ASSESSMENT OF ENTERPRISE RESOURCE PLANNING IMPLEMENTATION IN ZIMBABWEAN COMPANIES AND READINESS TOOL TOWARDS A STRATEGIC SUCCESS FRAMEWORK

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ABSTRACT

Enterprise Resource Planning (ERP) was a great leap of technology that received astounding welcome in the business world. However, with time problems began to surface, from complexity to inflexibility. Consequently, companies implementing ERP software are not attaining full benefits due to several reasons. Studies have been carried out in different countries to evaluate the causes of failure and provide solutions. This paper aimed at assessing ERP implementation from Zimbabwe’s perspective. Questionnaire surveys were done focusing on major project stages namely pre-implementation, implementation and post-implementation. The survey also targeted all parties involved in ERP implementation, comprising top management, Information Technology department, end users and consultants. From the findings analysed, a conceptual success model was designed and simulated using System Dynamics Software. Application software was developed using Visual Basic 200x to measure companies’ readiness level for ERP implementation. Based on these results, recommendations were made on ways to tap the full potential embedded in the Enterprise Resource Planning technology. Therefore, the resulting model and software was used as a tool for companies that intend to optimize their systems and to manage ERP projects in future.
1 INTRODUCTION

Research has attributed closure of most companies to decision making on inadequate, incomplete, inaccurate and obsolete information. As a result, the most popular trend in corporations nowadays, is to rely more and more on Enterprise Resource Planning (ERP) systems as they move towards increased integration and team-based work processes. These ERP systems allow companies to work as a whole instead of relying on islands of information. However, most companies have not been able to fully benefit from their very expensive ERP implementations. The failure of ERP projects remains a major concern for all organisations thinking of adopting ERP systems [1].

Pouransafar et al [2] shows 70 percent of all ERP projects fail to be fully implemented even after three years. Jahanyan et al [3] added that the management team has to concentrate not only on economic and formative objectives but also on the other aspectual objectives which are more qualitative and intangible for the success of ERP implementation. ERP project failure is a major threat to organisations and has influenced other companies’ decision in adopting ERPs. In order to cope with this challenging threat in the industry, Zimbabwean industry needs to explore the key factors influencing ERP project failures in order to help reduce the chances of failure. It is not the first time that attempts are made to solve this problem, previous attempts have tried to capture the cause of failure in different countries and different economic situations [4, 5, 6, 7, 8, 9]. The aim of this paper was to look at ERP implementation failures from a Zimbabwean perspective. This will allow companies, through their project managers to identify critical success factors to avoid failure in the future and reduce the level of threat for organisations thinking of adopting ERP systems. This paper can also be used as guidance for the ERP project managers in order to acknowledge previous failures and to understand the missing gap that they must fill in order to attain successful projects in some ERP implementations.

2 RELATED LITERATURE

Section 2 gives a brief on the ERP implementation stages, followed by the ERP implementation failure areas. Systems Dynamics was discussed introducing the tool used to support strategic framework of the paper.

2.1 ERP Implementation stages

According to Rashid [4], ERP implementation stages can be classified into:

a) Pre-implementation or setting up stage

This phase considers incorporation of the risk and quality management plans in the change management plan; breakdown of the project into natural phases or subsystems for modular planning and development of cross-functional communications.

b) Implementation stage

Implementation stage involves formulating a network for collecting user requirements, and setting-up monitoring network for collecting control information at each stage of the implementation process. In this stage preparation to handle expected or unexpected crises through a strong leadership with concern for the welfare of people and resource commitment are some of the strategies to consider. The top management support, client consultation, user participation are some more strategies to be considered.

c) Post implementation or evaluation stage

Post-implementation activities are critical for the acceptance of ERP systems. Requirements of IT systems and structures tend to change continuously even after the completion of a project. Post project evaluation strategy could be followed in measuring the effectiveness of an ERP system, where some of the questions could be used for further improvement:
i. Whether the objectives of the ERP system were realized fully
ii. Whether the scheme options were considered adequately
iii. Whether the estimates and project information were accurate
iv. Whether or not the agreed practices and techniques were complied with

2.2 Factors Leading to ERP Implementation Failure

Ligus [5] defines twelve (12) cardinal sins of ERP implementation and some of the factors are discussed are lack of top management commitment leading to lower management levels missing scope, size, time and resources required for successful implementation; Inadequate requirements definition; poor ERP package selection due to inadequately developed functional requirements definitions; inadequate resources in terms adequate skills and individual workloads; resistance to change and lack of buy-in caused by failure to build a case for change, lack of involvement by those responsible for working with changed processes, inadequate communication, lack of visible top management support and commitment and arrogance; miscalculation of time and effort; misfit of application software with business processes; unrealistic expectation of benefits and Return On Investment (ROI); inadequate training and education; poor project design and management by short-cut critical events in the project plan, such as time for documentation, redefining and integrating processes, or testing before going live; poor communications begin with announcing the reason for the up and coming effort, and continuing to advise the organization of the progress and importance of the ERP implementation to the company while good communication allows different parts of the organization to assess how they will be impacted by changes in processes, policies, and procedures and ill-advised cost cutting as seen in an effort to avoid temporary conversion costs, some companies take a very risky route and go live at multi-plant sites simultaneously, subjecting all plants or some plants to a total shutdown.

Some of the other work that looked at the critical success factors for ERP projects was Wong and Tein [6]. Aarabi et al, [7], and Saini et al [8] analysed critical success factors in ERP implementation with a focus on small and medium enterprises in developed an country which gave a basis of comparison of recommendation to Zimbabwe for some of the small to medium organisations considered.

2.3 Types of success in ERP systems

Success in ERP implementation can be categorised as follows [9]:

i. Correspondence success: when there is a match between IT systems and the specific planned objectives.
ii. Process success: when the project is completed within time and budget.
iii. Interaction success: is when users’ attitude towards IT is positive.
iv. Expectation success

2.4 Systems Dynamics

System Dynamics is a study of information feedback characteristics of industrial activity to show how organisational structure, amplification in policies and time delays in decisions and actions interact to influence the success of the enterprise. Real world processes are represented in terms of stocks, for example, material, knowledge, people and money, flows between these stocks and information that determines the value of the flows [10].

According to Sterman [11] large scale projects belong to the class of complex dynamic systems and such systems. These are extremely complex, consisting of multiple and interdependent components, highly dynamic, involve multiple feedback processes, involve
non-linear relationships and involve both hard and soft data. To manage such complexity properly, a model must be capable of representing systems with these characteristics and it must be understandable and usable by the managers of the projects.

3 METHODOLOGY

Purposive sampling was used in terms of the companies that had implemented ERP systems from the past work by Mhlanga et al [12]. Thirteen (13) companies were targeted of different products and employee sizes. Questionnaires were designed to interrogate the critical success factors and project management in three main ERP implementation stages namely pre-implementation, implementation and post implementation. The target groups such as Top management, Companies’ Information Technology Department, End-users and Consultants were selected based on the five main pillars of ERP implementation [13] for which questionnaires were designed.

Table 1 shows a summary of the companies using ERP systems and consultants.

The second stage of the methodology involved strategic analysis of ERP implementation through the application of systems dynamics using Vensim software. The motivation was to evaluate the effect of the different stages of implementation. The final stage involved the development of an ERP implementation readiness tool using Visual Basics programming which could give indication to the company on their position in ERP readiness.

![Figure 1: ERP Readiness Assessment framework](image_url)
4 FINDINGS

4.1 TOP MANAGEMENT AND PROJECT MANAGEMENT FINDINGS

The following are the findings gathered from top management and project management concerning their roles in ERP implementations.

**Table 1: Companies using ERP Systems and Consultants**

<table>
<thead>
<tr>
<th>Company</th>
<th>Business</th>
<th>Company Size</th>
<th>ERP software</th>
<th>Company</th>
<th>Business</th>
<th>Company Size</th>
<th>ERP software</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cafca</td>
<td>Power cables</td>
<td>150</td>
<td>Sage</td>
<td>Unilever</td>
<td>Fast moving consumer goods</td>
<td>360</td>
<td>SAP</td>
</tr>
<tr>
<td>Coca cola</td>
<td>Beverages</td>
<td>4000</td>
<td>Syspro</td>
<td>Victoria Foods</td>
<td>Foodstuffs</td>
<td>300</td>
<td>Microsoft Navision</td>
</tr>
<tr>
<td>Dairibord</td>
<td>Dairy products</td>
<td>800</td>
<td>SAP</td>
<td>ZESA Enterprises</td>
<td>Transformers</td>
<td>300</td>
<td>SAP</td>
</tr>
<tr>
<td>Delta Beverages</td>
<td>Beverages</td>
<td>1134</td>
<td>Syspro</td>
<td>Zimtile</td>
<td>Roof tiles</td>
<td>300</td>
<td>Microsoft Navision</td>
</tr>
<tr>
<td>Dunlop</td>
<td>Tyres</td>
<td>200</td>
<td>Syspro</td>
<td>23rd Century systems</td>
<td>ERP Consultants</td>
<td>-</td>
<td>SAP</td>
</tr>
<tr>
<td>Monarch Steel</td>
<td>Steel products</td>
<td>400</td>
<td>Sage</td>
<td>Chips Enterprise</td>
<td>ERP Consultants</td>
<td>-</td>
<td>Sage</td>
</tr>
<tr>
<td>Natpharm</td>
<td>Pharmaceuticals</td>
<td>180</td>
<td>Microsoft Navision</td>
<td>Pinsoft Consultant s</td>
<td>ERP Consultants</td>
<td>-</td>
<td>Microsoft Navision</td>
</tr>
<tr>
<td>Schweppes</td>
<td>Beverages</td>
<td>700</td>
<td>Microsoft Navision</td>
<td>West Chase Consultant s</td>
<td>ERP Consultants</td>
<td>-</td>
<td>Microsoft Navision</td>
</tr>
<tr>
<td>Turnall Fibre Cement</td>
<td>Roof sheets</td>
<td>500</td>
<td>Microsoft Navision</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4.1.1 Software selection factors

One of the factors that affect success in the implementation of ERP systems is the choice of software used. The types of ERP software used are shown in Table 1. Table 2 summarises selection factors such as vendor reputation, compatibility with existing system, ease of use, cost efficiency and consultants’ suggestion were used in choosing the software packages. There is diversity of software selection factors chosen by companies but an average of 3 factors are used by each company in selecting a software package to use, that is, 36.9% of factors are considered.
### Table 2: ERP selection factors

<table>
<thead>
<tr>
<th>Companies</th>
<th>Vendor reputation</th>
<th>Compatibility with system</th>
<th>Ease of use</th>
<th>Cost</th>
<th>Efﬁciency</th>
<th>Consultant’s Suggestion</th>
</tr>
</thead>
</table>

| % CONTRIBUTION | 30 | 30 | 38 | 30 | 30 | 8 |

#### 4.1.2 Objectives behind ERP implementation

Table 3 shows the companies objectives behind implementing ERP systems. Table 3 shows that companies implement ERP systems mostly to improve productivity, efficiency and customer service.

#### Table 3: Objectives behind ERP implementation projects

<table>
<thead>
<tr>
<th>Companies</th>
<th>Increase Revenue</th>
<th>Increase Productivity</th>
<th>Facilitate Growth</th>
<th>Economic recovery</th>
<th>Merger</th>
<th>Customer Service</th>
<th>Improve Efﬁciency</th>
</tr>
</thead>
<tbody>
<tr>
<td>% CONTRIBUTION</td>
<td>15</td>
<td>38</td>
<td>15</td>
<td>0</td>
<td>0</td>
<td>53</td>
<td>61</td>
</tr>
</tbody>
</table>

#### 4.1.3 Other strategic decisions

The other strategic decisions made by the top management are based on the number of modules in the software, the number of IT personnel on the ground to support the system and the number of additional personnel needed after implementation of the systems. Figure 1 shows an average of 5 ERP modules were being used in companies. The IT departments have an average of 5 personnel while only about 30% of companies employ new people as a result of ERP projects.
4.1.4 Total costs of ERP projects

The cost of ERP implementations are summarised in Figure 2 which support the great need for planning for success of the project comparing the investment that goes into the project. ERP projects cost small companies an average of US$100 000 while large companies spend up to US$1 Million on ERP implementations. This information was given to give a guide to the price of products. Thus companies can purchase products that are in their budget reach and still get the full benefits. The cost of the product should also be related to the usage of the package which is mentioned in sections below where some companies would pay for packages but do not fully utilize them.

![Figure 2: Total cost of ERP Implementation projects](image)

4.1.5 Pre-implementation stage

The main strategies used in the pre-implementation stages are as shown in Figure 3. Figure 3 highlights that there was more than 75% support from top management although in some companies it is as low as 50%. Of the key critical success factors in ERP implementation, companies are considering an average of 60% of them, with some recording as low as 20% consideration of the critical success factors.

![Figure 3: Pre-implementation stage: Strategic Decisions](image)

4.1.6 Implementation stage

The implementation activities and their variations are shown in Figure 4. Figure 4 highlights that ERP projects take an average of 13 months to be completed. There is satisfactory top management support (over 75%) during implementation while 60% of companies carry out basic computer training during ERP implementation and most of these carry out a one-off
training. Averages of five (5) ERP training were carried out during ERP implementations. Of the common challenges faced in ERP implementations, companies surveyed face an average of 37% of them and over 75% of the problems have been solved to date.

![Graph of Implementation Factors](image1)

**Figure 4: Implementation Factors**

### 4.1.7 Post implementation (overall)

The post implementation benefits as they are realised in the organisations are summarised in Figure 5.

![Graph of Post-implementation Stage Overall](image2)

**Figure 5: Post-implementation stage (overall)**

Figure 5 highlights that Averages of 65% set objectives have been achieved. There have been about 39% sales increases from the ERP implementations, with 58% productivity improvements. Companies exceeded set project time frames by 32%. Eighty percent (80%) of implemented ERP modules are running or in use while 20% is not in use.

![Graph of Post-implementation: User Evaluation](image3)

**Figure 6: Post-implementation: User Evaluation**
4.1.8 Post implementation (user)

The findings in Figure 6 show that ERP systems have 62% user friendliness, while overall satisfaction is 82%. Continuous support was found to be 83%, ERP user capabilities was at 67% while there was 77% measure of positive user attitude towards ERP systems.

4.2 TECHNOLOGY MANAGEMENT FINDINGS

The findings from IT departments were as follows:

4.2.1 Pre-implementation stage

Figure 7 shows IT changes that take place in the pre-implementation stage.

![Figure 7: Pre-implementation stage: IT Function](image)

Figure 7 shows the IT departments had an average of 73% involvement and influence during ERP implementation whereas there is 41% Business Process Re-engineering in companies for ERP projects. ERP systems have 70% functional capabilities and about 64% system-software alignments were achieved. Flexibility of ERP system was found to be 60%, real time information achievement 65% and efficiency was estimated at 75%.

![Figure 8: Implementation stage: IT Implementation](image)

4.2.2 Implementation stage

In the implementation stages, the IT department recorded 62% of the infrastructure required for ERP systems as shown in Figure 8. There was 58% capability to link with suppliers and customers and over 75% of organisational integration due to ERP implementation. Computer literacy was between 50% and 75% while Consultant capability was estimated at 64%.
4.2.3 Post-implementation stage

The IT departments handle the day to day running of the ERP system in the following ways shown in Figure 9 and their frequencies of occurrence. On IT post-implementation 52% of faults were dealt with internally as summarised in Figure 9 while 43% of faults were fixed by an external support team. About 13% of faults remained unsolved; there are about 27% system changes after ERP implementation while there was 36% further training after ERP implementation.

![Figure 9: Post-implementation stage: ERP Faults](image)

4.3 CHANGE MANAGEMENT FINDINGS

Findings from ERP end users are summarised in Figure 10. End-user ERP background, involvement of end users in implementation, ERP user friendliness, ERP speed capability, reporting capability and overall performance were 32%, 42%, 62%, 63%, 65% and 65% respectively.

![Figure 10: Change management: End User](image)

4.4 PROCESS MANAGEMENT FINDINGS

Consultants as the major influencers and drivers of the ERP implementations provided the following information.

4.4.1 Companies input

Figure 11 show that company information compactness was found to be 50% while about 75% of the information was quantitative. Business Process Re-engineering was carried out 42%
although system-software alignment was 58%. There was 50% top management involvement with computer literacy at 50% in organisations.

4.4.2 Consultants input

The consultants’ contributions were rated as shown in Figure 12. ERP projects took from 6 months to 24 months to complete while some project reversals ranged from 0-5 reversals per consultant history. Averages of six (6) test runs are carried out to come up with the best quality ERP system and Consultants ran an average of 5 training sessions in organisations during ERP implementation.

4.5 OPEN RESPONSES

4.5.1 Challenges faced by Top management in ERP projects

The following challenges were sighted by top management: upgrading to newer versions, infrastructure constraints, staff adaptation to new environment (culture change), aligning ERP software package to the existing company systems (BPR), network speed and reliability, end user resistance to change, budget constraints, implementation clashing with normal duties, skills deficiency, high turnover of consultants, limited consultant knowledge, changes in the business trading procedures, funding for training and training to make end users competent.

4.5.2 Challenges faced by IT in ERP projects

The following challenges were sighted by IT departments regarding ERP implementations: low computer literacy of users, users’ resistance to change, hardware upgrade, infrastructure robustness, maintaining link-up connection, delays in performing tasks, Business Process Re-engineering, infrastructure compatibility, inventory grouping, budget
constraints, identification of assets into the system, poor network systems, power outages, lack of backup information, customisation of the Dispatch function.

4.5.3 Challenges faced by End Users in ERP projects

The following challenges were sighted by end-user regarding ERP implementations: network fluctuations, low system response speed, reports do not give the correct on the ground situation, strong knowledge base required, user congestion, non-user-friendly system, too much centralisation, budget constraints, limited user licences, limited storage capability, little communication between management and end-users, poor integration with other existing systems e.g ONKEY, hierarchical decision making deems process slow, low computer literacy and bar coding.

The challenges the consultants faced in implementing ERPs in companies were lack of commitment and resistance to change from users, lack of adequate funding, high turnover of top management in companies and lack of adequate support resources.

4.5.4 Major Business Process Re-engineering

The major process changes made in companies are barcoding for stocktaking, procedure changes in Quality Management System, purchase of new hardware and process planning changes.

4.5.5 Means of addressing end user complaints

End-users face challenges such as faults and constraints and the channels used in solving the problems are call centre system, key users in each department, change request form to track user positions, back-end/ consultant support and centralised IT support system.

5 SYSTEMS DYNAMIC MODELS

The developed strategic success framework is shown in Figure 13. It shows the critical success factors as they affect success of ERP implementations in Zimbabwean companies at each stage of implementation project. The importance ratings are quoted with the factors to guide the project managers in managing ERP projects. It also shows interactions of factors between the three implementation stages.

Figure 13: Selected concept
# READINESS ASSESSMENT TOOL

The user rates the local weights by selecting a suitable value between 1 and 100. The {Local weights} button calculates the local weights and the results appear in the {Textboxes} adjacent as shown in Figure 15. The {Save} button appears on each of the subsequent forms thus each instance of the assessment can be saved to a Microsoft Excel spread sheet for tracking and reporting purposes. The {>>>>>} button navigates user to the next stage.

![Figure 15: Local weights-factors/ sub-goals](image)

Figure 16 calculates global weights based on the previously calculated local weights.

![Figure 16: Global weights](image)
Figure 17: Readiness level

Figure 17 calculates the readiness level for Project management, Organisational management and Change management. The {Save} button saves the results on Excel Spreadsheets and can be used for reporting and tracking. The {Analyse} button navigates the user to Analysis form that shows the factors that need improvement to increase readiness level. The {Close} button terminates the Readiness Assessment. From the calculations project readiness is 61%, organisational readiness is 71% while change management readiness is 61%.

7 RECOMMENDATION AND CONCLUSIONS

The following recommendations were derived from research and analysis of findings:

a) Top management support remains a highly rated factor fundamental for the success of any project in general and ERP projects in particular

b) Process management: There should be informed decisions regarding the selection of the software vendor and the consultant for the achievement of implementation vision and goals. Choose a vendor with knowledge of the local trading environment.

c) Technology management: Proper budgets and allowance for additional indirect costs should be made for the acquisition of adequate infrastructure for the efficiency of the ERP system.

d) Change management: There should be continuous involvement of end users through all project stages and culture change activities such as training should be carried out.

e) Benefits evaluation: Companies should carry out project evaluation and introduce continuous improvement activities such as software upgrades and end user training.

In conclusion the paper set to highlight the background on ERP systems and factors affecting the success and failure of implementation depending on the stages and the different people involved from top management, IT personnel, end users and consultants. Questionnaire
survey was used to gather data on success of ERP implementation in Zimbabwe companies as to give an insight to other companies that are hesitating of facing challenges in the implementation so that they learn from those that have implemented. Adopting the recommendations outlined in this paper will optimise the success levels of ERP implementations and will result in companies tapping full benefit from this huge investment.

8 REFERENCES


