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**"SAP IMPLEMENTATION: CHALLENGES AND
OPPORTUNITIES OF OPERATIONAL
IMPROVEMENTS IN AUTO COMP INDUSTRY"**

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"SAP Implementation: Challenges and Opportunities of Operational Improvements in Auto Comp Industry"

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Abstract – Indian small and medium auto comp industry segment have high growth potential because of increasing demands in automotive. However, the industry is facing a tremendous cost pressure because of competition within domestic market and because of the overseas low cost suppliers. Industry is continually struggling to excel in operational performance so as to keep the cost at minimal level. In this pursuit, SAP is very useful ERP application which can help achieving required integration within business processes, provide reports and dashboards to measure key performance indicators and thus achieving the operation excellence. This in turn results into overall improvements and reduction in cost overheads. The paper discusses the opportunities created by SAP implementation to meet the operational challenges in automotive industry.

1. INTRODUCTION

With the awake of globalization, Indian Automotive industry has shown a significant growth. As a result of which Indian auto component manufacturing industry also has shown a proportionate growth. At the same time the auto comp industry started facing challenges of new era. With globalization, the multinational companies also entered into the Indian market. The larger manufacturing companies in auto comp segment could adapt very easily to the challenges after tie ups with global houses. On the other hand, small and medium companies especially located at the remote places in India like Aurangabad, Nasik had difficult time to cope up. This however has forced these companies to be competitive for better sustenance.

For small and medium companies to remain competitive, it was imperative to reduce operating costs. This was only possible by making overall improvements in all business functions. It was observed that the integration between business functions was missing. This was resulting into the insufficient information and ultimately to the wrong decision making. This need of seamless information and data flow within integrated business functions demanded Industry to make use of a well-integrated Enterprise resource Planning (ERP) tool. SAP had emerged as a robust ERP tool which can meet the industry demands.

SAP has matured as ERP product over last 3 decades. SAP implementation may need a huge investment which is difficult for small and medium industry. Realizing this fact SAP has also come up with various pre-configured products which are suitable for small and medium auto comp manufacturing industries.

2. RESEARCH METHODOLOGY

The auto comp industries in the area of Aurangabad are selected as a scope of this study. Aurangabad is a developing hub of auto component manufacturing industries in last two decades.

1.1 Objective of the research

The objective of this research is to cater information to small and medium auto comp manufacturers, how SAP can help them improving operational excellence. The opportunities and challenges in implementing SAP are discussed as a part of this study. This research also provides information on SAP's modular structure, which can be useful to the researchers, students and entry level SAP professionals.

1.2 Data collection and sampling

The methods adopted to collect primary data are direct in depth interviews & mailed questionnaires. The data is collected from entrepreneurs and senior

management team of small and medium industries regarding the pain points and challenges in day to day operations. The sample includes both the representative companies who use SAP as ERP tool and also those who do not use SAP. The data is also collected from the SAP consultants. The purpose of this data collection is to get their views on SAP implementation in auto comp industries and the significance of SAP in improving the operational excellence.

The secondary data is collected from various published and unpublished sources. Various research papers which deal with the opportunity and challenges of Indian auto comp industry, challenges and opportunities of SAP implementation are taken into consideration. Various information stored in the official online library of SAP, various information stored on SAP service portal about SAP products is also referred. Various study material published on websites which share useful information about SAP products is also referred as secondary data.

3. INDIAN SMALL AND MEDIUM INDUSTRIES – OPERATIONAL CHALLENGES

Apart from the challenges posed by external conditions there are numerous challenges posed by the internal situation which are operational in nature. The key operational challenges are observed as below

3.1 Challenges in Financial Management – Financial information are the core of any business. It is observed that many times such information is not easily available. For example, the information about the assets (life of assets, depreciation of assets, and replacement of assets) is not realistic. This leads to wrong investment decisions. Similarly incorrect information about liabilities (vendor payments, customer credits, bank loans etc) doesn't reveal the correct financial health of the company. Improper information on assets and liabilities disturbs the cash flow estimations. It is a major observation that this incorrect management of assets and liabilities happen because of lack of integration in various business functions.

3.2 Challenges in operation management – A proper control on engineering change management is found missing which leads to the imbalance and obsolescence of inventory. Improper planning and scheduling of day to day work leads to capacity wastage and non-availability of finished products at right time. Insufficient quality control within process leads to major rework or even rejection of valuable material. Sometimes, the incorrect finished goods may reach to customer and which leads to customer dissatisfaction. Improper planning & procurement leads to the inventory imbalance which leads to excess stock or stock outs. Loss of control on plant maintenance leads to frequent maintenance issues, wastage of capacity and increased maintenance cost.

Again, it is the observation that these situation happens mainly because lack of proper information.

4. OPPORTUNITY OF IMPROVING OPERATIONAL EXCELLENCE WITH SAP IMPLEMENTATION

It is inferred after the discussion and the information received from entrepreneurs and top management of small and medium auto comp companies that many of the challenges are because of lack of integration between business processes. As there is no integration within processes, lot of manual intervention exists. This leads to the mistakes or non-transparency. Reports are created manually hence there are chances of manipulations. On the other side, SAP captures the real time data from various business transactions which are integrated. For example, goods receipt is captured in material management module which updates the stock position. Same goods receipt data is used for invoice verification & vendor payment in financial management module. Thus, any manual intervention is eliminated.

4.1 SAP – A brief background

SAP is an enterprise resource planning (ERP) software product capable of integrating multiple business applications, with each application representing a specific business area. These applications update and process transactions in real time mode. It has the ability to be configured to meet the needs of the business.

SAP was founded in 1972 in Germany by 5 former IBM engineers, namely – Dietmar Hopp, Hans – Werner Hector, Hasso plattner, KlausTschira, Claus Wellenreuther. Their first client was the German branch of Imperial Chemical Industries in Östringen, where they developed mainframe programs for payroll and accounting. Instead of storing the data on punch cards mechanically, as IBM did, they stored it locally. Therefore, they called their software a real-time system, since there was no need to process the punch cards overnight (for this reason their flagship product carried an R in its name until the late 1990s). This first version was also a standalone software, that could be offered to other interested parties. The acronym of SAP is System Application Products in data processing ((Systeme, Anwendungen und Produkte in the original German). So, by definition SAP creates a common centralized database for all the applications running in an organization. It started with a vision: to develop standard application software for real-time business processing. The founders wanted to develop and market standard enterprise software which would integrate all business processes, because they had noticed that client after client was developing the same or very

similar computer business programs which though were not really integrated with each other.

Evolution of SAP

- 1972 – SAP AG founded in Germany (this was also called SAP R/1)
- 1979 – SAP R/2 introduced for mainframe computers
- 1992 – SAP R/3 released as client server application
- 1996 – SAP R/3 SAP R/3 Became partially internet enabled
- 1997 – Developed & launched with new dimension product line including CRM, SCM & Data warehousing solutions
- 1999 – SAP announced mysap.com, the next generation of its Enterprise application system, based on the internet architecture
- 2000 -2005 – Introduced my SAP business suite, Net Weaver, & X-Applications

4.2 SAP's modular structure

SAP has developed multiple products over the years. For the purpose of simplicity, a comprehensive product SAP ECC 6 , which covers all the needs of auto comp industry is considered for the purpose of this research.

SAP has a modular structure which mainly covers three functional areas viz. financial accounting and controlling, Logistics and human resources. The business processes in various functional areas are triggered using SAP transactions in respective modules.

1.1.1 Financial accounting and controlling

The modules and sub-modules in financial accounting and controlling functional area are as follows

S. No.	Module	Sub-Module
1	Financial Accounting (FI)	<ul style="list-style-type: none"> ▪ General Ledger ▪ Accounts Receivable ▪ Accounts Payable

S. No.	Module	Sub-Module
		<ul style="list-style-type: none"> ▪ Asset Management & Accounting ▪ Bank Accounting ▪ Consolidation ▪ Fund Management ▪ Special purpose ledger ▪ Travel management
2	Management Accounting (CO)	<ul style="list-style-type: none"> ▪ Cost element Accounting ▪ Cost center Accounting ▪ Activity based costing ▪ Internal Order ▪ Product Costing ▪ Profitability Analysis ▪ Profit Centre Accounting
3	Financial Supply Chain Management (Treasury and Risk Management)	<ul style="list-style-type: none"> ▪ Treasury management ▪ Biller direct ▪ Cash & Liquidity management ▪ Collection management ▪ Credit management ▪ Dispute management ▪ In-house cash management

1.1.2 Logistics

The modules and sub-modules in logistics functional area are as follows

S. No.	Module	Sub-Module
1	Sales and Distribution (SD)	<ul style="list-style-type: none"> ▪ Master Data (Customer, Price) ▪ Pricing & Conditions ▪ Sale Order Management ▪ Contract & Scheduling

S. No.	Module	Sub-Module
		<ul style="list-style-type: none"> Agreement Shipping Transportation Billing
2	Customer Service	<ul style="list-style-type: none"> Structuring & Installing Technical Objects Call Management Service Agreements Warranties Returns & Repair Processing Orders
3	Materials Management (MM)	<ul style="list-style-type: none"> Material planning Purchasing Inventory Management Vendor evaluation Invoice verification
4	Production Planning and Control (PP)	<ul style="list-style-type: none"> Master Data (Material Master, BOM, Work Center, Routing) Sales and operations planning Demand Management Long Term Planning Capacity planning Material requirement planning Production order Repetitive or Discrete Manufacturing Production planning for Process industries
5	Quality Management (QM)	<ul style="list-style-type: none"> Quality Planning Quality Inspection Quality Control Quality Certificates Quality Notifications
6	Plant Maintenance (PM)	<ul style="list-style-type: none"> Technical objects Maintenance planning Maintenance

S. No.	Module	Sub-Module
		<ul style="list-style-type: none"> orders Maintenance Notifications

1.1.3 Human resources and other supporting areas

The modules and sub-modules in HR as well as supporting areas are as follows

S. No.	Module	Sub-Module
1	Human Capital Management (HCM)	<ul style="list-style-type: none"> ▪ Personnel Administration ▪ Organization Management ▪ Payroll Accounting ▪ Time Management ▪ Personal Development
2	Project Systems (PS)	<ul style="list-style-type: none"> ▪ Work Breakdown Structures and Networks ▪ Date Scheduling ▪ Project procurement ▪ Cost
3	Environment, Health & Safety (EHS)	<ul style="list-style-type: none"> ▪ Product Safety ▪ Hazardous Substance Management ▪ Dangerous goods movement ▪ Waste Management ▪ Occupational Health ▪ Industrial Hygiene & Safety

1.1 Benefits of using SAP

As SAP captures all the business transactions, lot of information is available after SAP implementation. There are standard reports available in SAP which is used. It is also possible to develop custom report as per needs. The key benefits of SAP implementation from management point of view are as follows

Business Visibility: SAP integrates business functions and provides the reports on various aspects of the business functions. This creates a visibility in the overall business. This visibility helps taking major operational decisions.

Alignment of strategies with operations: The business strategies decided by top management are executed in business operations. SAP helps to achieve such alignment in planning and utilization of business resources across various business functions.

Reduce business risk: SAP provides a support of seamless data and information across business functions which reduces business risk

Improve financial management and enforce controls: Business transactions in SAP are tightly integrated and result into appropriate financial impact. This helps making financial control documents easily available and accessible to top management to enforce required controls.

Benchmark and measure operational performance parameters – SAP helps to set up and measure benchmark for operational performance parameters which ultimately result into improved efficiency and cut cost.

1.2 Typical Key performance indicators (KPI) measured after SAP implementation

Once SAP is implemented, management is interested in measuring the performance. Typical KPIs which are measured for auto comp manufacturing industry are as mentioned below. Standard or custom developed reports are extracted from SAP to view the performance

Manufacturing function

- a. Time to Engineer change: This is the lead time after receiving the engineering change in exiting product to execute the change
- b. Average production cost of each product = $\frac{\text{Total cost of manufacturing}}{\text{number of pieces produced}}$
- c. Productivity per hour = $\frac{\text{Total pieces produced}}{\text{in 1 hour}}$
- d. Tact time per month = $\frac{\text{Available time per month}}{\text{Sales forecast or demand}}$
- e. Manhour per Piece = $\frac{\text{Number of people in cell in one shift} \times \text{Number of hours in that shift}}{\text{pieces produced in the shift}}$
- f. Capacity utilization = $\frac{\text{Total units produced}}{\text{Available Capacity to produce units}}$
- g. Manufacturing Cost per unit = $\frac{\text{Cost of Total unit produced}}{\text{Total Manufacturing cost}}$
- h. Net profit = Revenue – cost & taxes

Quality Management function

- a. Effective yield = $\frac{\text{Total pieces produced} - \text{defective pieces}}{\text{Total pieces produced}}$
- b. Right at first time = $\frac{\text{Total pieces produced} - \text{rework}}{\text{Total pieces produced}}$
- c. Warranty performance = $\frac{\text{revenue} - \text{warranty cost}}{\text{revenue}}$

Maintenance function

- a. Meantime to repair (MTTR) - Average time (e.g. in hours) between the occurrence of an incident and its resolution (This is applicable only if PM module is implemented)
- b. Mean time between Failure (MTBF) - The average time between equipment failures over a given period i.e. the average time a device will function before failing. (This is applicable only if PM module is implemented)
- c. Overall equipment effectiveness OEE = Availability x performance x quality
 - i. Equipment Availability: $\text{Equipment availability} = \frac{\text{Operating Time}}{\text{Planned Production Time}}$
 - ii. Equipment performance = $\frac{\text{Ideal Cycle Time}}{\text{Operating Time} / \text{Total Pieces}}$
 - iii. Quality = $\frac{\text{Total pieces produced} - \text{defective}}{\text{Total pieces produced}}$
- d. Corrective maintenance to preventive maintenance ratio - hours of corrective maintenance divided by [hours of preventive maintenance]

Inventory and logistics function

- a. Inventory turn WIP = $\frac{\text{Revenue}}{\text{Average WIP inventory}}$
- b. Inventory turn Finished goods = $\frac{\text{Revenue}}{\text{Average FG inventory}}$
- c. Transport cost to Sales cost ratio = $\frac{\text{Transport cost}}{\text{revenue}}$

5. CONCLUSION

Indian auto comp industry is rapidly growing in last two decades. Many of the companies have posted significant revenue growth. To remain competitive, the auto comp companies have to reduce the costs and to reduce the costs, it is imperative to improve operational effectiveness. It is observed that relevant data for measuring the operational effectiveness is missing because the lack of integration within business functions. As such, more and more small and medium auto comp industries are now implementing SAP as enterprise resource planning (ERP) application. After implementing SAP, it is possible to measure various performance indicators & take corrective actions if required. This is in turn helps to improve the operational effectiveness.

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