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Procurement with ERP

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Abstract

There are many advantages for the company when an ERP system is implemented in the procurement process. A brief summary of the main benefits and features of adopting ERP procurement is provided by procurement. In today's competitive corporate environment, efficient procurement is essential. ERP (Enterprise Resource Planning) solutions provide a way to optimize resource use, increase visibility, and streamline the procurement process. It examines the various ERP system components that have a direct impact on the procurement. These components, including Inventory Control, Financial Integration, Supplier Relationship Management, and Purchase Order Management, collaborate to automate and improve the procurement process. The important considerations for implementing ERP in procurement the crucial factors to consider while deploying ERP in procurement. It highlights the importance of selecting the best ERP vendor, designing the system in accordance with organizational goals, and effectively educating people. Data migration, change management, and continuing system maintenance are mentioned as important components of a successful ERP adoption. It cites technological developments like blockchain, machine learning, and artificial intelligence that could further change the procurement process. Describe ERP and the role it plays in the procurement process. It draws attention to typical problems faced by procurement departments, including disconnected systems and manual processes. The overview highlights the demand for an integrated ERP strategy to deal with these issues. It examines the various ERP system that have a direct impact on procurement. These modules, including Inventory, Supplier Relationship Management, and Purchase Order Management.

Keywords: Enterprise Resource Planning, Purchase Order Management, Data Migration, Inventory.

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Introduction

Procurement refers to the process of obtaining or acquiring commodities and services. It is advantageous for the goods/services to be suitable and acquired at the most optimal cost to fulfil the purchaser's requirements in terms of quality, quantity, time, and location [1,2]. Corporations and public entities frequently establish procedures designed to encourage equitable and transparent competition for their business while reducing the risk of fraud and collusion.

Procurement encompasses the management of purchasing activities, including sourcing supplies, vendor selection, contract negotiation, relationship management, and analysis to enhance service levels while minimising costs. Evaluation of the performance of periodical sellers and disposal of scrap commodities [3].

The procurement module, alternatively referred to as the purchase module, facilitates an organisation in acquiring the necessary materials or products for the purpose of manufacturing and/or selling commodities [4]. Organisations can utilise this module to maintain a catalogue of authorised vendors and establish associations between these suppliers and specific commodities, hence facilitating effective supplier relationship management. The module has the capability to automate the process of requesting a quote, and thereafter monitor and analyse the received quotes [5].

Upon acceptance of a quote by a company, the procurement module facilitates the purchasing department in the preparation and dispatch of purchase orders [6]. Subsequently, it can monitor the aforementioned purchase order as the seller converts it into a sales order and dispatches the merchandise, thereby automatically revising inventory levels upon the order's receipt by the procurement department with ERP.

This internship study was done on the software that uses JAVASCRIPT as front end and DATABASE as back end. This internship gives all the detailed reports about the procurement with ERP.

Literature Review

Katuu [6] This article's research strategy involved reviewing reports from the industry as well as academic journals. According to the article, ERPs have significantly evolved from earlier models such as Material Resource Planning (MRP) systems and Integrated Control (IC) packages. With the introduction of cloud computing and other digital advances like artificial intelligence, they have not stopped changing. Although the growth of ERPs has been the subject of numerous publications, this one stands out because it discusses the most recent advancements, including postmodern and cloud ERPs.

Gonçalves et al [7] ERP initiatives are among the greatest ways for businesses to become more efficient, but there can be significant delays in terms of both budget and schedule. In order to increase the probability of a successful implementation, it is imperative for organizations to design a long-term plan for continuous development that prioritises users as positive agents of change within the technical environment. In an ERP project structure, the post-implementation phase is typically ignored, resulting in ineffective long-term plans. In contrast, the pre-implementation and implementation stages bring together important stakeholders and system specialists. System users are essential components in the long-term strategic plan definition of ERP. According to the study's findings, users who are in an appropriate technical environment are more likely to be involved and participative, and knowing how end users specifically affect a system might increase its likelihood of being implemented more skilfully and at a lower cost.

Utomo et al [8] concentrated on PT Bank Mantap finds it challenging to analyze its financial data. In order to improve current business processes, PT Bank Mantap uses SAP S/4 HANA to implement the ERP, Finance & Controlling (FICO), and Procurement modules. This is known as Business Process Improvement (BPI). This is the most recent version of SAP's business suite, which helps users streamline corporate operations within an integrated setting. The implementation's outcomes can address issues that arise, resulting in more efficient and integrated corporate operations as well as more accurate transaction data calculations.

Zhang [9] compared the top four cloud ERP platforms available in Australia and suggested using a hybrid cloud ERP system to handle online transactions. This article designs and presents a web-based purchase application using a case study methodology. Generally speaking, user businesses can process online purchasing transactions with shorter operation times and greater business efficiency thanks to the proposed hybrid cloud ERP framework and integrated web-based purchasing application. At the same time, the framework lowers the security risks associated with using the public cloud.

Hadidi et al [10] offers a methodical strategy for an ERP deployment that is successful in the construction sector. The methodology offered by this study makes ERP project implementation easier for Saudi Arabian and international construction organizations. To rank various ERP modules, a case study approach is carried out with specialists in the

construction field on ERP deployment. This study created a four-step process for implementing ERP modules in order. The most popular ERP modules used in the construction sector are described in the first phase. The anticipated advantages of using ERP are outlined in the second stage. The significance index (I) will be defined in the third phase. The ERP modules are ranked in the fourth and final phase using a global index that combines the module and criteria indexes.

Proposed Methodology

Modules in the System

Purchase Requisition

This module allows users to create and submit purchase requests for the good and they require [10]. It has options for choosing the quantity, preferred delivery date and any other relevant details. A purchase requisition module facilitates the creation, submission, and management of the requests. The purchase Requisition process works within an ERP system are

- Request Creation
- Approval workflow
- Review and Authorization
- Purchase order Conversion and Reporting and Tracking.

Supplier Management

A database of authorised suppliers is maintained with the help of the supplier management module. It has tools for qualifying, qualifying suppliers and tracking performance. Additionally, it might provide tools for handling supplier contracts and agreements.

Purchase Order

The purchase order module enables users to create purchase orders based on approved requisitions. It includes features for specifying the items, quantities, prices, and delivery terms. The module may also support automated generation and tracking of purchase.

Contract Management

Due to ERP's function as the organization's financial center, the necessity of the contract management inside an ERP procurement module cannot be overestimated. Missed deadlines or milestones should be unheard of with accounts payable and receivable integrated with contract management.

Vendor Management

Efficiently processing purchase invoices contributes to the enhancement of vendor relationships. The procurement management system should offer a centralised database that accurately and consistently records all vendor information. Efficiently enrolling new vendors and assessing the performance of current vendors can be achieved expeditiously and effortlessly by utilising a centralised vendor database.

Procurement Analytics

Procure-to-pay software should deliver crucial actionable insights derived from the procurement data. The Solution should facilitate instantaneous monitoring of crucial performance indicators and production of tailored reports for management to formulate strategic business determinations.

Supplier Relational Management

Within ERP, this provides a place to record communications between a supplier and the business and the person(s) involved.

Supplier Portal

This module provides a self-service portal for suppliers to access information, submit bids or proposals, view purchase orders, update their profile, and collaborate with organization. A supplier portal for procurement is a web-based platform that allows suppliers to interact and collaborate with the organisation procurement department.

The supplier portal for procurements is supplier profile manufacture and it called as a supplier portal.

Supplier Collaboration Module

Facilitates secure communication and collaboration with suppliers. The Provides mobile - friendly interfaces for users who need to access procurement functions on mobile device

Purchase Order (PO) Management

Manages the creation, approval and issuance of purchase orders based on approved requisitions. Tracks the status of Pos and manages changes or cancellations.

User Access and Security Module

Here the user means the individuals or stakeholders who interact with the procurement system or software to perform specific tasks related to the procurement. These users can be from different departments or roles within an organization and their involvement in procurement may vary depending on their responsibilities.

Dataflow Diagram

A data flow diagram (DFD) illustrates the movement of information within a system or process. The diagram exhibits data inputs, outputs, storage locations, and routes between each destination through the use of predefined symbols such as rectangles, circles, and arrows, accompanied by concise text labels. Data flow diagrams can range from simple hand-drawn process overviews to more intricate, tiered DFDs that systematically delve into the intricacies of data handling. They have the capability to simulate a novel system or evaluate an already established one. A Data Flow Diagram (DFD), similar to high-quality diagrams and charts, often has the ability to visually represent concepts that are difficult to articulate in words. They are suitable for both technical and non-technical audiences, ranging from developers to CEOs. This elucidates the reason behind the continued prevalence of DFDs in contemporary times, as depicted in Figure 1. Currently, they have become less effective at representing interactive, real-time, or database-driven software or systems, despite their continued suitability for data flow software and systems.

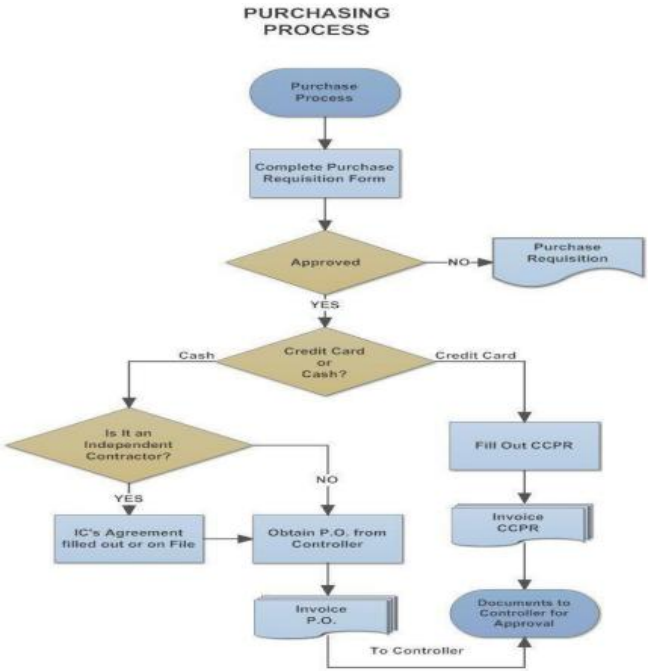


Fig. 1: Data Flow Diagram for ERP

Level 0

The Zero Level Data Flow Diagram (DFD) is the highest-level overview of the procurement process. It shows the primary external entity, the supplier, interacting with the procurement system.

Level 1

The First Level Data Flow Diagram (DFD) gives how the system is divided into subsystems, it identifies the purchase order and purchase order tracking and delivery guarantee then purchase order can be divided into 3 category and search for suppliers can be divided into purchasing marketing and vendor management.

Level 2

The Second Level Data Flow Diagram (DFD) gives more functionalities of customer and their request of the product and purchase order(po) and more about the purchase order (PO). It describes the second level data flow diagram. This data flow diagram shows customer and the confirmation letter for the purchase order and more details about the po details. The purchase order (PO) has request granted for the management documents. then it is the data flow diagram for the level 2.

In this level 2 that the purchase order details and accept the orders of the product and the customer should send the confirmation letter it is the data flow diagram for the level 2.

Software Requirements

Software Features

The specifications of the software are

Operating System: Windows 11

Front End: JAVASCRIPT

Microsoft Developer: 2010

Back End: DATABASE

Overview of Front End

JavaScript is a widely used high-level programming language primarily known for its uses in web development. Created by Brendan Eich in 1995, JavaScript was originally designed as a client-side scripting language to provide interactivity on webpages. JavaScript versatility and ubiquity have made it a fundamental language for web development. It has evolved significantly Since its inception and continues to be at the forefront of modern web technologies, enabling developers to create dynamic, interactive and feature rich web application.

JavaScript has a thriving ecosystem that provides various tools, libraries, framework and resources to help developers write better code, streamline development, and build powerful application.

JavaScript is a fundamental technology for frontend development enabling developers to create dynamic, responsive and feature- rich web applications. It works in conjunction with HTML and CSS to provide a complete user experience in modern development.



Fig. 2: Java Script Logo

Benefits of Java Script

- **Client-Side Interactivity**

JavaScript is primarily used to add interactivity to web pages, enabling dynamic content updates without requiring a page reload. This creates a more engaging user experience as users can interact with elements on the page without waiting for the server to respond.

- **Cross-platform Compatibility**

Since JavaScript is supported by all major web browser it enables developers to create Cross platform applications that work on different devices and operating systems without requiring separate codebases for each platform.

- **High Performance**

Modern JavaScript engines have made significant performance improvements, making JavaScript one of the fastest scripting languages. This allows developers to build complex and high-performance applications on the web.

- **Overview of Back End**

A Database is a structured and organized collection of data that is stored and managed electronically. It serves as a central repository for data, making it easy to store, retrieve, update, and manage large volumes of information

efficiently. Databases play a crucial role in various applications, from simple desktop software to complex web applications and large-scale enterprise systems.

Databases are foundational components of modern software applications, enabling efficient data management and supporting critical business processes across various industries and document as shown in Figure 2.



Fig. 3: Database Logo

Benefits of Database

Databases offer numerous advantages that contribute to efficient data management, improved application performance, and enhanced decision-making. Here are some of the key advantages of using databases are

- **Data Centralization**

Databases centralize data storage, providing a single, organized repository for all relevant information. This reduces data duplication, maintains data consistency, and ensures a single source of truth

- **Data Integrity**

Databases enforce data integrity through constraints and validation rules, preventing data inconsistencies and maintaining the accuracy and reliability of stored information.

- **Efficient Data Retrieval**

Databases provide powerful querying capabilities, allowing users to retrieve specific data quickly based on various criteria. Indexing and optimization techniques improve data retrieval performance.

- **Scalability**

Modern databases are designed to handle large volumes of data and accommodate growing user demands. They can scale vertically (adding more resources to a single server) or horizontally (distributing data across multiple servers) to meet increasing requirements,

- **Data Security**

Databases offer robust security features, including access controls, authentication mechanisms, and data encryption, to protect sensitive information from unauthorized access and potential.

Drawbacks of Database

- **Increased Cost**

There are various types of costs. These are explained below.

- **Cost of hardware and software**

This is the first disadvantage of DBMS. This is because to run the DBMS, there is must need for high-speed processors and large memory size. Nowadays, in every field, a large amount of data needs to be stored safely with security. But nowadays, the cost of a high-speed processor and large memory storage is very expensive in hardware and software.

So, we need to upgrade our hardware and software for the smooth running of DBMS, which will be very expensive. Also, the maintenance cost for both hardware and software is very expensive. All the operations, regulatory compliance, and training (like programming, application development, and database administration) are very expensive.

Performance

The conventional file system is designed for small-scale organisations and specific applications, resulting in generally excellent performance. However, for small-scale enterprises, the performance of DBMS is inadequate due to its sluggish speed. Consequently, certain apps will not achieve their maximum speed potential. Therefore, utilising a DBMS for small organisations is not advisable. Performance is sometimes underestimated, but it plays a crucial role in user adoption and usability. If a system performs well, it will be readily embraced by developers, designers, and

end-users, making it user-friendly. The speed of the system is contingent upon its performance, thus necessitating a high level of performance.

Applications of Database

- Database are an integral part of modern computing and have numerous applications across various industries.
- Business Management enables efficient organization, analysis and make informed decisions • It is used to deal with analytical queries to analyse the data and get instincts from it.
- Retrieving Information.
- Modification/Manipulation of data and database table such as Insertion, Deletion and Updating.
- The most popular database in the world is Oracle. Oracle is followed by MYSQL, SQL Server, PostgreSQL and MongoDB.
- A database application can be used for storing or retrieving data, processing transactions or various machine learning calculation.
- The database management system is the main priority of industries because they need to store huge amounts of the data.
- The industry database stores customer details, sales records, product lists, transactions, etc. all the information is kept secure and maintained by the database.

Results and Discussion

System Design

System Design is builds which is to fulfils the given requirements. Design phase of software development deals with transforming the user's requirements into a logically working system. Normally, design is performed in the following two steps:

- **Primary Design**

In this phase, the system is studied at block level. The blocks are created on the basis of analysis done in the problem identification phase. Different blocks are created for different functions emphasis is put on minimising the information flow between blocks. Thus, all activities which require more interaction are kept in one block

- **Secondary Design**

In the secondary phase the detailed design of every block is performed.

- **User Interface Design**

User Interface Design that allows procurement professionals to access and interact with ERP system easily. the interface should provide intuitive navigation, clear layouts, and relevant information is to facilitate efficient procurement activities. Input screen is specifically for creating a purchase requisition and procurement accurate input data are the most common cause of errors in data processing, the procurement with an Enterprise Resource Planning system is designed to capture all the necessary information related to the procurement process. It allows users to enter and manage procurement requests, purchase orders, and other procurement related details. Here some common fields and elements you might find on an input screen for procurement using ERP.

The goal of studying input data in this system is to primarily related to data analysis, decision-making and process improvement:

- The analysts can identify tenders and patterns enabling them to make forecasts and predictions.
- Field sequence, which must match that in the source document.

Table Design

Tables are the most essential part of any software. Table designs are essential to ensure that there are no discrepancies in the stored data. A good table design makes data handling, storage and analysis easier and smooth.

Table 1: Item Table

Table Name: Item Table

Name	Datatype	size	Description
Item-id	Integer	11	Unique identifier for each item
Item-Name	String	10	Name or description of the item

The table 1 describes about the Item Table. The table consists of the following attributes Item-id, Item-Name.

Table 2: Vendor Table

Name: Vendor-table

COLUMN NAME	DATA TYPE	DESCRIPTION
Vendor-ID	Integer	Unique identifier
Vendor-name	String	Name of the vendor
Contact-Name	String	Name of the vendor's primary contact
Email	String	Email address of the vendor
Phone	String	Contact phone number
Website	String	Vendor's website URL

The table 2 describes about the vendor table. The table consists of the following attributes like fee vendor-id, name, contact name, email, phone, Website.

Table 3: Purchase Order Table

Table Name: Order-details

COLUMN NAME	DATA TYPE	DESCRIPTION
Order-id	Integer	Unique identifier for each purchase order
Order-date	Integer	Date when the purchase order was created

The table 3. describes about the fee category. The table consists of the following attributes like order-id, order-date.

Table 4: Payment Table

Table Name: Payment-fee

FIELD NAME	DATA TYPE	DESCRIPTION
Payment-id	Integer	Unique Identifier for each payment
Vendor-id	Integer	Foreign key referencing the vendor
Payment-date	Date	Date when the payment was made
Tot-amt	Decimal/Float	Total amount of the payment
Payment-Method	string	Method used for the payment
Notes	Text	Additional notes or comment

The table 4. describes about the payment fee. The table consists of following attributes like Payment-id, vendor-id, payment-date, total amount, payment -method and notes.

Table 5: Budget Table

Table Name: Budget Table

FIELD NAME	DATA TYPE	DESCRIPTION
Budget-id	Integer	Unique identifier
Budget-Amount	Decimal/Float	Total budget amount allocated to department
Remaining-amount	Decimal/Float	Remaining budget amount available for procurement
Department	String	Department name
Notes	Text	Additional notes or comments

The table.5 describes the Budget table, the table consists of following attributes like budget id, budget-Amount departments, notes.

Table 6: Procurement Table

Table Name: Procurement Table

FIELD NAME	DATA TYPE	DESCRIPTION
Procurement-id	Integer	Unique id
Requester	String	Name of the person requesting the procurement
Department	String	Department of the customer
Item-id	Integer	Foreign key referencing the Item table
Quantity	Integer	Quantity of the item
Procurement-date	Date	Date when the procurement request was made
Delivery-date	Dater	Expected delivery date

The table 6. describes the procurement tables list. The table consists of following attributes like requester, department, item-id, quantity, procurement-date and delivery- date.

Output Screen

The output screen for procurement system will typically display information related to various procurement and activities. ERP systems are comprehensive software solution that integrate and automate different business process, including procurement, to enhance efficiency and decision making. The ERP system's procurement output screen aims to provide a comprehensive view of the procurement process are

- Allowing users to track and manage orders
- Monitor expenditures
- Maintain control over the entire procurement lifecycle.

Conclusion

ERP system Procurement is a system that is created to control the costs of procurement of goods in a company to be more efficient. This system has four benefits full traceability, easy backorder management, controlled procurement costs and timely payments. The process of an ERP system can help streamline procurement processes, reduce costs, and improve communication between departments. been Additionally, ERP systems can help managers better monitor and track spending in order to make informed decisions about where resources should be allocated. An ERP helps purchasing managers easily create purchase orders.

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