ENTERPRISE RESOURCE PLANNING (ERP) – AN INSTRUMENT FOR CONTINUOUS PRODUCTION IN AUTOMOBILE SUPPLY CHAIN MANAGEMENT

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Abstract

In this fast and ever growing automobile companies are striving hard to maintain their market shares in this highly competitive environment. There is high demand on the firms to process the orders faster and provide customers with better information on order status and simultaneously manage compliance with legal and regulatory requirement. To achieve this companies are trying to adapt to novel management tools which are capable of assimilating real-time information flows across supply-chain touch points with ease. But manufacturers are facing serious technical challenges in terms of process and data flows - especially when it comes to integrating the information of systems controlling individual customer, supplier and production functions. To resolve this integration challenge, enterprise resource planning (ERP)- software programs provides the answer by coordinating information in every area of business by using shared management reporting tools and a common database as a means of gaining all that important "single version of the truth". Enterprise Resource Planning (ERP) as a supply chain management tool allows customizable web services to make it simple and quick to connect with suppliers, logistics providers and customers and enable seamless real-time data exchange and process sharing. In this article, I have put on effort to give a brief overview of ERP systems and highlighted its implications on Supply Chain Management.

Keywords: Real-time information, Enterprise Resource Planning, Supply Chain Management.

1. Introduction

Enterprise Resource Planning (ERP)

Enterprise Resource Planning (ERP) programs are core software programs used by companies to relate information in every business area. ERP (pronounced “E-R-P”) programs help to manage all the business processes within a company, using a common database and shared management reporting tools. ERP software supports the efficient operation of business processes by integrating throughout the business tasks related to sales, marketing, manufacturing, logistics, accounting, and staffing and helps in optimization of overall organization that includes sharing and exchange of information from a common database. Simple example like processing and

tracking of customer orders in different departments is difficult at times. But with ERP any department can track the status of customer's order through central database.

Rationale for ERP systems introduction

Historically, the functional areas of the industries maintained independent information systems. Systems were not designed to interface with one another and exchange of information was mostly paper based which led ineffective management and decision making. This triggered the need for the introduction of ERP systems, which allows a company to unite its information handling.

Evolution of ERP software

In 1970s- Materials Requirement Planning (MRP) was designed to assist the manufacturing process, which focused on resources needed to accomplish scheduled production and time of their requirement.

In 1980s-Materials Requirement Planning (MRP II) was designed, which expanded the approach to production planning by incorporating non production data from marketing and finance (What should be made?). In 1990s -Enterprise Resource Planning (ERP) expanded the concepts of MRP II to all the business functions i.e integrated planning focus (how best we can operate).

Effect of ERP on functional areas of an organization

The functional areas of operation of an industry are: Marketing and Sales, Supply Chain Management (SCM), Accounting and Finance (A/F), and Human Resources (HR), Before the introduction of ERP all the functional areas of an industry worked individually with unintegrated information systems that supported only the activities of individual business functional areas, which posed a problem in sharing real time information between various departments which ultimately resulted in unnecessary time delay in achieving company's goals. But the introduction of ERP software allowed the company to unite its information handling and thus promoting efficient operation and decision making.

Introduction to Automobile Industry in India.

Demographically and economically, India's automotive industry is well-positioned for growth, servicing both domestic demand and, increasingly, export opportunities. A predicted increase in India's working-age population is likely to help stimulate the burgeoning market for private vehicles. Rising prosperity, easier access to finance and increasing affordability is expected to see four-wheelers gaining volumes, although two wheelers will remain the primary choice for the majority of purchasers, buoyed by greater appetite from rural areas, the youth market and women.

Domestically, some consolidation or alliances might be expected, driven by the need for access to better technology, manufacturing facilities, service and distribution networks. The components sector is in a strong position to cash-in on India's cost-effectiveness, profitability and globally-recognized engineering capabilities. As the benefits of collaborations become more

apparent, super-specialists may emerge in which the automobile is treated as a system, with each specialist focusing on a sub-system, akin to the IT industry. Though this approach is radical, it could prove an important step in reducing complexity and investment requirements, while promoting standardization and meeting customer demands.

Manufacturers are already planning for the future: early advocates of technological and distribution alliances have yielded generally positive results, enabling domestic OEMs to access global technology and experience, and permitting them to grow their ranges with fewer financial risks.

This exciting outlook for the industry is set against a backdrop of two potentially game-changing transportation trends – the gradual legislative move towards greener, gas-based public transport vehicles, and a greater requirement for urban mass mobility schemes to service rapidly-expanding cities.

Green Revolution: In a price-conscious economy such as India's, the shift towards green vehicles will be slow unless spurred by government mandates. Although the major players are already equipped with the necessary capabilities to develop cleaner vehicles, they do not see much merit in commercializing these technologies until the green revolution gains momentum – most likely through changes in political legislation – and it achieves the market scale required for commercial viability.

Manufacturers are placing greater faith in dual-fuel technologies than in battery-powered alternatives because the necessary support infrastructure, such as recharge stations, is not yet in place for the widespread adoption of the latter. The launch of electric motorcycles could have a significant impact on the market, given that motorcycles account for the majority of two-wheeler sales in India.

Manufacturers of four-wheelers and commercial vehicles in particular stress the importance of optimizing conventional combustion engines before experimenting too radically with costly new technologies.

Mobility Revolution: Use of public transport in India has waned as private vehicle ownership has boomed, but increasing strain on the road infrastructure in major cities means public investment is likely in Urban Mass Mobility Schemes such as metro systems and buses. The automotive industry is unlikely to lose much of its customer base in the near-term, even as these schemes become more prevalent, because the socio-economic statement of car ownership will continue to make private vehicles desirable.

At present there is a lack of clarity in the automotive industry over the role it will play in any mobility revolution. Although some industry experts believe the impact of the mobility revolution will be minimal in the short-term, there may be opportunities for manufacturers to become involved with the public sector in areas such as improving links between different modes of transport.

2. Objectives of the study

1. To study the importance ERP in automobile industry in India.
2. To study the importance of Supply chain Management in Automobile Industry
3. To study the functions of Supply Chain Management in ERP
4. To study the modules of SCM in ERP

3. THEORETICAL FRAMEWORK OF ERP - SCM

Supply chain management (SCM)

Supply chain management (SCM) is the oversight of information, finances and materials, as they move in a process from various parties within a supply chain like supplier to manufacturer to wholesaler to retailer and finally to consumer. The main role of Supply chain management includes integrating and coordinating these flows among and within companies. The ultimate goal of any effective supply chain management system is to reduce inventory. Supply chain management flows can be divided into three main flows:

- The product flow- which includes the movement of goods from a supplier to a customer, as well as any returns from the customer.
- The information flow- revolves mainly around receiving and dispatching orders and updating the delivery status.
- The finances flow-The financial flow consists of payment schedules, consignment and title ownership arrangements and credit terms.

SCM Software can be classified into two types:

- Planning applications – which use advanced algorithms to determine the best way to fill an order.
- Execution applications- Execution applications track the physical status of goods, the management of materials, and financial information involving all parties.

What can ERP do for the supply chain management?

Earlier, the software vendors tried to fit a single ERP solution for diverse industry verticals, which resulted in shortfalls in the levels of support needed for industry terminologies and industry-specific complexities in the manufacturing operations. Today's next generation out-of-the-box, supply-chain-management-specific ERP solutions effectively streamline and automate the business processes across the supply chain. Apart from delivering all that important data unity within the enterprise, today's ERP solutions use customizable Web services to make it simple and quick to connect with suppliers, logistics providers and customers and enable seamless real-time data exchange and process sharing. ERP employs proven business

processes for decision making and provides high degrees of cross functional integration among sales, marketing, manufacturing operations, financial accounting, logistics, new product development, Supply chain management, Customer relationship management and human resources Powerful inventory management tools help to improve forecasting and planning, so supply and inventory levels can be fine-tuned to customer demand.

Key elements to SCM

SCM covers the design, planning, execution, control and monitoring of all activities regarding supply with the objective of creating building a competitive infrastructure, net value, giving strategic advantage over worldwide logistics, creating an equilibrium between demand and supply while measuring performance globally. A SCM system provides real-time visibility into operations integrates these activities through improved supply chain relationships, to achieve a sustainable competitive advantage. Below are the four key elements to Supply Chain Management.

1. **Supply Chain Planning:** Here we determine a set of procedures and policies that influence the supply chain. Planning includes the promotions, determination of marketing channels, stock and replenishment policies and production policies respective quantities and timing,. Planning involves establishing the parameters for the successful operation of supply chain.
2. **Supply Chain Execution:** Execution-oriented software applications are used for effective procurement and supply of goods and services across a supply chain. It includes manufacturing warehouse and transportation execution systems, and systems providing visibility across the supply chain.
3. **Supply Chain Monitoring:** The ability to review supply chain activities in real-time, whether to identify the current status of individual activities or review overall performance.
4. **Supply Chain Measurement:** Measurement is comparison of the actual activity against targets. This is often used with scorecards of benchmarks so that unusual or undesirable variances can be identified and investigated.

Supply chain management modules

Supply chain management systems can be used by the manufacturers throughout the entire production process. The modules include:

I. Supply chain planning system

A successful manufacturing SCM strategy starts with supply chain planning software. Having the right supply chain planning software can help in building a strategy for demand management and production process planning. Supply chain planning software can keep up with changes in manufacturing and help in adjusting daily or weekly schedules.

II. Supply chain execution software

Supply chain execution software helps run day-to-day manufacturing operations. Supply chain execution software when combined with planning software, helps in management of the supply chain, from production to shipping.

III. Supply chain visibility system

To stay ahead of problems and changes in the supply chain, manufacturers rely on supply chain visibility software. Supply chain visibility reduces supply chain risk by helping companies in meeting critical manufacturing objectives such as quarterly revenue, on-time delivery and production goals. It can also help manufacturers in meeting global compliance regulations.

IV. Supply chain inventory management system

SCM inventory management software extends beyond tracking of orders, materials and finished goods. It can also optimize inventory levels and locations and tap into demand data to improve forecasts. Inventory management modules generally come in two types of suites -- inventory planning software and inventory optimization software.

V. Supply value chain system

All the factors that add value to a product comprise the value chain, Services on or related to the product like designing, manufacturing and procurement are included in it. Demand and supply sides of supply chain are brought together by software along with planning.

VI. SCM transportation and logistics management system

SCM transportation and logistics management software helps manufacturers in navigating global supply chains. In addition to this, it also helps users to discover unnecessary charges with a freight payment audit and duplicate invoices. Software as a Service (SaaS) are being added by vendors which helps in making these modules simpler and more affordable

VII. Supply chain network design system

It helps the manufacturers in locating and analyzing their customers, suppliers and transportation options using this software. It can be primarily put to use to create a business map of a company's global supply chain network. Network design functionality helps in optimization of supply chain by pinpointing the location of suppliers and customers and also identifying where major transportation lanes are located.

VIII. Supply chain event management system

With supply chain event management software, manufacturers are able to identify and react quickly to changes in the supply chain. Adapting to unexpected supply chain events is critical to survival in global markets. If a supply chain event doesn't happen on schedule-say a shipment doesn't make its destination, it can affect the manufacturing process in small and large ways, including actually stopping production.

IX. SCM proof of delivery system

Guaranteeing that products reach the right customers is a critical need for all manufacturers. SCM proof of delivery software helps manufacturers meet this need from the delivery of final products through customer payment collection. Shipping confirmations, automated customer payments and optimized shipping routes are just a few of the benefits of proof of delivery modules.

X. Supply chain forecasting system

Supply chain forecasting software is another important SCM module. With it, manufacturers can use algorithms to create a forward demand plan. SCM forecasting software also gives a company a view of possible scenarios and provides options for handling specific situations and resulting outcomes. Forecast planning is typically bundled in with other capabilities, often in a demand planning system

XI. SCM asset management system

SCM asset management software helps manufacturers keep track of physical pieces of equipment inside manufacturing facilities. It is even more powerful when combined with other types of asset management software, such as mobile asset management, used for tracking shipping containers and boxes, and enterprise asset management, used for tracking capital assets

XII. Supply chain reporting system

Manufacturers can use supply chain reporting software to create an in-depth analysis of their companies. This module looks at a manufacturer's supply chain history and estimates future production needs. A manufacturer might look at cutting back production, or eliminating a particular supplier, and use the software to measure impact. Integration with business intelligence data creates an even more comprehensive picture.

Parameters for successful SCM implementations

The primary goal of any supply chain is to satisfy customer needs and generate profits. Supply chain activities begin with a customer order and end when a satisfied customer has paid for the purchase (sales order fulfillment, order-to-cash, etc). Profit is created when the customer pays more than the cost of satisfying the customer’s needs. SCM, as with any other enterprise-wide software system, can be successfully implemented when the following are in place:

1. A clearly defined process-flow chart of the organization specifying who the owners in each functional area.
2. Commitment to the project from management to ensure the rest of the organization, and especially users, will make this happen.
3. An understanding of the financial aspect and expected return on investment for the project.
4. A good understanding of what resources are required, in terms of infrastructure, to see the project through

Implementation of ERP as Supply Chain Management tool

1. **Process preparation**

Through analysis of the existing business processes in the company is required before implementation of ERP. Poor understanding of the business process lead to failure of ERP projects. The prior analysis helps the company to identify the opportunities for process improvement and optimization.

2. **Configuration**

It depends on the company how to customize according to their needs. ERP system has got many changeable parameters that can be altered based on the company's requirements.

3. **Customization**

ERP vendors offer some customer configuration options that will allow the company to incorporate their own rules.

4. **Data migration**

It is the process of copying and restructuring of data from the existing system to the ERP database. Data migration is critical step in successful implementation of ERP hence it is done with significant planning.

Steps involved in data migration:

- Identify the data to be migrated
- Determine the time required for data migration
- Generating data templates
- Defining data archiving policies and procedures

Integrating SCM and ERP systems

The integration of ERP and SCM systems is always easier with the following considerations:

Business priorities: is it ERP first or SCM? In most cases, ERP starts with financials and corporate workflow, and companies build on from here.

Technology issues: if the ERP and SCM systems are on similar technology platforms, integration is simpler to execute, decreasing time to ROI.

Cost of implementation: a company must consider and evaluate the cost impact of both systems being integrated, or if the software only allows data transfer.

Total cost of ownership: can there be cost savings if both systems processes can be merged, therefore reducing the points of data capture, and integration of data and user interfaces can be enhanced.

Benefits of an integrated system

There are many success stories and unfortunately much-hyped failures as well. However, if most projects follow some simple guidelines, companies can increase the chance of success, deliver on time, and proudly involve the

relevant group of users who utilize the system to maximum gain. Some benefits to look forward to include:

1. Improved efficiencies, lower costs and improve productivity
2. Ability to provide better services to customers, and therefore increase customer retention
3. Increased ability to manage resources through a streamlined process, and in some cases, an automated workflow.
4. Leveraging IT to enhance the speed of tasks and increase production
5. Ability to cope with business changes in the future and to adapt to changing rules and regulation, therefore enabling the organization to compete more effective.

ERP Modeling Framework

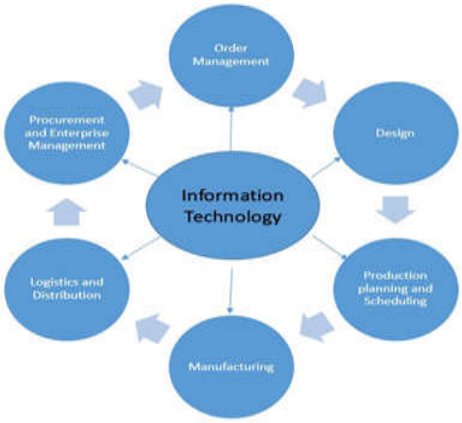

Table 1: The business functions of an organization

Functional areas of operation	Marketing and Sales	Supply Chain Management	Accounting and Finance	Human Resources
BUSINESS FUNCTIONS	Marketing of a product	Purchasing goods and raw materials	Financial accounting of payments from customers and to suppliers	Recruitment and Training
	Taking sales order	Receiving goods and raw materials	Cost allocation and control	Training
	Customer support	Transportation and logistics	Planning and budgeting	Payroll

	Customer relationship management	Scheduling production runs	Cash flow management	Benefits
	Sales Forecasting	Manufacturing goods		Government Compliance
	Advertising	Plant maintenance		

CONCLUSION

- An ERP system can improve the efficiency of production and purchasing processes. A production plan is created based on the forecast and shared with Purchasing so that raw materials can be ordered properly.
- Companies can do production planning without an ERP system, but an ERP system that contains materials requirements planning allows Production to be linked to Purchasing and Accounting. This data sharing increases a company's overall efficiency.
- Now a day's company are building on their ERP systems and integrated systems philosophy to practice supply chain management (SCM), a strategy by which a company looks at itself as part of a larger process that includes customers and suppliers. Using information more efficiently along the entire chain can result in significant cost savings. Because of the complexity of the global supply chain, developing a planning system that effectively coordinates information technology and people is a considerable challenge.
- The market for greener vehicles opens up a whole new world of possibilities for Indian companies, even outside the automobile sector (such as leaders in renewable energy), to make a global foray
- A greater focus on export opportunities could tap into a worldwide market hungry for green technology, which India can provide cost-effectively and to global standards. Business models of global green vehicle manufacturers should be examined to see how mass market penetration can be enhanced
- Collaboration is likely to be the theme for the next decade as new markets and products are created by companies forging previously unimagined partnerships. Companies will need to think beyond existing business models.
- Concentrations of resources and technical ingenuities may be vital to generate workable economies of scale. There may be merit in greater specializations, such as that witnessed in the IT industry, to simplify processes and reduce investment need
- Across all vehicle types, under-served demographics such as young people, women and rural customers could be targeted by making greater overtures to these markets and by improving distribution networks

- Better links should be forged with support industries such as battery manufacturers to help drive down costs of making and maintaining green vehicles

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