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Integration Portals For SAP Enterprise Service

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***Abstract*—Users of enterprise resource planning systems can work in a variety of functional fields with industrial solutions. The world's top ERP system, SAP, offers the most recent standard. When releasing its new product, the company uses information technology, architecture, and methodology. Old methods and procedures are eventually replaced by new features of the newly released product. However, these informatics systems are better capable of swiftly replacing outdated methods. Important solutions still exist in the SAP systems that were developed utilizing outdated tools and techniques. To bridge the gap between dated, dependable new technology, there is a paucity of learning methodologies. The current article illustrates how outdated methods can coexist with the most recent SAP architecture. Our students learn about outdated yet effective development tools and techniques from this development example. Following globalization, corporate dimensions are changing quite quickly. The global economic realities are combined with issues that are distinctive to each nation. No aspect of the company, regardless of the size of activities, was untouched by the global circumstances. Due to this, the Indian automotive component manufacturing industry has had to radically alter its business practices. To be competitive, survive in the global market, and triumph in the long run, they had to make use of systems of the highest caliber. Performance became largely dependent on process integration and a smooth exchange of information and data between multiple processes. To meet this need, the appropriate Enterprise Resource Planning (ERP) application had to be chosen. Enterprise resource planning (ERP) applications come in a variety of forms, including applications from Oracle, SAP, JD Edwards, PeopleSoft, Microsoft, and others. SAP is a well-respected and popular ERP programme that is able to integrate various business modules, each of which represents a different business function. The SAP application's various modules update and handle transactions in real time. It can be set up to accommodate the various needs of the company.**

Keywords—ERP, SAP, Development Tools, System application product.

I. INTRODUCTION

The Indian automotive component manufacturing sector experienced tremendous expansion as a result of globalization opportunity, but it also began to face fresher difficulties brought on by the new period. The profit margins were significantly reduced by the current pricing brought on by the buyer's market created by the intense competition. The industry understood that continuing to operate in the same way as before would not be lucrative.

The Indian automotive market was expanding very quickly, but to keep up with expansion and remain profitable, it was important to remain competitive. Cutting costs was the main strategy used to boost the profit margin, and the market's survival depended on extremely aggressive pricing. Industry came to the conclusion that improving operations generally was the only way to minimize costs. Industry engaged in extensive introspection in order to attain overall improvements. The integration of the many business functions was found to be the main shortcoming. The requirement for close integration of the various business processes was recognised by industry. This was a requirement for data and information to flow through corporate operations. a requirement for seamless information data flow required industry to utilize an Enterprise Resource Planning (ERP) product that was well-integrated. SAP had emerged as a reliable ERP technology that could satisfy market demands.

Therefore, the focus of the current study is on various features of SAP as an ERP technology and how it contributes to overall operational improvements. This study includes the following topics:

- Evolution and Journey of SAP as ERP Application - The Goals and Benefits.
- The technical and functional components of SAP, such as Enterprise Modules, integration, and other components.
- India's automotive component manufacturing industry - history, business issues, SAP deployment methodology and approach.
- The importance of SAP in tackling the commercial issues faced by India's automotive component industry.

Numerous new dimension products developed by SAP enhance the use of SAP ERP solutions and increase corporate productivity. Such a study for the manufacturing of vehicle components is uncommon.

Many businesses discover that their end-to-end processes are flawed. They can use SAP ERP there to construct an end-to-end procedure and hone their main function. They will be able to automate their business and keep their operating procedures current with the ever evolving sector. SAP can aid in the implementation of ERP solutions in numerous industrial sectors. There are more than 50000 clients using SAP ERP globally, spread across more than 100 countries. These figures are anticipated to rise as more businesses jump on the SAP ERP bandwagon.

Businesses adore the ability to access real-time updated information so they can maintain an advantage and stay competitive.

Meaning of sap

System Application Products is known by the abbreviation SAP. As was already mentioned, SAP is a

well-known and reliable ERP programme. SAP makes use of ERP software programmes to enhance the efficiency of resource planning, management control, and operational control within enterprises.

SAP software is a multi-module application that integrates tasks from several functional divisions, including product planning, purchasing of parts, inventory control, sales and distribution of products, plant maintenance, quality control, human resource management, and finance and managing. SAP software allows for the integration of numerous other functions.

SAP implementation as ERP application

It may occasionally be necessary to reengineer existing business processes in order to achieve SAP's goal of streamlining and improving internal business processes. The following are the general goals that most sectors have for SAP implementation:

Company Visibility - SAP combines business operations and offers reports on numerous business operations' elements. This increases visibility for the business as a whole. Major operational choices are made easier with this visibility.

Aligning business strategies with operations - Top management decides on business strategies, which are then carried out in corporate operations. SAP assists in achieving such coordination in resource planning and use across multiple business functions.

Reduced business risk is made possible by SAP's support for seamless data and information across business functions. Enforce controls and improve financial management: Business transactions in SAP are closely integrated and have the right financial impact. This makes it easier for senior management to access and use financial control records to implement necessary controls.

Benchmark and assess operational performance metrics - SAP aids in the establishment and assessment of benchmarks for operational performance metrics, which eventually lead to increased effectiveness and cost savings.

A management information system's components are similar to those of a SAP system (MIS).

- **SAP Software** - The heart of an ERP system is module-based ERP software. Each software module streamlines operations for a certain functional area of a company. Product planning, part buying, inventory management, product distribution, order tracking, financial, accounting, and human resource management are examples of common ERP software modules.
- **Business Processes** - Strategic planning, managerial control, and operational control are the three levels on which business processes are organized inside a company. ERP has been marketed as a way to support or streamline business operations at every level. However, a large portion of ERP success has been restricted to the fusion of various functional units.
- **SAP Users** - Employees of the organization at all levels, from workers to supervisors to mid-level managers to executives, use ERP systems.
- **Hardware and Operating Systems** - UNIX is the basis of many big ERP systems. Other widely used operating systems for running ERP applications include Windows NT and Linux. Other operating systems might be used by legacy ERP systems.

ABAP Development

The German software company SAP developed the high-level programming language known as ABAP (Advanced Business Application Programming, originally Allgemeiner Berichts-Aufbereitungs-Prozessor, or "general report creation processor"). It is pronounced "ah-bop." It is presently positioned as the language for programming the SAP Application Server, part of its NetWeaver platform for developing business applications, alongside the more recently adopted Java. ABAP's syntax has certain COBOL-like characteristics.

The SAP database houses all ABAP programmes. Unlike Java or C++ programmes, they are not kept in distinct external files.

All ABAP code is stored in the database in two different formats: produced code, a binary representation akin to Java bytecode, and source code, which may be viewed and changed with the ABAP Workbench tools. The runtime system, which is a component of the SAP kernel, manages the execution of ABAP programmes. The runtime system is in charge of executing ABAP statements, managing screen flow logic, and responding to events (such a user touching a screen button); in this regard, it might be compared to the Java VM's virtual machine. The Database Interface, which converts ABAP statements that are database-independent (known as "Open SQL") into statements that are understood by the underlying DBMS (known as "Native SQL"), is a crucial part of the ABAP runtime system. On behalf of ABAP programmes, the database interface manages all communication with the relational database; it also includes extra functionality like buffering tables and frequently used data in the application server's local memory.

A program's execution is referred to in SAP as a transaction. By inputting a transaction code (for example, VA01 is the transaction code for "Create Sales Order"), ABAP code is typically executed in the SAP system. Through system-defined or user-specific, role-based menus, transactions can be called. Additionally, you can launch them by directly putting the transaction code into a command area found on every SAP screen. The ABAP statements CALL TRANSACTION and LEAVE TO TRANSACTION can also be used to initiate transactions programmatically.

It is important to note that the term "transaction" in this instance merely refers to invoking and executing an ABAP programme. The term "transaction" is frequently used in application programming to describe an indivisible operation on data that is either committed as a whole or undone (rolled back) as a whole. This idea already exists in SAP, where it is known as a LUW (Logical Unit of Work). There may be various LUWs within the course of a single transaction (programme execution).

Similar to other programming languages, an ABAP programme can be either an independently executable unit or a library that offers reusable code to other programmes.

ABAP distinguishes two types of executable programs:

- Report
- Module pools

A user may choose to provide a set of parameters (such as a selection over a subset of data) while creating a report, and the computer utilizes those parameters to create the report in the form of an interactive list. The name "report" can be deceptive because reports can also be built to edit data; these programmes are termed reports because the output they generate is "list-oriented."

Using a selection of screens, module pools construct more intricate user interaction patterns. The actual, physical image that the user sees is referred to as the "screen." Additionally, each screen has "flow logic," which alludes to the ABAP code that is implicitly called by the screens. The flow logic for each screen is separated into two sections called "PBO" (Process Before Output) and "PAI" (Process After Input). The term "dynpro" (dynamic programme) is used in SAP documentation to describe the interaction between the screen and its flow logic.

Through a function referred to as "ABAP Objects," the ABAP programming language allows object-oriented programming. Applications become easier to use and more manageable as a result.

Because ABAP Objects is fully backwards compatible with the existing language, it is possible to utilize both ABAP Objects in new ABAP programmes as well as existing ABAP programmes in new ABAP programmes that use ABAP Objects. In ABAP Objects applications, syntax checking is more rigorous, and some syntactical forms of specific statements—typically older ones—are prohibited.

II. LITERATURE REVIEW

[1] Acceptance of enterprise resource planning systems by small manufacturing enterprises" by Rubina Adam, Paula Kotzé, and Alta van der Merwe (2011) has mentioned with ,According to their study, less research has been done to understand the acceptance of ERP systems by small businesses than by larger ones. They therefore make an effort to close this gap by taking into account the strategic, business, technical, and human factors that affect ERP system acceptance in small manufacturing enterprises. In the research, they have offered a list of consultative acceptance factors that can direct future efforts aimed at ensuring the acceptance of ERP systems by small manufacturing enterprises.

[2] The importance of business process reengineering and ERP implementation in the Indian healthcare industry was ingested by Akondi Srikant in his 2012 article, "Significance of BPR and ERP Implementation in Healthcare Industry." The processes that are currently in use are challenged during process reengineering, and new processes that are widely used in the specific industry are adopted. Standardization and the elimination of non-standard processes are both strongly advised by ERP implementation. This boosts the sector's performance & competitiveness for the industry.Despite the study's focus on healthcare, it also applies to other manufacturing sectors.

[3] In a study, "ERP implementation issues and challenges: A FISHBONE analysis in context to Indian industries," by Dr. Manas Kumar Sanyal, Sajal Kanti Bhadra, and Sudhangsu Das (2012), they specifically focused on Indian ERP implementations. They used Fishbone analysis to determine the crucial problems Indian industries faced when implementing ERP in their businesses. According to their research, certain factors, such as poor system implementation tactics, a lack of clearly defined implementation procedures, poor project planning, and extensive customization of the system chosen for implementation, among others, have a significant impact on successful ERP implementations.

[4] Equity foundation, an Indian company (2012) In this study, the effort made by Indian manufacturers to achieve operational excellence is described under the heading "Operational excellence in Indian Manufacturing." It is explained how implementing lean manufacturing practises, adopting world-class manufacturing practises, and cutting costs help businesses remain competitive. The product quality has increased as a result of the adoption of Total Quality Management (TQM).Utilizing manufacturing execution systems (MES) and other IT solutions more frequently has produced the necessary online data to facilitate quicker decision-making.

[5] Prof. M.S. Prasada Babu and S.Hanumanth Sastry (2013) - The authors of "ERP implementation for Manufacturing Enterprises"stressed that problems like demand changes,balancing demand-supply factors and exercising control ERP customization is severely impacted by operational costs.backbone. Additionally, they have emphasized that the prosperous Putting any ERP project into practise requires all stakeholders who are aware of their responsibilities and being accountable throughout the process and being realistic the post-implementation scenario is anticipated.

[6] The small scale industries are the foundation of the Indian economy, according to Subhash Chander Verma's (2013) study "A study of factors responsible for growth, sickness, and Mortality of SMEs (bought out parts and ancillary) in MIDC Pimpri Chinchwad." They provide semi-finished parts at incredibly low prices to meet the demands of large-scale industries. Additionally, he discussed the factors that affect SMEs' expansion as well as the causes of their ill health.

[7] "Managing Business with SAP: Planning, Implementation and Evaluation," Londa L. Lau (2010) The various criteria for the effective implementation of SAP as an ERP application are thoroughly covered in this book. Three main sections make up this book. The foundation for ERP and SAP technology are introduced in the first section. The second section covers the development of SAP's main initiatives since its founding in 1972. How academicians can effectively incorporate understanding of the SAP R/3 systems into undergraduate and graduate college courses is covered in the third section.

[8] Stephen J. Sturgeon The research paper "Effects of the Crisis on the Automotive Industry in Developing Countries" by Johannes Van Biesebroeck was published in 2010 and was made possible by the Global Trade and Financial Architecture (GTFA) project. This study looks at how the recent financial crisis has affected global value chains (GVCs) in the automotive sector. The goal of the paper is to present a thorough analysis of this significant industry, look at government responses to the recent financial crisis, and present a picture of the industry's future, especially in light of the growing significance of both production and consumption.

III. SAP MODULES

SAP focuses on three primary functional areas, including finance, human resources, and logistics. These functional areas, which are highly integrated with one another, produce various modules.

Logistics:

- Sales and distribution (SD)
- material management (MM)
- warehouse management (WM)
- production planning (PP)
- plant maintenance (PM)
- project system (PS)
- general logistics (LO)
- quality management (QM)

Fig-1: Logistics module

Financial :

- Financial Accounting (FI)
- Controlling (CO)
- Enterprise Controlling (EC)
- Investment Management (IM)
- Treasury (TR)

Fig-2: Financial module

Human Resources:

- Personnel Administration (PA)
- Personnel Development (PD)

SAP has developed a number of high-end modules in addition to the core functions mentioned above, including Customer relationship management (CRM), Supplier relationship management (SRM), Product Lifecycle Management (PLM), Business intelligence and Business objects (BI-BO), etc.

IV. SAP ENTERPRISE PORTALS

The main objective of the portal development is to make oneself gain business level understanding of the SAP core functional modules and to become full stack techno functional consultant. One should design an SAP ERP Portal for a particular organization which is a user-friendly portal.

SAP Portal needs to be developed for below given verticals, the front-end portal application system will be the data center for Angular and SCP app.

The verticals are to be developed as follows

1. Customer Portal (Angular App)
2. Vendor Portal (Angular App)
3. Employee Portal (Angular App)

The below table illustrates the portal and its respective SAP module which are to be integrated.

S.No.	Portal Application	Module
1.	Customer Portal	✓ Sales and Distribution (SD) ✓ Finance (FI)
2.	Vendor Portal	✓ Material Management (MM) ✓ Finance (FI)
3.	Employee Portal	✓ Human Resource (HR) ✓ Finance (FI)

Customer Portal

The objective of the customer portal is to understand the functionalities of Sales and Distribution (SD) and Finance (FI) module. This portal is to be designed for maintaining the data of all the customers carrying out business with the organization. The need of Customer portal is to access and view the complete transaction between the company and customer.

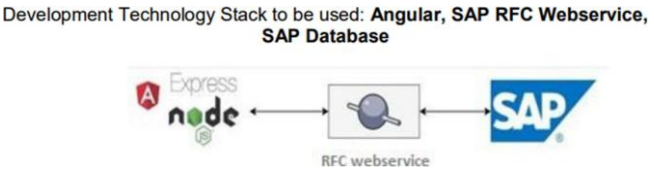

Figure 3 : Customer Portal

Middleware

SAP RFC Web Service is used as middleware to integrate the SAP ERP Portal with the SAP Database.A web service connection is to be made via the RFC function modules.The adapters provide the end to end communication between the application and database.

4.1.1 Backend

- The complete back-end have to be implemented using SAP ECC/S4 Systems via ABAP (Advanced Business Application Programming).
- All the ABAP programs are to be saved in packages with the corresponding TR (Transport Request).

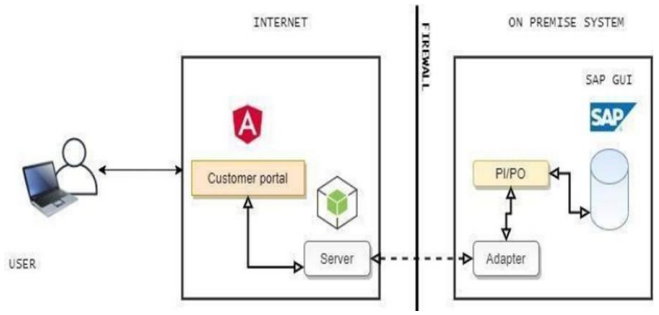

Figure 4 : Customer Portal Architecture

Vendor Portal

The objective of the vendor portal is to understand the functionalities of the Material Management (MM) and Finance (FI) module. This portal is to be designed for maintaining the data of all the vendors carrying out business with the organization. The need of a vendor portal is to access and view the complete transaction between the company and vendor.

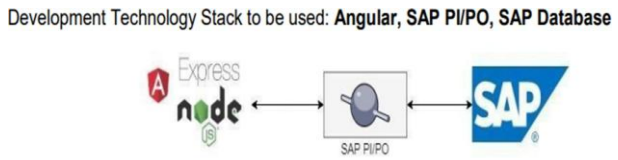

Figure 5 : Vendor Portal

SAP PI/PO **Middleware**

SAP Process Integration / Process Orchestration (PI/PO) is used as middleware to integrate the SAP ERP Portal with the SAP Database. A seamless synchronous connection is to be made via the adapters (ABAP PROXY/ RFC/ IDOC) available.The adapters provide the end to end communication between the server and database.

4.2.2 Back-end

The complete back-end have to be implemented using SAP ECC/S4 Systems via ABAP (Advanced Business Application Programming). All the ABAP programs are to be saved in packages with the corresponding TR (Transport Request).

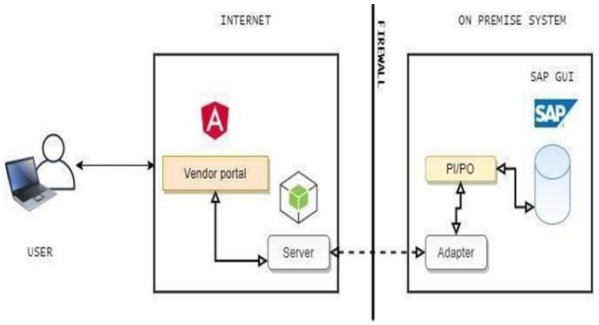

Figure 6 : Vendor Portal Architecture

Employee Portal

The objective of the Employee portal is to understand the functionalities of Human Resource (HR) and Finance (FI) module. This portal is to be designed for providing info about the organization and employees, getting the pay slip as printable, leave balance and to request leave. The need of Employee portal is to have quick and easy access to HR-related transactions and services.

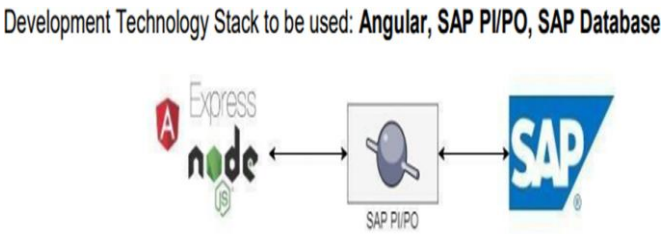

Figure 7 : Employee Portal

4.3.1 Middleware

SAP Process Integration / Process Orchestration (PI/PO) is used as middleware to integrate the SAP ERP Portal with the SAP Database. A seamless synchronous connection is to be made via the adapters (ABAP PROXY/ RFC/ IDOC) available. The adapters provide the end to end communication between the server and database.

Back-end

The complete back-end have to be implemented using SAP ECC/S4 Systems via ABAP (Advanced Business Application Programming). All the ABAP programs are to be saved in packages with the corresponding TR (Transport Request).

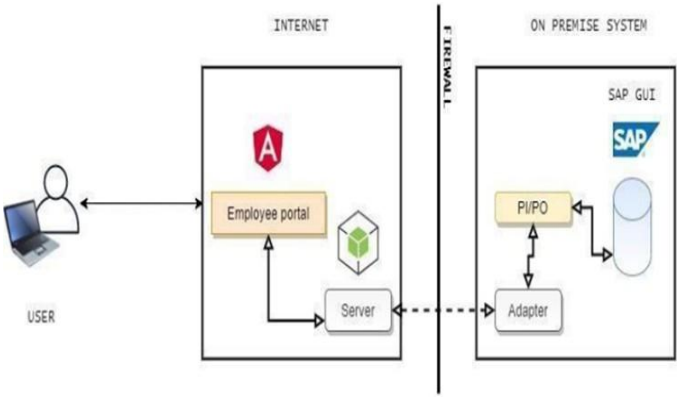

Figure 6 : Employee Portal Architecture

The presented paper points out the possibilities of implementing innovative technologies in the teaching process. Specifically, this is the application of the SAP ERP information system to the teaching of the subject Controlling the manufacturing company.

V. CONCLUSION

The SAP development in organizations was covered in this paper. Any module of the ERP system that thebusiness hires consultants to implement.The system must be used by the end-users, who are the company's employees, after implementation (installation). To get the most out of the system, they must become accustomed to how it functions.The person who uses the software at the conclusion of the implementation, or an end user, is someone who uses SAP after it goes live.The paper being presented highlights the potential for integrating cutting-edge technologies. This specifically refers to the integration of the SAP ERP information system .Customer portal includes finance as well as sales and development modules .Which are helpful to display the credit ,debit,invoice,list of delivery,profile,inquiry,overall sales order,payments and aging etc.Vendor portal consist of material management and finance.Modules include vendor credit ,debit, purchase, request for quotation,goods receipt, invoice, purchase order,payments and aging etc.Employee portal involves human resource management and finance.Employee functional modules includes payslip ,leavedata,profile.These helps the employee to visit the information in a centralized manner.

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