A Survey on ERP Implementation Techniques

Mercy Elizabeth¹, Megha Sanjana R², Nayantara N V³, Sheetal VA⁴

¹,²,³Pursuing B.E in Computer Science & Engineering, BMSCE, Bangalore, Indore
⁴Assistant Professor, Department of Computer Science & Engineering, BMSCE, Bangalore, Indore

Abstract—Enterprise resource planning (ERP) are business processes that are widely used in companies. However large number of ERP fail to meet the expectations of the companies. Also, with the increase in the competitive pressure in the market, products have to be developed in shortest periods of time. The software development, which once took nearly years, are now being developed in days. Thus, we will look into various ERP implementation techniques and compare them.

I. INTRODUCTION

A. Enterprise Resource Planning (ERP)

Enterprise Resource Planning (ERP) is a business software that helps connect various departments and modules, supporting information flow within and outside a system. It is large and complex and integrates the business applications to collect, store, manage, and integrate data from business activities of the organizations and its features include:

- ERP can be used in large organizations.
- It is an integrated system which can operate in real time.
- It consists of a set business modules.
- It has a common database supporting large number of applications.

The popular ERP systems in industry are SAP Business Suite, Microsoft Dynamics, Oracle EBS, Sage, SprinxCRM, OrangeHRM and many more. However, investments in ERP are still significant due to other constraints like lack of resources, lower experience in the field of IT and Information Science [5, 6, 7, 8]. 70% of ERP implementations fail because of underestimation of efforts or overestimation of the benefits. Investing multi-million dollars on ERP could be risky. Therefore the managers must make proper decisions and they need to have a clear and full understanding of the objectives by using evaluation methods [9, 10]. Implementation of ERP is a complex process and the company’s business process must be changed before implementing ERP and this is known as Business Process Reengineering (BPR) [11].

II. ERP IMPLEMENTATION APPROACH

Implementation implies the method that is adopted by the company to achieve goals. And the common implementation methods of ERP are:

A. Big Bang approach
B. Agile approach
C. Parallel
D. Hybrid

Each of these methods has its own advantages and disadvantages. In Big-bang approach there are distinct phases which has to be strictly followed and is expensive to undo any of the ERP changes that are brought to the company. It is also called Waterfall approach. In Agile implementation approach, the methodology is iterative and incremental in nature. It has small chunks of functionality with short development cycles. Thus agile method is also called the phased or incremental approach. Parallel development boosts the productivity of large software development by making two systems run in parallel. The Hybrid strategy is a combination of both, Big-bang approach and Agile approach.

A. Big-bang approach:

This implementation, as suggested by the name, takes place as a single, main event. All the modules are installed in one go and is used by all the users on the same specified date. The various steps in implementing this approach includes planning and preparing the management, converting the system from legacy system, releasing the new proposed system, and finally training the users. As per the survey in the paper [12], on adopting big bang approach, the performance decreases to bottom value, and after a while increases again. This catch-up period has to be dealt with carefully to avoid difficulties and future problems.

The advantages and disadvantages of Big-bang implementation method is:

i. Low cost. It is lower than phased method as it involves maintenance only of a single system.
ii. Return on investment is faster. The changes are immediate for all users across various departments.
iii. Implementation time is faster.
iv. High risk can incur as the users focus more on meeting the deadlines than planning. Some organization may not be ready to switch by the specified date.
v. Operations may be disrupted due to the catch-up period where the performance is decreased while adapting to the new system.
vi. If one module fails, the other modules are affected too. [13]
B. Agile approach:

Agile method provides alternative to traditional project management and is used in software development. In agile process the entire system is not built at once. Instead, the nontrivial system are partitioned into increments and developed in parallel. [18] The different forms of agile includes Scrum, Extreme programming, Crystal and many more [1].

Scrum: It is a popular simple and flexible way of introducing Agile. Scrum deals with empirical studies, self-management, and testing the built product. The traditional team management involves three Scrum roles: Product owner, Team, and Scrum Master. It increases the success in development of software.

Extreme Programming (XP): Extreme programming is one of the first proposed agile approach. Here, the whole team is considered important. The team may consist of developers, testers, software analysts, and customer representatives. Release planning involves analyses of the features given by the customers and finding the constraints and technical challenges. Iterative planning deals with the features given by the customer for the next iteration. The team estimates the time and cost. [16]

What are the defects of traditional Approaches?

Dr. Winston Royce, in his paper asserted that the software development should be independent of the previous stages. It must not be treated as an automobile development where pieces are added phase by phase. He recommended in gathering of all the requirement and then start with the design, coding and implementation. Today, very few organization prefer the traditional waterfall method. [15]

Agile implementation approach takes place in a phased or iterative way. It simple, and delivers fast operational functionality. The pitfalls in big-phased or iterative way. It simple, and delivers fast operational functionality. The pitfalls in big-

2) Sprint Realization: This phase consists of five steps:

i. Sprint planning meeting is done with the process owner and implementation team.
ii. Delta Realization deals in realization of the delta requirements, and includes testing and documentation.
iii. Daily status meetings are held to check the progress of the project and the obstacles are discussed.
iv. Sprint demo session, with the phased users and IT determine whether the requirements are met.
v. Sprint reviews are held to assess the advancements. [12]

The Agile adoption survey shows that agile techniques have been successfully adopted within a majority of organisations. Following agile means following the best practices, listening to the customers, improving existing capabilities, and providing individuals, groups and units the autonomy to improve and act on acquired knowledge. [14]

Advantages:

i. The number of resources required for implementation is less.
ii. It is less complex and the associated risks are low.
iii. There is ample time available for modifications giving the users longer time to adj[t.

Disadvantages:

i. It is time consuming thus making it expensive.
ii. More time for implementation comes with compromises.
iii. On the negative side agile can be misused for disordered development as it does not have any limitations or rules.
iv. Limited support for development of large, complex projects with large teams involved. [13, 14, 17]

Microsoft Dynamics AX is an ERP system that has a technical support from the agile principles. It sets a new standard for simplicity and it is a generation shift in business software, provides compelling user experience, with unmatched ability, and new levels of capability. It is a platform where one can customize the solution as per needs. It covers administrative and operational requirements like retail, public sector, manufacturing, service industry and distribution. It provides a global solution with global coverage designed to scale with the business. Dynamic AX 2012 does not focus merely on transaction, but turning transactions into information and then into business intelligence helping users make faster and better decisions. It helps capture business intelligence consisting of workflows and processes along with transactional information enabling rich analytics for business optimization and process effectiveness. Dynamics AX provides a model driven layered architecture.
Dynamics AX is simple—from installation, deployment, customizations, user interface, upgrading, connecting employees, partners, vendors, suppliers [2]. It helps reduce cost and time while improving margins and drives innovation. The manufacturer is benefitted as it shows improvement in productivity, visibility, supply chain collaboration, customer relation management and reduced inventory [3]. The solution areas of Dynamics AX is human resource management, sales and marketing, services management, supply chain management, project accounting, mobility, compliance management, collaborative workspace, business intelligence and reporting, manufacturing and finance management [4]. It can access data from Microsoft Excel, Microsoft Word, and documents from SharePoint. It is a unified solution bringing Microsoft research, development, and innovation [2].

C. Parallel Methodology

Parallel adoption involves running both the existing and the new ERP system at once, side by side. This reduces the risk in ERP implementation. Regular activities run on the old system while users learn the new ERP system. Once the new ERP system is implemented successfully, the legacy system is then shut down. The transition phase in Parallel development is slow compared to big-bang but faster than agile. Also, user adoption of parallel adoption is faster than big-bang but more complex than agile method.

D. Hybrid Strategy

Hybrid approach combines both sequential and incremental implementation concurrently. Sequential implementation is used for certain sub modules while incremental is used for some others. The advantages of hybrid strategy includes:

i. In phased approach large number of interface programs are used. Hybrid approach decreases its use largely as the sub modules are implemented together.
ii. Because of the above reason, the cost is also decreased.
iii. Implementation time is short unlike the agile method.
iv. As the implementation is done in two phases or cycles, large amount of resources are not required like the big-bang.
v. Going back to the previous phase is possible and this affects the cost of implementation.

III. CONCLUSION

It has been reported that large number of ERP implementations fail. Thus it is essential to analyse all the implementation strategies. Adoption of the right method increases the productivity of the enterprise. In waterfall approach, each aspects of the project will be considered. Even though the implementation time is shorter, there is no going back to the previous phase to make changes. Risks cannot be handled and has long catch up period. If something goes wrong, the productivity of the company falls.

Agile development provides assessment and direction throughout the life-cycle of a software. This is achieved through Sprints or iteration, at the end of which a shippable product increment is presented. But in agile, every aspect of requirement, development or design is considered. It requires more time and resources. However, during re-evaluation, going back is made possible. It also provides security. And talking about how does agile development helps the companies, the right products are brought to the market. It optimizes the value of the product, brings competition by continuously re-planning the release instead of just bringing a piece of product that has not yet been written. Thus the product developed by the team is prevented from being “shelved” and “never dispensed”. [15]

Parallel development uses a large amount of resources and is cost-centric.

The right approach for implementation depends on the organization where various aspects like technical and organizational factors are considered.

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REFERENCES


