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ORIGINAL RESEARCH PAPER

Navigating the virtual frontier: Best practices for ERP implementation in the digital age

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Abstract

The term enterprise resource planning (ERP) emerged as an evolution of material requirements planning (MRP) and computer-integrated manufacturing (CIM). Initially, MRP focused on material planning and scheduling for manufacturing at the same time, MRP ii (manufacturing resource planning) expanded this scope to include other resources, such as labor and machine capacity. by the early 1990s. Businesses require more integrated solutions to manage various enterprise-wide processes beyond manufacturing. ERP systems became essential for streamlining operations by integrating core business processes across departments such as finance, human resources (HR), supply chain, and customer relationship management. This integration provided a unified data platform for real-time decision-making (Chang *et al*., 2000).

ERP systems have evolved to support various industries beyond manufacturing, extending to non-profit organizations, governments, healthcare, education, and more. A vital characteristic of an ERP system is its ability to integrate multiple business processes within a single platform. By handling various functions such as accounting, payroll, supply chain management, and human resources, ERP systems offer a unified, centralized solution for managing enterprise-wide operations. To qualify as an ERP system, software must provide at least two core functionalities that were previously standalone systems (Al-Mashari, M., & Al-Mudimigh, A. 2003). This modularity and integration enable organizations to streamline processes, improve data accuracy, and enhance decision-making by consolidating information from different departments into a single, accessible system.

This flexibility also makes ERP systems suitable for organizations of all sizes, allowing even small businesses to benefit from the efficiency and insights that larger enterprises have traditionally enjoyed. Some organizations, particularly those with strong IT capabilities, opt for a "best-of-breed" approach rather than relying entirely on a single ERP vendor. They may implement only selected modules of an ERP system while integrating them with other specialized software solutions. This approach allows organizations to tailor their IT landscape to their unique business needs while managing different functions flexibly. On the other hand, the integration process necessitates meticulous coordination to guarantee a smooth data flow between systems. This is why firms with sophisticated information technology teams or the ability to collaborate with external integration specialists frequently choose to implement this strategy. This flexibility makes ERP solutions flexible to enterprises of varying sizes and industries. This enables firms to solve specific operational difficulties without being trapped into a solution that is universally applicable to all situations. ERP development was initiated by SAP in 1990. (Robert Jacobs, 2007).

Keywords: ERP, Implementation, Expert panel, Case study, Risk assessment, MRP, T&M, SOW.

Introduction

Compared to the cost-effectiveness of traditional onsite procedures, the online implementation mode is a more recent and cost-effective methodology. On the other hand, it continues to be underused, particularly in India, due to the many problems and myths that surround it. Although the online implementation method is most commonly linked with cloud-based enterprise resource planning (ERP) systems, it applies to many ERP systems, such as on-premises ERP, SaaS ERP, open-source ERP, and cloud-based ERP. An online implementation mode that takes a time and materials (T&M) approach can be more advantageous than a traditional one since implementation expenses are only paid for the hours booked and authorized. On the other hand, a fixed-fee costing strategy is often utilized in the case of conventional onsite installation.

Suppose a time and materials technique is used instead. In that case, the consulting team must pay for all the

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scheduled hours, regardless of whether or not the task has been finished. One of the most significant benefits of the online implementation mode is that both sides can meet electronically, which means that time is rarely a barrier. The firm responsible for the implementation ought to choose this method since it enables the same team to oversee many implementations simultaneously by effectively allocating hours. When the consulting team travels to the client's location, they become entirely focused on the project they are working on. This is the case with onsite implementations. The introduction of online services demands improvements at each level, which necessitates the identification of gaps and comparisons with procedures carried out onsite. It is necessary to devote more time during the implementation cycle to the phases of discovery and training. During these two stages, traditional onsite teams are customarily required to remain at the client's location.

On the other hand, online implementation allows these sessions to be completed in various sections, which accommodates the availability of users. Most clients do not frequently accept this form of deployment for ERP projects in India, although it is effective. Small and medium-sized enterprises (SMEs) benefit the most from this since it has the potential to cut considerably down on implementation costs. Online implementation, when used appropriately, has the potential to be more effective than onsite techniques. The primary advantages of online implementation include regular touch-base meetings and weekly status calls conducted over virtual platforms. Fixed fees and T&M are two ways of costing for implementation that must be decided upon before the project begins and documented in the statement of work (SOW).

Additionally, the manner of implementation, whether onsite or online, should be stated in the work statement. Installing online services was not viable in the past since the internet infrastructure was not yet fully built. On the other hand, online implementation is frequently shown to be a more acceptable and cost-effective option for businesses with many sites or branches located in different parts of the world from one. It is possible for the cost of onsite deployment to become unaffordable for a firm if they choose to execute it at each premise.

The primary objective of this research is to identify effective practices in ERP project management that are frequently disregarded for various reasons. If these procedures are neglected, they may fail in the implementation, or even if they are performed successfully, they may exceed the restrictions of both the money and the time. According to the findings of a few studies, the level of interest demonstrated by both sides decreases when the implementations exceed their intended budgets or schedules. Since both the client and the ERP implementation team approach the deployment of ERP as a project, it is vital to have good management across all of the different stages of the implementation process. This research will concentrate on various methods that may be utilized efficiently, including the primary reasons for their utilization, the required precautions, and the suitable situations.

Literature Review

Concept and History of ERP

With the introduction of MRP (II), an improved extension version of MRP (I) was made available. It oversaw critical organizational divisions, including sales, financial accounting, purchasing, order management, marketing, and human resource management (Kumar and Hillegersberg, 2000).

ERP Product Selection

This study places a significant emphasis on ERP product selection. That is because every ERP business releases a new version of its product either once a year or twice a year. This is because each new version has a relatively limited number of new features, with most new features being bug fixes. However, customers do not certify new versions of ERP software. Because of changes in system architecture, databases, and other areas, the stability of the new version has not been demonstrated beyond a reasonable doubt (Al-Mashari *et al*., 2003).

Selection of the Right ERP Vendor

The significant difficulties associated with the ERP Vendor Selection process were mainly explained in this study. Some of the most important aspects that we need to take into account during the process of selecting a vendor include the following: the history of the organization, the technology, the management of change, the market share of the vendor, their reputation, the number of consultants, the number of installations, and so on (Mark Alexander Fox and Ganesh Vaidyanathan, 2017).

Open-Source ERP

ERP cost is dependent on the ERP features available. Costs will be increased, which will be dependent on needed customization (Herzog, 2006).

ERP Implementation Critical Failure Factors

In their study, identifying the critical failure factors of industries in an Iranian setup, they found that technologically advanced developed countries have developed most of the technology IT standards. As in developing countries, businesses that operate in these setups face unique challenges and conditions (A. Amid *et al*., 2012).

ERP Implementation

Three main stages must be crossed before an organization successfully adopts ERP systems. They are the pre-implementation stage, execution stage and postimplementation stage (Silva and Olivera, 2015).

Critical Success Factors (CSF) for ERP Implementation

According to the findings of this study, the researchers describe the most essential aspects that completely impact the ERP adoption process. The process of implementing ERP is a significant and lengthy one. This technique requires substantial financial commitments to be made. A complicated process that is influenced by both internal and external environmental influences, ERP installation is a complex environment (Umble *et al*., 2003).

Navigating the Digital Frontier: A Review of Education Management in the Age of Technology.

The purpose of this research is to illustrate how educational systems may benefit from the implementation of new technology. This research promotes the utilization of emerging technology for improvement. During this investigation, the researchers discovered and discussed some difficulties. These difficulties included being aware of new technologies, having a high cost, and so on (Jangjarat, Kris & Limna, Pongsakorn & Maskran, Prin & Klayklung, Prapasiri & Chocksathaporn, Piyawatjana, 2023).

Impact of ERP implementation on Internal process of organization

This research reveals a one-of-a-kind piece of knowledge. At some point in the implementation process, a stage will arrive at which the performance of the organization will deteriorate even worse before it begins to improve. The reason for this sort of issue is that throughout the installation process, there were times when users were required to complete work duplicated in both the existing ERP system and the new ERP system (Poston & Grabski, 2000; Robey & Ross, 2002).

Knowledge Transfer

This research explains the significance of knowledge, highlighting that knowledge is the most critical aspect of the ERP adoption process. The knowledge transfer step is highly significant and necessary in the implementation process (Chataway, Joanna & Quintas, Paul & Wield, David & Gault, Fred 2003).

There is a correlation between knowledge and power and the ability to take action. The ability to access information on the internet or anyplace else is pointless if one does not possess the knowledge necessary to comprehend the content, make sense of it, and put it to use. Arguably, the inability to convert the contents of the web into economic and societal value is a component of a "knowledge divide" far more severe than the access problem, which can be solved via investment and technology (Chataway, Joanna & Quintas, Paul & Wield, David & Gault, Fred).

ERP Implementation Strategy

This researcher explained the factors that affect ERP implementation those are risk management, resource planning, business process reengineering, etc (Berger E.F, 2014).

Usage of ERP System

This study clearly shows that the researcher proposed the Technology Acceptance Model (TAM). This model is well-known and widely used. This model increases the efficiency of the ERP system (Davis,1989).

It is evident from this study that the technology acceptance model (TAM) is primarily utilized to explain the utilization of ERP; it has the potential to improve the comprehension of the factors that contribute to enhancing the efficiency and effectiveness of ERP systems currently being utilized (Shih and Huang, 2009).

Readiness for the ERP

This study explains some essential readiness for the ERP system like Business process, Team participation, Business status readiness, scope and configuration, Functional issues and challenges, technical issues and challenges, IT assessment conclusions, IT infrastructure baseline, IT readiness assessment and recommendations etc. (Abuhashish, F. and Al-Tahat, K., 2020).

Implementation Approach

When any organization decides to change its entire system with a new system and the existing system will be discontinued after the implementation of all modules of the new system in one go, that approach is called extensive bang implementation (Nicolaou, 2004).

From this research, the researcher explains the advantages of the Big Bang approach, like not being required to run legacy systems parallel, using a short method, etc. However, it increases the chance of total system failure (O'Leary, 2000).

For this research, researchers focus on the Vanilla approach, adopting new changes and becoming part of the organization (Grabski and Leech, 2007).

User Acceptance and Satisfaction

The researcher proposed a conceptual User acceptance model for the ERP system in this research. This framework is based on the unified theory of acceptance and use of technology (UTAUT) model. In this research, the researcher studies the adoption behavior of ERP (Bamufleh, Dalal & Almalki, Maram & Almohammadi, Randa & Alharbi, Esraa, 2021).

Assessment and Analysis of Risk Associated with the Implementation

The risk involved in ERP implementation should be defined before implementation. An integrated model combining the risk management approach from the PMBOK standard and the FMEA technique was used to evaluate risk management. This method helps in designing a risk management model.

Table 1: various stages of ERP implementation

S. No.		*Onsite*	*Online*
1	Presence of implementation team	Requires physical presence of the implementation team at the client's location.	It relies on virtual communication tools; the implementation team may work wremotely.
2	Interaction and communication	Direct face-to-face interaction with client stakeholders. But time is not recorded for future reference.	Communication occurs virtually through video conferences, emails, and online collaboration tools. It will be quickly recorded for future reference,
3	Access to resources	Limited by geographical constraints, access to resources may be restricted to onsite facilities.	It allows access to a broader pool of resources regardless of location. It can leverage cloud-based tools and remote servers.
4	Flexibility and convenience	Due to travel requirements, less flexible in terms of scheduling may disrupt daily operations at the client's site.	It offers more flexibility as it eliminates the need for travel to accommodate varied time zones and schedules.
5	Costs and expenses	Typically, it involves higher costs due to travel expenses, accommodation, and the onsite presence of consultants.	Generally, it is more cost-effective as it reduces travel expenses and overhead costs associated with onsite implementation.
6	Security and data privacy	Provides more control over security and data privacy since implementation activities are conducted within the client's premises.	Relies on secure online communication and data transmission protocols may raise concerns about data security and privacy. However, reputable cloud providers often employ robust security measures. The client can create an NDA document for data security, which both parties should sign off on before starting.
7	Resource utilization	Requires dedicated space and infrastructure at the client's site for implementation activities.	Utilizes cloud-based resources and online collaboration tools, reducing the need for physical infrastructure at the client's location.
8	Response time and support	Offers immediate response and support as consultants are physically available onsite.	Response time may vary depending on the availability of virtual communication channels; support may be provided remotely.
9	Risk management	Risks related to travel disruptions, unforeseen delays, and onsite challenges.	Risks associated with internet connectivity issues, cyber threats, and remote collaboration challenges.
10	Backup and upgrade	Backup and upgrade process in this mode is complicated	The backup and upgrade process in this mode is straightforward.

The present study helps implement processes in project-based industrial Organizations through risk breakdown structure and risk management model. The success ratio of implementation becomes high if the organization manages risk (Taghipour, Drmohammad & Shabrang, Matin & Machiani, Hassan & Shamami, Nader, 2020).

Quality Benefits of ERP Implementation

An enterprise resource planning (ERP) system is a technology that assists businesses in enhancing their overall performance and efficiency and reducing the obstacles they face in their operations. This study aims to investigate the effects that several independent factors, such as training, the hardware and software utilized, and project management, have on the efficacy of an ERP system after it has been implemented. To optimize the quality advantages of ERP-CRM deployment, the model established through quantitative analysis using SPSS can assist small and medium-sized enterprises (SMEs) in prioritizing aspects (Prashant D. Deshmukha , G. T. Thampib , V.R. Kalamkarc (2015)).

Methodology

This section provides an overview of the research methods used for data collection and the tools and techniques for data evaluation. The study will consist of two phases of data collection. In the first phase, online interviews will be conducted with domestic and international ERP implementation experts. This will be followed by an in-depth case study analysis, which will include seven interviews: two with representatives from a large business, two from an SME-focused ERP implementer, and three with representatives from midsize and small businesses. Insights from both phases will help enhance and refine the research content and its presentation. Pastor Collado, J. A., & Esteves, J. (2000).

Several techniques are available within the framework of qualitative data collection and analysis. For this study, however, only two methods will be applied, tailored to the research's focus. The first technique involves the formation of an implementation expert panel, while the second consists of case study interviews.

Qualitative data analysis requires effectively interpreting data through various strategies outlined below:

Content Analysis

This method identifies patterns, themes, or meanings within the data.

Interpreting Data

- Transcribe the data
- Go through all transcripts to familiarize
- Create data categories.
- Analyzing the ideas, and
- Organizing the categories based on concepts.

Results

Usually, there are two factors of ERP implementation cost: product license cost and implementation cost; during onsite implementation, this cost becomes very high. On the other hand, online implementation mode costs are low. However, due to some issues in some stages, Indian organizations do not prefer online implementation. This research focuses on best implementation practices in the SME segment through online implementation mode for small-scale industries. Most small-scale industries (SSIs) in India are unorganized, and ERP implementation will help them. Some open-source ERPs are available at zero license cost and significantly less implementation cost. But suppose we follow some of the best implementation practices in various stages of ERP implementation. In that case, the online implementation mode becomes the effortless and cost-effective mode of implementation (de Castro Silva, S. L. F., & de Oliveira, S. B. (2015) (Table 1).

Conclusion

The outcome of this research is some of the best practices of ERP implementation. Suppose the customer and implementation team follow those suggested steps or methods. The chances of implementation failure will be reduced, the chances of successful implementation will increase, and the total implementation cost will be controlled or under budget. 3 Major benefits will be found.

- The ratio of successful implementation will be increased.
- Implementation will be completed within a defined timeline.
- Implementation will be completed within the limit of the budget.

Best Practices on Various stages of ERP implementation is a step-by-step approach. Below are steps of implementation where we need to make some corrections so implementation becomes successful and cost-effective.

- Presales/Final demo information should be appropriately carried forward to the implementation team.
- Scope of work (SOW) should be appropriately defined and contain all required information.
- Non-disclosure agreement (NDA) should be signed before the implementation so customers can share information without hesitation.
- Define High-Level Project Plan
- Define one point of contact
- Escalation matrix should be defined.
- Central repository for all documents
- All communication should be in writing.
- Declaration and communication of every milestone completion
- All Sessions should be recorded.
- Project kick-off meeting
- Gap analysis or discovery phase
- Business blueprint (BBP) document
- Change request document
- Proof of concept session
- Master data migration
- Weekly touch base meeting
- Training phase
- Conduct handholding sessions
- Periodically review session
- Cutover plan
- Conference room pilot session (CRP)
- UAT sign off
- During go-live support
- Project closer meeting
- Post go-live support

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