Risk based ERP Implementation framework for Higher Education Institutions

Rajesh Subramanian  
Research Scholar, Amity University Rajasthan,  
India  
Academic Services, Botho University, Botswana  
Dr. Swapnesh Taterh  
Associate Professor, Amity University Rajasthan,  
India
Abstract - Despite the difficulties, risk and failures, higher education institutions are continuously replacing/implementing ERP Systems to meet the demands of sector competition and expectation form the stakeholders. Many literatures claim that the ERP implementation is risky and challenging. Especially when HEIs are novice, it becomes important to mitigate the risk involved in ERP implementation for a successful implementation. This paper proposes a new risk based framework for ERP implementation in higher education.

Keywords: Enterprise Resource Planning (ERP), ERP Implementation, Higher Education, Implementation framework, Implementation model.

1. INTRODUCTION

Educational institutions are having traditionally been non-competitive. However, with the advent of technology they have become competitive in order to survive [1]. A robust way to rationalise and enhance bottom line is implement process automation. Thus ERP’s have become the main stay. ERP systems not only automates a given process and system, they bring transparency, manageability [2] and huge cost saving if implemented correctly. ERP systems are high capability software with complex algorithms with scope to service any vertical within or outside an organisation, with the main role to support key administrative and academic services in an educational system[3]. Accuracy and accessibility of information are the hallmarks of an ERP system with in any business organisation and these are just some of the tangible benefits amongst a host of other advantages that come with it [4]. Primary focus of ERP system is to connect all the business functionalities into a single consolidated source that can help to meet the needs of the entire organisation. This ubiquitous system is expected to bring quality, productivity efficiency and profitability [8]. Despite the presence of many commercial program packages that merely amalgamate data and business processes, they cannot be suitable for implementation in an educational organisation such as universities [5]. The biggest threat to ERP systems, despite all their advantages, are their high levels of “failure proportion” [6]. An organisation by all measures can consider an ERP implementation as its biggest project undertaking [7]. Risk mitigation and framework procedures adherence are of paramount importance for a successful ERP implementation.

2. LITERATURE REVIEW

2.1 Higher Education and ERP systems

The challenge of increased competition, regulatory demands from the government and rising customer expectations has added pressure to the higher education sector to improve their operational efficiency. The continuous and major changes in the education sector demands all administrative processes to be managed efficiently [8,9]. Higher education ERP systems address the basic administrative functions such as Admissions, Student Administration, Programme and course management, Batch schedule management, Assessments, Student Services Facilities etc., which are traditionally not traditionally a part of ERP systems. “Traditional ERP systems address only administrative functions such as HR (Human Resource), Finance, Operations & Logistics and Sales and Marketing applications” [9]. Yet, the HE sector requires unique function as mentioned above.

According to Fisher [10], “ERP systems were initially introduced into HEIs in the US in response to the same drives that encouraged private sector adoption”. American HEIs embraced the ERP systems as a mode to integrating and managing complex process deficiencies that were inherent in the existing setup [11]. Despite the numerous advantages that are related with the implementation of ERP in higher education, they have far too often been described as un affordable, un-necessarily complex and or hazardous and risky to the implement [3, 6, 12, 13, 14]; However, globally, more organisations are seeing ERP as an efficient tool to develop, grow and sustain their organisations and have continued to embrace it [15].

Although liturgical resemblance of likeness between corporates and HEI’s do exist however a “copy & paste” would prove disastrous [16, 17]. Pollock and Cornford [9] “suggest that though Universities share similarities with manufacturing organisations, but recognise that Universities have specific and unique administrative needs”. “The uniqueness of HEIs according to Lockwood [21] is as follows:

- complexity of purpose,
- limited measurability of outputs,
- both autonomy and dependency from wider society,
- diffuse structure and authority, and internal fragmentation.”

2.2 ERP Success and failure stories

Various literatures reveal that there are mixed results in the implementation of ERP.

According to a survey [10], almost 85% of ERP system users have categorically stated their absolute satisfaction with the system. Additionally,
some have even argued that it is impossible to continue without the system.

Umbe1 [18] said, “At Toro Co., ERP, coupled with new warehousing and distribution methods, resulted in annual savings of $10 million due to inventory reduction. Owens Corning claims ERP software helped it save $50 million in logistics, materials management, and sourcing”.

According to Zaglago, Novotny and Sabati said that “The Earthgrains Company witnessed a net improvement in its operating margin from 2.4 to 3.3%. The company also improved its on-time delivery to 99% thereby improving its customer satisfaction metric” [19].

While these are some evidences for ERP implementation successes on the other hand the literatures also registered the failures in the ERP implementation.

Rasmy says [20], “three quarters of ERP projects are considered failures and many ERP projects ended catastrophically”.

Muscato1lo & Parente [22] reported that “failure rates estimated to be as high as 50 percent of all ERP implementations”.

Wang [23] said that, “70 percent of ERP implementations fail to deliver anticipated benefits”.

Malahat [24] reports that “more than 50 % of the projects were cost 189% of their original estimates” Panorama Consulting Solutions, an ERP consulting firm had published a report in the ERP 2015 magazine with the following information: [25]

- 58% implementation showed a cost overrun
- 65% had issued time overruns
- 53% of the implementations stated that the system met less than 50% of the set objectives in comparison to tangible benefits.

2.3 Risk involved in ERP implementation

Research has indicated that there exists a high implementation failure rate of integrated information systems. A few instances have evolved in to “high risk category”.

This is clearly due the way in which ERP evolved historically. Success models of highly efficient companies where used as a benchmark reference for implementation. Complexities arising due to adaptation were not considered thus increasing the rise manifold.

Contrary to expectations of improved organisational effectiveness due to an ERP implementation, documented failure rate is high. The reasons for failure can be manifold. But the core reasons is due the evolution the ERP system itself. The initial strategy was to capture “best practice” processes across successful industries and create a reference benchmark model. So, when a different industry embarked on adapting the best practice of completely different trade sector the challenges and complexities became evident and proved to be a huge deterrent to the exercise. Other causes can be:

- Unrealistic organisational objectives
- Undecided implementation methodology
- Poorly outlines goals
- Lack of management support and participation
- Miscalculated scope, size and complexity
- Organisation change readiness
- Inconsistent project resource selection process
- Unqualified human resource with no relevant skills
- Questionable data accuracy
- Infrastructure issues of technical nature

An ERP system serves all verticals of an organisation. Hence a successful ERP implementation can only have defined by many factors, for example:

- Stakeholder/management participation
- Upgrade & or modernise existing processes
- Connecting integral system to external systems
- Co-operation between advisors and staff
- Highly skilled & educated staff.

An organisation is expected to undergo huge financial cost for the implementation of an ERP system. According to Umble [18] “the cost of implementation of an integral information solution for a medium-sized enterprise may amount to between $2m and $4m. On the other hand, the expenses for the implementation of ERP systems in a large enterprise can exceed $100m”.

2.4 ERP implementation Success and failures in Higher Education Institutions

Global ERP solutions were introduced to help organise and standardise processes within an organisation. The manufacturing sector was the first to reap its benefits. However, a “copy & paste” of this framework into any other sector could mean risk consequences as every other sector is different. Hence it is safe to say that HEI’s have a unique context of operations. More industry specific research needs to done to completely evaluate the challenges and risks of implementing an ERP system in the HEI sector.

However, Swartz [9] says “Universities are now spending upwards of $20 million each to implement modern Enterprise Resource Planning (ERP) projects that can take two, three or more years to implement. Early reports suggest a mix result of ERP implementation in the HEI sector.
from across demographics. The two authors of this report, both CIO’s of large universities, share their experiences and lessons learned on ERP and provide a framework to approach an ERP that could save universities millions of dollars.”

[21] “Despite a limited number of implemented integral programme solutions in higher education institutions, some cases of unsuccessful implementation can be found in practice: At Cleveland State University, they were almost forced to take legal action against the ERP vendor, after they had found out that only half of student requests can be dealt with in 1998. The University continued with the implementation of ERP system despite rising costs (the planned amount was exceeded by $10.8m and amounted to more than $15m).

Similarly, the planned cost of the implementation of integral information solution at Ohio State University rose from the initial $53m to $85m.

The University of Minnesota had a similar experience, when the planned cost of $38m rose to $53m, and finally reached $60m.”

In many cases ERP implementation project failures are prescribed to many reasons. Some projects were left uncompleted and some others were terminated. The core reason however is:

• cost overruns that are a consequence of improper scope definition

• Slow or negative project progression

According to several studies ultimate success or failure solely lies in the commitment and contribution the top management brings into an ERP implementation. Hence stakeholder involved is not only imperative but also crucial. [11].

Traditionally ERP projects are a high cost, high intensity endeavours that come with certain uncertainties and risks [12]. Hence to reduce/minimize the risk the next section of this paper proposes a framework that gives focus on risk management in ERP implementation.

3 PROPOSED FRAMEWORK

This proposed framework is based on the analysis of previous studies of scholars, the relevant research publications and considering the uniqueness of the higher education sector. There were few frameworks found in the literature for higher education however, there is no much importance given to risk management. This proposed framework has different stages and gives focus on risk management as well.

The different phases are as follows:

• Preparation Phase
  a. Acceptance stage
  b. Selection stage
• Planning Phase
• Implementation Phase
• Go-live Phase
• Integration and Upgrade Phase
• Risk Management Phase

3.1 Preparation Phase

Preparation is the initial stage of the framework. There are two different stages in this phase they are Acceptance stage and Selection stage.

Acceptance stage is focuses on the adoptive decisions of the ERP systems. There are important activities in this stage. They are

1. Need analysis
2. Current environment
3. Decision making

The existing environment needs to be analysed for a gap or need statement, the steps leading to defining the “need statement” should be documented. The “need statement document will highlight the draw backs and strengths of the current system. Based on this data a “need analysis” for a new ERP system can established. This initiative will help determine whether the current systems should be replaced with an ERP system or to merely enhance the current system to include additional capabilities.

A critical foresight of the challenges and risks involved in the implementation of an ERP system should be made know at this nascent stage of decision making.

Institutional readiness for a project of this magnitude in terms of time and mission criticalness should always be gauged across the business vertical. Rhetorical readiness questionnaires would try and validate answers to the following kind of questions:

• Is this initiative the only one of its kind in perusal at the moment across all business verticals?

• Does the top brass willing to commit to this project and back it to the hilt will support and resources?

• Does the institution need this system, in other words, is the environment, right?

• Are bottom line variants definitive and quantifiable in numbers?

A validation of the responses to this questionnaire may help in identifying and addressing any resistance that might arise.

All this step will help in making the decision whether the institution should really to implement ERP system or the existing setup is enough to
Selection stage is another important phase after the decision is made to move to ERP Systems. The following selections to be done carefully

1. Product and vendor
2. Consultant
3. Steering committee
4. Project team
5. Risk management team

Product and vendor

A consensus in selecting the best fit ERP can only begin when all current processes are audited and documented in for SOPs. An in-depth analysis of the strengths, weaknesses, opportunities and threats in fulfiling organisational goals have to be understood. Representatives from across all the business verticals should be able to pitch in with “pain areas” in their use of the current system. These “stake holders” should be empowered by the top management to challenges vendors to demonstrate proof of concept either in an existing environment or as feature that can be implemented via customisation.

Critical to this process is a score card that can quantify the system evaluation scores in numbers, for the purpose of benchmarking with other vendors if necessary. It is very crucial to not be overwhelmed or be “star struck” by the features, aspects & benefits of the system as elaborated by the vendor, but to keep the end user impact in mind while understanding each aspect of the system. A strong negotiation system should be put in place to ensure that both parties fairly gain maximum benefit from this endeavour. Organisational negotiation is very imperative in established a solid working foundation for the project.

Consultant

As is the general business standard a consultant’s role should never be relegated to a mere 3rd party. In many instances consultants are veterans in implementing ERP solutions across various industry sectors. Their role as a neutral guide with experience in tight corners can make a huge difference in terms of cost and time saving. Educational organisations that embark on this endeavour should interview and choose the best possible personnel for this task.

Committees and Project Team

For a successful ERP implementation, it is important to comprise the committees and a strong project team. The following committees to be formed namely, project steering committee which is responsible for the overall governance and administration of the implementation. This committee will be completely responsible for the major changes and decision making in relation to the cost and scope or any other key changes in the ERP implementation process. This committee represented at the top and senior management people.

The project team on the hand is an implementation team which consists of head from the various department including the project head. This is the core team which must be involved from the beginning to the ending of the implementation. There must regular recorded meeting should happen between the committees and the project team and the vendor project manager.

Risk Management Team

It is also vital to form a risk management team with the risk management experts to identify, analysis and mitigate the risk in the implementation. This is a very important team which is usual not formed in the project which may result in unsuccessful implementation. This team should play a vital role from the beginning to the ending of the project with regular update through meeting and reports on the status of the risk management in the project.

3.2 Planning Stage

Develop a clear SOA

Framework literature have always demanded a clear definition of the scope of objectives as critical to ERP implementation success [26,27]. The scope definition to be defined by team of people from all the divisions of the higher education institution. For eg. The staff member from Management, Faculty office administrators, Academic division such as department level staff, IT members, Student affairs, human resource, finance, etc.,

Decide the Project Plan and timeline

Scheduling is key to the implementation of the project. Activity time lines as defined by the contract of implementation is critical to the success of failure of the project. Frequency and sequence of order is imperative in the scheduling process. Time overruns and schedule adherence reports should be validated frequently to identify delays or obstacles to implementation in regards to time management.

A defined schedule of activities among other things will help define the following:

- Monitor and control mechanism
- Resource allocation and utilization
- Quantify time based delay and its impact on project cost
- Project progress tracking.

The initial contract developed with stakeholder will act as roadmap to ERP implementation. Interact
and develop a clear BRD with all stakeholders – intensive work done in Phase 1 use the same

Short listing a framework is important to the implementation process. Choosing the right fit eases the roll out phase of implementation. In this stage process documentation and single step implementation can be used.

Some organisations depending on their complexity level can choose a phased roll out. Organisations with a legacy system would prefer a parallel adoption method where the legacy system will be phased out at a later stage

Decide the transition strategy (as applicable)

Identifying legacy data for conversion is the critical action in this stage. Creating plans and templated so the identical process flows are captures and automated in the ERP system. A clear agreement of Scope, Size, and schedule of the data should be understood. Building a virtual module with the process flows can ease the transition stage.

Initiate and sign the contract with deliverables

A contract initiation plan is finalized. Here the shortlisted vendor is advised of deliverables and also importantly penalties. All issues of BRD are mentioned in the contract with turnaround time and quality assurance matrix as specified by the implementer and the vendor.

Technical infrastructure

In this step the existing technical infrastructure is analysed. It is compared with proposed requirement of the vendor to implement ERP system. It is important to procure the necessary technical components for the infrastructure to be ready for the implementation including the relevant licenses.

3.3 Implementation Stage

Create necessary technical environment

A technical environment within an organisation helps create essential validators to service provision and inter departmental co-operation. This would essentially mean putting the correct infrastructural elements in place as defined by the vendor. Example servers, network provision, software etc.

Configure/develop and Deploy:
To set up systems to replicate the legacy model. Modules need to function as defined in the signed BRD. In the event of a feature not readily available the vendor will need to develop and implement the same.

Data Migration

In this crucial stage the legacy master data from the current system is prepared for movement or migration in to the new ERP environment. Any issues identified in this stage needs to be documented and rectified immediately with regular incidence reports.

Test and Ensure

Testing scenarios are the next vital step in the process. The process flow to achievable are tested to
demonstrate its effectiveness. A testing environment should typically assimilate both typical and unusual scenarios and workflow validation as defined in the BRD is essential at this stage. All fixes and alignments need to be documented and implemented.

Documentation

In this stage the implementation team documents all their activities and shared incident report with the necessary solutions to the project team.

3.4 Go-live

Many this stage as exciting or nervous as the outcome would define the way forward. Critical elements of this process are as follows:

- The implementer need to address all issue logs and affirm that that have been corrected during simulation. All modifications are inspected for faults and documented if any. Staff and end user training is put into motion. Vendor and consultants are on “standby” on Go Live day.

- End users are assisted and trained by vendors and implementers during this phase.

Fig 1: Phases of the framework and its interconnections
The Figure 1 above explains difference phases in RBERPI framework. The relationship between the phases with Risk management phase is also indicated. It also show the activities involved in each phase and its contribution is the other phases.

3.5 Integration and Upgrade Stage

The Go Live ERP system is then integrated into the work environment as the “De Facto” system replacing all legacy systems depending upon the implementation strategy planned. If all the integration is done before go live phase then only upgrade to be focused. If the integration is planned at different stage then that needs to be considered.

Periodical audits are conducted in order to assess if the ERP systems is delivering according to set objectives. The implementer needs to highlight need for upgrade as when a business need is not met. If this can be solved by a simple workflow enhancement, it needs to carried out without delays.

3.6 Risk Management

One of the most crucial and mostly neglected stop is risk management and mitigation. Due to the colossal size and scope of the system it is easy for the project to under estimate or overestimate the risks involved. Risks can range from broad to narrow and can neutrality affect the outcome of the implementation.

Identification, Assessment and control

Identifying risk factors is key, Simple steps like evaluating a vendor track record for successful implementation is imperative. Similarly checking if the Business Process Mapping is in line with the organisational executive objective. GAP analysis in failure to meet objective is a ongoing process if neglected can prove fatal. Another factor is TCO of total cost of ownership. When the initial selection and short listing of the vendor process is in progress. Organisations fail to seek clarity on how much the system might cost eventually.

Need to have a water tight implementation road map with insight and support from all the stake holders are important. Buy in from all stakeholders are essential.

An internal risk assessment team can also prove to be extremely helpful. Or a risk assessment advisory consultant will be a benefit to the team.

Risk identification and prioritization of risks at the early stage is very important to minimize the risk in the later stages. After the identification and prioritization how to control the risk is planned. It is also to identified the probability of the risk to occur and re occur. At this stage the contingency action plan is also devised to deal if the risk turns into a problem.

Design or control risks are sounded off at a very nascent stage of implementation, this gives implementers to be prepared. It is important review or assess the current risk along with control library. Checking system for conformance compliance is key.

Overcoming risks at all stages are important. Agility on part of the both the parties are critical. Automating[28-30] a specified process into a software. End users feedback about scope of functions and improvement needs to done on a regular basis. Vendor agreement must include “on demand change”, whereby any required changes are enacted within the stipulated time.

A clear segregation of the business process and the technology layers are needed to understand end points and handover points.

Optimizing the process design to meet internal control objectives. Risks in “to be controls” vis -a-vis “to be business process” are to be standardized and categorised on their level of impact.

Baseline risks in change management needs to be understood and incorporated in the planning stages. Stake holders such as the IT department should know when in advance as to what roles they would be required to play in the implementation plan.[31-32]

4. CONCLUSION

The purpose of this paper is to present a risk based ERP implementation framework which has been proposed. This framework will help the higher education institutions to implement the ERP systems with risk management and to engage and act on the risk that will arise during the implementation. This framework will also help to identify the risks at in the vital stages of the ERP implementation. The key focus is given to the risk identification, Risk assessment and mitigation at in the early stage of the implementation to reduce or avoid implementation failures.

5. REFERENCES

3. Zornada, L., & Velkavrh, T. B., “Implementing ERP systems in higher education institutions,” In 27th International Conference on Information