprawling 297 acres of land with three fully integrated production facilities. It rolled out more than 0.56 million vehicles last year. On the average, two vehicles roll out of its factory every minute and it takes just 14 hours to assemble a car. The company has just established two new plants in Manesar, Haryana — a car manufacturing plant and an engine and transmission facility. The new car manufacturing plant involves an investment of approximately US$340 million. The capacity of this new plant will initially be 100,000 cars per annum with scope to scale up to 300,000 cars per annum by 2010. The new engine and transmission facility will have a total plant capacity of 300,000 diesel engines per annum to be developed in phases. The initial annual capacity of this facility will be 100,000 diesel engines, 20,000 petrol engines, and 140,000 transmission assemblies. The total investment in this facility would be in the region of US$390 million. Both plants were inaugurated in February 2007.

FIGURE 1

Market Share of Maruti Udyog, 2004–2005



Source: Manufacturing Insights, 2006

MUL has a portfolio of 11 car brands, including Maruti 800, Omni, Zen (premium small car), Alto, WagonR, Gypsy, Esteem, Baleno (luxury car), Versa (multipurpose vehicle), Swift, and Grand Vitara XL7 (luxury sports utility vehicle). These 11 brands constitute 11 base platforms and give rise to 300 variants, and are exported to 100 destinations.

In recent years, MUL has made major strides toward its goal of becoming Suzuki Motor Corporation's research and development (R&D) hub in Asia. It has introduced upgraded versions of WagonR, Zen, and Esteem, all completely designed and styled in-house. MUL's contribution as an engine of growth for the India automotive industry, and its impact on the lifestyle and psyche of an entire generation of the India middle class, is widely acknowledged.

The company's service businesses include sales and purchases of pre-owned cars; lease and fleet management service for corporations; Maruti Insurance; and Maruti Finance. These businesses, rolled out several years ago, were aimed at enhancing customer satisfaction by providing all car-related services customers required under one roof. In addition to providing total mobility solutions to customers in a convenient and transparent manner, these initiatives have helped improve the financial health of dealerships.

MUL's healthy top-line growth, coupled with continuous improvements in operational efficiencies, has contributed to its strong financial performance for 2005–2006. The company sold 561,819 vehicles in the domestic and export markets in 2005–2006. Of this, the share from exports was approximately 6% of the total units. The gross sales revenue of the company for the year 2005–2006 was US$3.27 billion compared to US$2.95 billion in the previous year, showing an impressive growth of 10.6%.

The company profile of MUL is provided in Table 1.

Table 1

Maruti Udyog Company Profile

Corporate headquarters	11th Floor, Jeevan Prakash, 25, Kasturba Gandhi Marg, New Delhi, 110001, India
Local office address	Palam Gurgaon Road, Gurgaon, 122015, Haryana, India
Number of employees	3453
Revenue	US$3.27 billion (FY05–FY06)
Manufacturing subsegment	Automotive — passenger cars
Main business groupings	• Passenger cars • Multipurpose vehicles (MPVs) • Utility vehicles (UVs) • Car-related insurance • Car-related finance • Spares parts and accessories • Fleet management and pre-owned cars • Driving schools
Key manufacturing locations/facilities	• Existing facilities in Gurgaon, Haryana • Two new plants (a manufacturing and an engine and transmission plant) Manesar, Haryana (near Gurgaon)
Products	Maruti 800, Alto, Zen, Swift, Wagon-R, Esteem, Baleno, Omni, Versa, Gypsy, and Grand Vitara
Url	www.marutiudyog.com

Source: Manufacturing Insights, 2006

Problem/Opportunity Facing the Company

MUL is expecting a compound annual growth rate (CAGR) of 10–12% over the next three years in its industry. As part of its plans to meet this kind of growth, it augmented capacity at its Gurgaon plant with that of a new plant in Manesar, which was inaugurated in February 2007. Despite the generally positive economic and industry outlook in the short to medium term, the company is exposed to a variety of market and other risks including the effects of demand dynamics, commodity prices, product obsolescence, supply uncertainty, currency exchange rates, interest rates, as well as risks associated with financial issues, hazard events, and specific assets. In addition to mitigating a number of these risks through using the instrument of insurance, the company consciously addresses the more important business and operational risks through initiatives to meet its strategic business objectives that include:

- Managing growth
- Controlling costs
- Improving productivity levels
- Managing complexity and achieving flexibility in its operations
- Meeting the emerging technologically stringent quality standards and improving all-round quality and perception of quality
- Integrating and connecting its entire value ecosystem

For example, to improve productivity and better control costs, MUL has implemented the Maruti Production System (MPS) on the shop floor. Derived from Suzuki Production System, MPS enables a systematic way to identify and eliminate waste in operations such as unnecessary movement of people and materials, among others. The company has also worked with suppliers to increase productivity and reduce costs at their end. It extended and replicated the MPS to many of its suppliers, with total direct saving from various implemented projects accruing more than 2,500 man-hours per day by the end of 2004–2005.

When it comes to its operations and supply chain, MUL's key challenges include:

- Achieving a lean supply chain
- Managing continuous supply-demand matching and optimization
- Achieving efficient use of materials and other resources
- Managing demand and customer expectations
- Achieving complete supply chain visibility for all stakeholders, including MUL, suppliers, and dealers
- Enabling MUL, suppliers, and dealers to constantly adapt their strategies, processes and systems to meet dynamic market needs

Cost management, quality management, and customer/demand management continue to be priorities driving operational and supply chain improvement initiatives in the company. IT continues to be an integral part of MUL's business strategy and plays a crucial role in the company's quest to meet many of the challenges mentioned above.

MUL's key IT initiatives undertaken in recent periods, which support its key business objectives mentioned above, include:

- Implementation of Oracle E-Business Suite in the areas of finance, human resource and procurement

- Implementation of a new PLM system as the backbone for the company's product development processes
- Upgrading its system of ordering imported components supporting the old "complete knock-down (CKD) ordering process" to a more superior parts ordering system
- Introduction of a comprehensive warehouse management system (WMS) that better manages and streamlines imported components inventory within the factory
- Implementation of the E-Nagare system — an online system built in-house on Oracle technologies to schedule and order materials for just-in-time inventory
- Implementation of the new dealer management system (DMS) — a centrally hosted system connecting all dealers and providing important information on operations and performance to the dealer management

Besides focusing on initiatives that improve its internal operational efficiency, MUL's IT function has also looked to enhance the value across the supply chain. Both the E-Nagare scheduling system and the DMS are key initiatives that play major roles in improving visibility, efficiency and collaboration at the level of MUL's external supply chain. The E-Nagare scheduling system was implemented in 2003–2004. It is essentially a scheduling and automatic replenishment system that integrates with the company's production planning system for the daily, line production plan along with the model sequence on that line. As for the DMS, the following discussion will focus on the specifics of this project.

Background of the Dealer Management System Project

MUL has the largest dealership and service network in the Indian automotive industry, servicing more than five million customers. The network spreads across the country and encompasses over 750 retail sites (inclusive of service outlets) throughout 227 cities. MUL's sales and service network has been a source of competitive advantage, both for its size and quality. In recent years, the company has made focused efforts to improve the quality of the network. In addition to strategically expanding its dealership and service network to keep pace with its growth plans, MUL began to leverage IT to enable and support these critical portions of its business operations.

MUL began evaluating the "as-is" and "to-be" processes associated with managing their dealers as early as 2002. It started planning for a DMS in 2003. Through its DMS, the company wants to "provide a world-class standardized process for dealership management and bring about long-term value to the Maruti family (including the dealers and end customers)." In other words, the key objective of the DMS process blueprint is to streamline and standardize processes at all its dealerships in order to provide a uniform and enriching experience to end customers.

Before the implementation of DMS, MUL does not have an integrated and consistent means to collaborate and communicate with its large dealer base. While it depended heavily on the company's extranet and email system in working with dealers, inefficiencies arose due to non-standardized and inconsistent processes/systems, particularly at the dealers' end. All of these led to late, incomplete and "difficult to verify" information at the dealers' end of the operations.

As a result of the inconsistent and non-uniform processes and experiences across the entire dealership network, visibility in the distribution network was poor and customer satisfaction levels took a beating. The company looks to the new DMS to address many of these issues. With the DMS, MUL wants to:

- Have a consistent and standardized platform to support its dealership and service network
- Leverage the system's real-time capability for greater flexibility to respond to changes in industry/customer trends and requirements, and to increase customer satisfaction levels

- Achieve higher levels of productivity in its own and dealers' operations through more integrated process management and collaboration
- Improve visibility in the distribution network with better sharing of timely and accurate information to facilitate superior decision making

IT Solution and Selection Process

In 2002, MUL had enlisted Cap Gemini to study the existing ("as-is") processes at various dealerships across the country. Subsequently these processes were benchmarked and compared with best practices in the domain. The final outcome of the study was a "to-be" process blueprint for the dealers' end processes.

To IT-enable the "to-be" process blueprint, proposals were invited from leading solution vendors including Wipro, IBM, Oracle, Tata Consultancy Services (TCS), and HP. The major evaluation parameters to select the solution partner consisted of the following:

- Vendor's understanding of MUL's requirements with respect to their current setup, project objectives, and business needs and opportunities
- Capability of the vendor and its partners
- Functional fit with MUL's requirements in terms of various dealer end processes including presales, inquiry management, sales, service, inventory management, and customer relationship management (CRM)
- Compliance and completeness of proposal in terms of solution components that included technical architecture, applications, infrastructure and networking, among others
- Project management and change management approach and expertise
- Post-implementation support including helpdesk support, service level agreement (SLA), and training, among others

After a detailed evaluation of all vendors, MUL selected Wipro as its primary solution provider with overall responsibility for project management, development, and implementation of the DMS. Wipro fared well based on the evaluation criteria previously stated in this report, especially with respect to its understanding of MUL's requirements, completeness of proposal, post-implementation support, and project management methodology.

Implementation/Deployment

The DMS implementation kicked off in December 2003 and involved two key phases:

- **Phase I:** In this phase, MUL first implemented the system at a pilot site in Bangalore by September 2004. From the completion of the pilot up till March 2006, the system was rolled out to 250 dealership sites.
- **Phase II:** In this phase starting from March 2006, MUL planned to extend the coverage of the DMS to the remaining dealership sites (an additional 500 sites), bringing a total of 750 sites operational with the system.

The DMS is an application service provider–based (ASP-based) solution. The application supports all the dealer processes pertaining to different functional areas including presales, planning, sales, inventory management, service management, and financial management. Under the new system, the dealers' invoices are shared with MUL in real time through the extranet. The requirements of dealers are met on a first in, first out (FIFO) basis through the system, and proofs of delivery (POD) are sent back to MUL via the DMS, after the physical delivery of vehicles.

The system has a highly available, fault-tolerant architecture with the primary data center (PDC) located at Bangalore, India. Dealers connect to the PDC via leased line/very small aperture terminal (VSAT) with ISDN/dialup as backup. Dealers are routed to an alternative disaster recovery (DR) site if PDC is not available, and monitoring of the entire network is done from a centralized network operations center (NOC).

Table 2 shows the implementation details of the DMS project for MUL.

Table 2

Maruti Udyog Dealer Management System Project Implementation Details

Scope	• The project covers sales and value-added service processes at all dealership locations • This includes 750 sites with more than 5000 users of DMS
Implementation strategy/approach	The entire project was divided into two phases (with the initial pilot done at a Bangalore site). The implementation strategy was for: • Phase I: To bring and integrate the first 250 dealership sites under the system • Phase II: To bring and integrate the remaining (about 500) dealership sites under the system Wipro was the primary implementer for this ASP based solution. As part of the solution, dealers connect to the PDC located at Bangalore, through leased line/VSAT with ISDN/dialup as backup.
Timeline	Total project duration: approximately three years • Phase I: Project conceptualization started in December 2003. MUL extended this system to a single location in September 2004. By March 2006, MUL had extended this system to 250 dealer locations. • Phase II: By December 2006, MUL plans to extend coverage of the DMS to the remaining (500) dealers.
Resources and team structure	Internal: IT + business functions = 5 people (two from IT and three functional managers) External: Wipro project team = 70–80 people (including project manager)
Description of solution components and suppliers of the different components	• Hardware: Servers consist of primarily IBM hardware running Linux or AIX • Software: Multi-tier Oracle based applications running on Oracle 10g • Services: Wipro (primary implementer)
IT investment amount	Total investment: INR598.5 million (US$13.3 million). The hardware infrastructure accounted for approximately 50% of the total costs.

Source: Manufacturing Insights, 2006

Post Implementation: Review and Lessons Learned

Phase I of the project saw the successful completion of the DMS implementation at the pilot site in Bangalore, followed by a rollout of the system to a total of 250 dealership sites by March 2006. The project is technically uncompleted at this point, as rollout of the DMS continues at the remaining dealership sites up to the end of 2006. While it is still too early to talk about the longer-term benefits of the system, preliminary results at the time of this study look very positive. The key significant business benefits of the DMS to MUL, its dealers, and end customers are as follows:

1. MUL

- Allows for better and more centralized control of the prices of vehicle and spare parts, with lower levels of information discrepancies
- Allows for more accurate, timely, and transparent data acquisition from all dealership sites — enabling better feedback and quicker response to the market
- Provides a good mechanism to enforce and rollout policies, communications and best practices across the network
- Provides a wholesome view of a particular dealer at any point in time, in addition to views (such as customer base, vehicle histories, inventory statuses) across multiple dealers
- Enables online dealer business performance monitoring and management (including dealers' balanced scorecards). For instance some of the parameters which are monitored include:
  - Service load (labor per vehicle, spares per vehicle) which is now monitored because robust data is available from the dealer sites enabled by the DMS
  - Maruti genuine accessories (MGA) per user — if a dealer is recording more MGA and buying less from MUL, it needs to be checked. This helps to monitor buying of spare parts from MUL versus local buying
  - Enquiry conversion ratio — refers to how many enquiries for new cars are converted into actual sales
- Provides an integrated platform enabling more efficient product recalls
- Allows MUL to recommend dealers to access parts and accessories from nearby dealers, thereby satisfying market demand faster
- Provides customer profiling and market feedback to marketing and business planning, including retention and loyalty programs
- Enables online tracking of sales satisfaction index (SSI) and customer satisfaction index (CSI)

2. Dealers

- Provides an integrated platform that enables consistency and efficiency in various dealers' business processes
- Provides accurate and timely information that supports better local business decision-making
- Enables better joint (MUL and dealers) decision making, including problem resolutions through more effective collaboration
- Allows dealers to 'advertise' slow-moving inventory and provides opportunity to implement inventory risk pooling in the dealer network
- Allows easier MIS reporting across multiple sites

3. End Customers

- Increases customer satisfaction through better service quality and processes at dealers enabled by higher quality, more accurate and timely information through the system
- Improves the uniformity and quality of customer experience across the dealer network from better collaboration among dealers and between MUL and dealers
- Improves efficiency of sales (for example, through enhanced order status tracking) and after-sales support (for example, through enhanced service and warranty management processes)

The key lessons learned at the end of Phase I include the following:

- **Pay attention to change management.** Implementing a DMS is a complex undertaking as it involves managing expectations and changes not just within the "four walls" of MUL, but also at the level of its entire dealer network. The deployment of the DMS saw some resistance from the dealers initially, with a number of them showing concerns and apprehension over data privacy and the disruption the project would caused in their operations. Many of these issues were overcome through a mix of tighter communication, and widespread training and education programs organized by MUL and Wipro. In addition, proactive change management requires MUL to address the right structure, policy, processes, and performance measures with all entities affected by the change.

- **Make sure that there is good process ownership.** It is important for processes that cut across various functions or entities to have an identified process owner. In addition to helping define business requirements and craft "to-be" processes, the process owner needs to proactively preempt problems and play an active role in the resolution of issues.

- **Put in place a strong and effective project management team.** A project of this nature which spans the external value chain require strong project management to ensure optimal project planning and execution, as well as to minimize any adverse impact on the continuity of important business operations. An important point here is to ensure committed people with strong project and change management skills are enlisted as part of the core project team.

Future Outlook

The automotive industry in Asia/Pacific continues to experience challenges in an ever-changing market with supply and demand variability, rising costs, and from sophisticated customers with a taste for innovative products. While OEMs and component manufacturers are trying to maintain growth and profitability, attention to critical issues such as R&D, and collaboration with suppliers and dealers/customers will play an important role in their strategy. IT systems will continue to impact businesses more than ever, with the globalization of markets, the need for faster decision making, and the requirement for creating competitive advantage through technology and service innovation.

Manufacturing Insights believes that companies that have access to critical information about customers in a demand-based value chain, and can drive research and production using such information by aligning demand and supply collaboratively, will be ahead of the competition through improved customer loyalty and reduction in overall supply chain costs.

Essential Guidance

Actions to Consider

Automotive OEMs and component manufacturers should the following:

- Consider tight collaboration with dealers/customers and suppliers as a key element in the value chain that helps to reduce inventory and cost, and to better manage risk and capital deployed in the manufacturing facilities as well as in the channels.

- Streamline information availability and access across the value chain for collective decision making to create customer value through product and service differentiation with a strategic shift from build-to-stock to a build-to-order model.

- Implement IT systems only after identifying the gaps and re-engineering inefficient business processes. Top management support and a proper project ownership are the key success factors for such implementations.

Methodology

For this study, IDC Manufacturing Insights regional and country analysts interviewed senior IT executives of identified Asian-based automotive manufacturers who have overall responsibility or visibility of recent critical IT solutions deployment. The prospective companies were selected from industry players with significant manufacturing operations in India, the People's Republic of China (PRC), and Korea. The targeted automotive manufacturing segments include the OEMs (that produce motor vehicles and the bodies for trailers, trucks, buses, campers, motor homes, semitrailers, motorcycles, and/or bicycles) and automotive parts/accessories producers (that manufacture motor-vehicle parts and accessories; tires and inner tubes; engine parts such as carburetors, pistons, valves, and electrical equipment for internal combustion engines; automotive stamping firms; and vehicular lighting equipment).

The manufacturing companies were asked to identify a recent critical IT solution deployment and provide details on:

- Background of the company, industry, and project
- Need for the IT system/solution
- Solution and selection process
- Deployment/Implementation
- Results and lessons learned
