Enterprise Applications Modernization, Issues and Opportunities

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ABSTRACT

The Enterprise application complexity of enterprises has assumed gigantic proportions in last 3-4 decades. In large enterprises, thousands of applications run on varied platforms. IT is not able to cater to the fast changing business needs as productivity is hindered by the soloed and duplicate applications. One of the key objectives of CIOs in 2015 onwards is to how to make future ready of the Enterprise applications so that they can meet the macro-economic business challenges of the modern day.
This paper examines the major business challenges and drivers for enterprise application modernization, key benefits of optimization and modernization.

Key Words
Enterprise Resource Planning, Enterprise Applications, Legacy Modernization, Information Systems Optimization, ERP Post Implementation Enhancements

I. INTRODUCTION

Irrespective of whether the company is a multi-national, multi-million dollar organization or a small company with single digit million turn over, they need to have robust Enterprise Resource Planning framework and systems.

Since the mid-1970s, companies started introducing computer based materials requirement planning systems. Majority of the firms got attracted towards this and this has initiated the evolution of Enterprise applications and attracted the researchers in this space.

In mid 1990s the Enterprise applications gained the momentum and many of the software companies launched their Enterprise applications as off the shelf products. Enterprise Resource Planning (ERP) systems are highly customizable applications to ensure it meets the requirements of differed Industries [22], [28]. As ERP systems support end to end business processes and business planning, it becomes fundamentally different from any other information systems.

Enterprise systems take long time to implement and it requires huge investments in terms of top management involvement, all users training, key business user involvement and implementing change management. Enterprise systems include ERP application, Customer Relationship Management (CRM), Supplier Relationship Management (SRM), Strategic Enterprise Management (SEM), and Advance Planning & Optimization (APO) and so on.

Enterprise Applications provides end to end solution for the entire enterprise. All the business preprocesses are mapped in enterprise applications and with the help of middleware technology Internal and External integration are implemented.

The macro business environment is changing fast. The conventional marketers such as brick and mortar companies are struggling against the e-commerce newbies of the market. The need of the hour is to be nimble and agile and be ahead of the market evolution curve. The market changes are being driven by the technology advancements. So, if one need to stay ahead of the curve, it is highly imperative that his/her IT systems are nimble enough to add new functionalities in quick time and low cost. Modernization of legacy applications is all about transforming the old applications to bring in that agility and nimbleness. Researchers and practitioners have identified and tested that it is not very simple and easy way to enable technology to transform business, though opportunities are huge and CIO's have no choice. In order to be living organization it is high time for the CIOs to ensure enterprise applications are not only transactional systems, but they are transforming the business. Research in past two decades says there are opportunities to enhance and modernize the applications to ensure it is utilized to its maximum value. Some of the key challenges are enterprise applications have become very complex, not easy to transform, change or replace. Organizations business maps have evolved extremely fast in past 20 years and which has contributed to maximum complexity in the enterprise applications.

In the current times, no modernization of the business is possible without modernizing the IT.
The size and complexity of today's IT application landscapes are reaching unmanageable levels and present major challenges to the CIOs. For many large corporations, the number of applications is more than 1000. A good percentage of this large application landscape consist of legacy systems, which consumes up to 70% of the IT budget for their maintenance, but yet lack the agility to meet the emerging business needs and pose big challenges in integrating the application with the new systems.

The legacy applications have an inflexible, rigid architecture that is not amenable to quick changes to meet the emerging business needs. Integration of the legacy applications with the modern platforms is complex.
Some of the examples for legacy systems include Mainframe systems (Online and Batch), Midrange systems using COBOL, Systems which use Power builder, Legacy Java and VB. It would be amazing to know that even today, 70% of all business transactions are processed in COBOL.
CIOs now see the task of legacy modernization as one of the key strategic imperatives, which may make or break the entire business of the enterprise.

II. LITERATURE REVIEW

We reviewed the various journals and conferences papers on Enterprise Applications and we have tried to analyze the trend of research in enterprise applications.

In 1980s to 1990s the focus of the research was to moving from small legacy applications for each department, business units to move to integrated enterprise applications. Many software products company launched their ERP products i.e. SAP, JD Edwards, BAAN and so on.

From 1990s to 2000 most of the studies, research has been performed on how to select the right ERP software product, how to implement and implementation success and failure. Major success in competitive advantage is improving speed of supply chain process [13]. SAP started becoming market leader by acquiring ERP market share and many researches during this period also did research on SAP ERP. Key benefits of SAP is speedy decisions, reduction in operations cost, systematic planning [3]. Global organization can benefit from ERP in speedy decision making [11], [16].

In 2000 to 2010 most of the research has been on defining the framework to identify the success of ERP, methods & means to improve ERP performance. Many researchers have worked on how organizations can enhance functionality of ERP, internal systems integration and external business partner integration issues, challenges. ERP setting up, implementation, and evaluation it the entire journey which brings in ERP success and ERP benefits [1]. ERP is highly customizable package

software to ensure it fits to different industries and able to integrate business processes seamlessly [22]. ERP success has been mixed; many researched have worked on critical success factors for successful ERP adoption [23].

Below table shows the various studies in ERP field.

TABLE 1: LITERATURE ON ENTERPRISE APPLICATIONS

Broad Area	**Research Literature**
Details of ERP Systems, architecture, end to end integration of various functional department business processes, Customer Relationship Management (CRM), Knowledge Management (KM)	Markus and Tanis (2000); Kumar and Hillegersberg (2000); Klaus (2000); Light (2001); Davenport (2000)
Enterprise Applications are highly customizable software applications. Integration is the key of ERP success.	Markus and Tanis(2000); Rosemann and Watson(2002); Klaus (2000); Hanseth (2001); Parr and Shanks (2000); Light (2001); Gattiker and Goodhue (2000)
ERP systems are complex applications and require organization full involvement.	Markus and Tanis (2000); Bunker (2000); Gosain (2004); Robey (2002); Davenport (2000; 1998)
ERP supports organization strategy and business strategy	Davenport (2000); Scott and Vessey (2002); Hanseth (2001); Fan (2000)

In 2010 onwards the focus moved to Freeware ERP Vs Traditional ERP, threat, benefits. Many research talks about how to simplify the enterprise landscape, Back to Basics Principals, Application portfolio optimization. Critical success factors (CSF) in ERP systems have been studied by many researchers and many of them proposed framework to measure the CSF [5]. Huge Investments bring return of investment need to be empirically tested. Some studies shows involvement of Management consultants leads to success of ERP [19]. [24] Nazir developed a framework to analyze the importance of IT in organization performance and agility. The framework suggests that Internal and external integration are two most important factors for the organization performance.

Morteza has proposed a model to measure the success of post implementation of ERP systems. In 2000 Markus and Tennis [22] proposed their model with three distinct phases. In 2003 Gable developed model based on four dimensions. In 2006 Ifinedo and Nahar extended model in six dimensions. [32]Wang studied the readiness of Freeware ERPs, in terms of functionality, security, integration and feasibility to host on cloud.

In last 2 to 3 years due to eCommerce, Digital evolution, the business process models and organization process models have changed drastically. Now most of the organizations are talking are they future ready in order to support future business models.

Now most of the research is happening in Big Data, Analytics, Mobility and Social Media. The major research question remains open; does this mean back bone enterprise applications will be completely replaced? Most of the CIO in 2015 has started talking about modernization of application portfolio to be in Digital race but at the same time they need to ensure enterprise applications can support tradition business models as well as Digital business models.

McAfee and Brynjolfsson, [21] recommend a three-step strategy, to gain and keep a competitive edge in the environment, Deploy, Innovate and Propagate. Continuous innovation should be the manta for the CIO in this competitive world.

III RESAERCH GAP:
Most of the studies have been in selection of right ERP product and key critical success factors in implementing ERP solutions. The absence of proven theoretical model to measure the performance of ERP systems and how it needs to be continuously evolved for business transformation also provides a weak platform for empirical research.

IV ISSUES & OPPORTUNITY IN MODERNIZATION
The main concern about the legacy systems is that they are not amenable for quick changes or integration with modern platforms which give the modern day market firepower for the enterprise. At the same time, they are costly to maintain as the skilled workforce is dwindling and the original vendors no longer exist or have stopped supporting these systems. Let us look at the key problems of legacy systems in detail. Continuous innovation should be the manta for the CIO in this competitive world.

The key issues of modernization to achieve business transformation;

1. Legacy Applications Unable to meet Changing Business Objectives

   - Productivity of enterprise is hindered by siloed and duplicative applications

   - Many of the Legacy applications are unable to meet business growth objectives (can't support large no of users or large no of customers)

   - There is a need for increase in transaction speed and capacity

2. Legacy applications are not SMAC ready (Social Media, Analytics , Cloud)

   - Presentation Layer is from old world. Not social media ready, no good interfaces

3. High Cost: In general, Enterprises spend almost 67% of its IT budget on maintaining legacy platforms.

   - Unsupported software – The version running is very old and unsupported. Or the software vendor does not even exist now!

   - There are 1000s of distributed applications developed / acquired over many years. There is no documentation for many of them.

4. Lack of Flexibility: Inflexible, closed architecture of the legacy applications hinder web enabling and integration with contemporary platforms

   - Higher time to market for changes due to tedious development cycles

   - Applications were not very modularized.

5. Lack of skilled resources on legacy technologies

   - The pool of skilled resources for old technologies is shrinking constantly. Cost goes up for available resources.

Challenges of the 'Digital Age' CIO: The business process maps are evolving fast. Digital marketing is replacing conventional marketing. SMAC alignment (readiness for social media, cloud, mobility) is not a choice but crucial for the very existence of the firm. Agility of the IT systems to roll out new features quickly is very critical to the success of the enterprise.

At the same time, the CIOs are under tremendous cost pressure as the enterprise tries to boost its bottom line. Hence they are looking for cost effective solutions, preferably self-funded transformation programs which can overhaul the old technology systems to a very flexible and agile IT landscape.

By taking up the legacy modernization projects, the CIOs are aiming at the following

   - Business – IT alignment. IT transformation to enable business transformation

   - Overall Cost reduction

   - Allocate higher budget percentage to innovation (By reducing the overall Maintenance cost)

   - Invest in cloud computing and enablement of social media

   - Improve the IT application agility and make it future ready

   - Cloud First Mobile First mindset

In short, the CIO is expecting to lower the complexity and footprint of the IT landscape, while the productivity and control increases.

VI. CONCLUSION

In conclusion, enterprise applications are back bone of enterprise and it needs to be evolved, modernize on continuous basis to suppose macro-economic changes and future business maps. Due to complex nature of enterprise applications the challenges are how to modernize, what to modernize and when to modernize. Despite the challenges, opportunities are huge and enterprise needs to find the right framework to modernize enterprise applications.

VII. FUTURE STUDY

The exhaustive study in this paper recommends the following areas for the researchers:
- Define the framework to modernize the enterprise applications
- Test the framework and pilot in any organization

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