

MANUFACTURING INSIGHTS EXCERPT

Automotive Manufacturing: Critical IT Deployment Case Study — ChangAn Auto

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 ChangAn Auto Co. Ltd. (People's Republic of China). 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 ChangAn Auto Co. Ltd. are included in this Excerpt: Manufacturing Insights Opinion, Situation Overview, Company Background, Future Outlook, Essential Guidance, and Methodology. Also included are Table 7, and Table 8.

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)

- 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 ChangAn Auto Co. Ltd., 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: ChangAn Auto Co. Ltd.

Company Background

The history of ChangAn Auto Co. Ltd. can be traced back as early as 1862, when the original company, Shanghai Foreign Gun Bureau, was founded in Shanghai, and soon emerged to be the first industrial group in modern PRC. ChangAn entered the PRC's auto industry in 1957 and made the first jeep, called Yangtze River. It began a technical and commercial cooperation with Suzuki Company of Japan in 1984 and the two companies jointly produced ChangAn minicars and Jiangling engines. From then on, cars and engines steadily became the mainstays of ChangAn. ChangAn was officially renamed as ChangAn Auto Co. Ltd. in 1997, with its headquarters located in Chongqing.

ChangAn group has three production bases, one each in the southwest, east, and north of the PRC. It partnered with international auto leaders such as Ford, Mazda, and Suzuki, and established several joint ventures in the PRC. They are ChangAn Suzuki Auto Corp. in 1993, ChangAn Ford Auto Corp. in 2001 and ChangAn Ford Nanjing Corp. in 2004. Since the establishment of ChangAn group, its production and sales of cars have been increasing at an impressive rate of 30% annually and hit 630,000 cars in 2005. The brand value of ChangAn rose to RMB 10.0 billion in 2005 from 2.5 billion in 1998.

ChangAn group has 28,000 working staff including a thousand scientific and technical personnel and has also set up auto engineering research institutes with branches in Italy, Germany, Shanghai (PRC) and Chongqing (PRC). It operates 11 car-manufacturing factories and has an extensive lineup of models including low-, middle- and high-class passenger and commercial vehicles. ChangAn also attaches great importance to safety and quality and it is the first company to enforce crash regulations for minicars in the PRC.

ChangAn group adheres to a goal of fuel efficiency, environmental protection, and functionality in making cars. Its guideline is to continue mini car production, develop sedans, expand commercial car lines and enter the service market. The key values of ChangAn are to offer the best choice for customers, maximum dividends for shareholders, and most returns for its employees. ChangAn strives to become a world-class group in a very short term.

The company profile of ChangAn is provided in Table 7.

TABLE 7

ChangAn Auto Company Profile

Corporate headquarters	Chongqing
Local office address	No.260, Jianxin DongLu, Jiangbei District Chongqing, PRC, 400023
Number of employees	28,000
Revenue	US\$3.88 billion
Manufacturing subsegment	Complete car, assembly and component
Main business groupings	Complete car and engine manufacturing
Key manufacturing locations/facilities	15 Whole car and assembly factories in Chongqing, Jiangxi, Jiangsu and Hebei
Products	Ford Mondeo, Ford Fiesta, SUZUKI Gazelle OK, SUZUKI Happy Prince, SUZUKI City Baby, Chinese Dragon, Chinese Sturgeon, CM8, Raimondi, SC6360, SC6391 City Rainbow, SC6372 Series, SC6350C, SC6371 Sports Series, Landwind SUV, LandWind Two-door Off-road, Police Vehicle, Ambulance, Post Vehicle, Passenger Transport Series, Public Transport Series, Truck, Van, Light Truck, etc.
URL	www.changan.com.cn

Source: Manufacturing Insights, 2006

Problem/Opportunity Facing the Company

ChangAn faced several challenges in its business operations, that was impacting its management control and growth potential:

- Difficulty in managing finance, manufacturing, and sales due to inefficient and disparate systems

- Difficulty in optimizing production due to poor communication and collaboration capability between its front end and back-office systems
- Not sensitive enough to the market change due to lack of innovation in design and production
- No effective budget management and budget control
- Inefficient systems necessitating day-to-day fire fighting, with little or no time for enterprise management and operational control
- Difficulty in controlling capital dispersed among the channels

To take control of the situation and manage the diverse enterprise (10 whole car factories, two assembly factories, 29 province-level sales companies, 160 direct-sales companies, 1000 dealers, 800 after-sales service providers, etc.), ChangAn group implemented 38 different IT application systems in all such as financial management system, manufacturing resource planning (MRP), JIT, etc., before 2001. But there were still significant challenges that ChangAn had to live with:

- Poor integration among disparate systems
- Ineffective standard code application
- Difficult to upgrade systems
- Inadequate system security

ChangAn looked at its overall business objectives and formulated strategies to remove bottlenecks from existing systems, at the same time strived to create a comprehensive information systems platform to support its management and operations for growth. In achieving this goal, the key building blocks as identified by ChangAn were:

- Update its research and development (R&D) system and processes to strengthen both product and technical innovation
- Enhance supply chain management systems to enable information availability for better customer service
- Consolidate sales and marketing management
- Increase export to fuel growth
- Consummate financial supporting system for better management of capital

To meet these business objectives, and achieve profitable growth and high productivity across the entire enterprise value chain, ChangAn group started to deploy Oracle 11i E-Business Suite from 2001 and PTC Windchill from 2005.

- **Oracle 11i:** The E-Business suite included ERP, SCM, CRM, human resource management system (HRMS), and E-Business modules, among others. The specific implementation processes and benefits are described in the next section.
- **PTC Windchill:** This product data management (PDM) solution covered both whole car manufacturing and assembly, to help cost reduction, shorten R&D cycle, and enhance the efficiency of data availability and transmission.

Besides these enterprise solutions, the ChangAn group also started to set up a centralized stock management platform, in order to efficiently manage resources, suppliers, and products through a centralized model.

IT Solution and Selection Process

ChangAn's strategy for the implementation was to take a cautious, step-by-step approach, ensuring success and realizing value incrementally. It worked out a detailed IT master plan, and followed up with a phased implementation approach. The plan consisted of pilot stages, and business process reengineering before embarking on a full-blown business system implementation.

Specific deployment timelines and milestones were as follows:

- **December 2001:** ERP project implement kickoff
- **October 2002:** Headquarters' finance, sales, and whole car manufacturing systems went live together
- **May 2003:** ChangAn's import and export company's financial system went live
- **June 2003:** Manufacturing system at ChangAn's assembly facilities went live
- **December 2003:** CRM system and Hebei ChangAn's sales system went live
- **January 2004:** Budget control and analysis system went live
- **January 2004 to November 2004:** The distribution management system in 29 cities went live including those at Zhejiang, Henan, Shanghai, and Jiangsu
- **May 2004:** Nanjing ChangAn's sales system went live
- **July 2004:** Manufacturing systems at ChangAn's five whole car-manufacturing facilities and group financial system went live
- **August 2004:** Supplier collaboration platform and quality tracking and alert management system went live
- **October 2004:** Maintenance management system went live
- **August 2005:** Hebei ChangAn's manufacturing and financial systems went live
- **October 2005:** Nanjing facility's ERP system went live

While major revamp of key operational systems were being done, ChangAn group also continued to explore new operational models using IT systems. These initiatives include:

- Centralized management and control of group financial model through a "shared service center"
- Centralized stock management through estock platform
- Channel reform using extensive sales and marketing network and business-to-business (B2B) ebusiness

Implementation/Deployment

Table 8 shows details of ERP implementation/deployment.

TABLE 8

ChangAn Auto Enterprise Resource Planning Project Implementation Details

Scope	<p>Functions: Entire enterprise value chain including research, design, source, make, market, sell, and service.</p> <p>Geographies: The whole car manufacturing and sales companies all over the PRC.</p>
Implementation strategy/approach	Preparation of detailed IT master plan, followed by a phased implementation approach. The plan consisted of pilot stages, and business process reengineering before embarking on a full-blown business system implementation.
Timeline	Project duration: Started in 2001, and completed all the phases in 2005.
Resources and team structure	Led by both business and IT departments. Total number of staff involved: 70–80.
Description of solution components and suppliers of the different components	<p>Consulting + Software + Services: Oracle</p> <p>Number of consultants involved: 7</p>
IT Investment amount	<p>Total amount: US\$4.9 million.</p> <p>Hardware: Software: Services: 5:4:1.</p>

Source: Manufacturing Insights, 2006

Post Implementation: Review and Lessons Learned

Outcome and Lessons-Learned

ChangAn's direct tangible benefits as a result of the IT implementations were multifold:

- The economic benefit brought about by eliminating multiple disparate systems and streamlining operations through a standardized ERP platform in 2003 was RMB189 million (US\$24.5 million), and the benefit realized through cost savings and productivity improvements was in the range of RMB180–210 million (US\$23.3–27.2 million)
- The project payback period was about four and a half months
- ROI during the period 2003–2005 was 664%
- ChangAn enhanced its operational efficiency; improved its quality control processes; accelerated the introduction of new products
- Empowered the management to make timelier decisions and implement strategies based on consistent financial data
- The accounts receivables in 2003 was reduced from 11.14% to 8.8% of sales, and reached 5.2% in 2005

Other benefits realized by ChangAn were through:

- Innovation of management model, with efficient financial management as the core
- Logistics reform — inducted the third-party logistics model to outsource noncore activities
- Implementation of intelligent decision model that used up-to-date information from transactional systems to make better and informed decisions
- Transformation of product development model — synchronous collaborative design across Chongqing, Shanghai, and Italia

Lessons Learned

- Conceptualization of an elaborate IT master plan before implementation is a key success factor
- Top management support, and not just that of the IT department, is essential for the success of an ERP project, particularly if the project scope spans multiple business units
- Strong project management is one of the most important factors contributing to the timeliness and success of the project
- Standardization of software, hardware, and network platforms lowers total cost of ownership (TCO)
- A strict control over procedures to troubleshoot and resolve issues during the implementation phase is essential

Best Practices

- **Management innovation:** Outdated management models and business processes need to be changed.
- **Technology innovation:** Implementation of a service oriented architecture for a real-time, agile enterprise.
- **Business innovation:** Business-driven enterprise with IT as a key enabler.

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

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