



ISSN: 2319-5967

ISO 9001:2008 Certified

International Journal of Engineering Science and Innovative Technology (IJESIT)

Volume 4, Issue 2, March 2015

Investigation of Enterprise Resource Planning System (ERP) implementation in Libyan oil Service Company

Redha M. Elhuni

Abstract—This paper presents the findings of the investigation of ERP implementation. It highlights the challenges and experiences of Libyan Companies in ERP implementation. The success factors, failures are analyzed and have proposed recommendations to improve ERP implementation. The adopted research approach covers both quantitative and qualitative methods. The data collection methods used were questionnaires, 75 out of 100 questionnaires were returned sufficiently completed. The paper contributes to discussion based on literature review and ERP implementation in developing economics. The results of the study revealed that the majority of the respondents are aware of what ERP is all about, and they are also aware about critical issues in the implementation of ERP. The findings revealed that: failure to select committees needed for the successful implementation of ERP, an inadequate financial budget and resources, and failure to make knowledgeable input at the planning stage can be problems to successful implementation of ERP. The conclusions suggest for addressing challenges and problems in the ERP implementation. Enough time should be provided to project team, show leadership in change management and sufficient resources should be allocated for the proper implementation of ERP.

Index Terms—ERP, CSFs, MRP, MRP II.

I. INTRODUCTION

An ERP system is a packaged business software system that allows a company to automate & integrate the majority of its business processes, and share common data and practices across the entire enterprise [1]. ERP also produces and accesses information in a real-time environment. Many companies use ERP software to integrate the enterprise-wide information and process for example their human resources, financial, manufacturing, logistics, sales and marketing functions. ERP was designed mainly to provide a total, integrated company's resource to manage the business process efficiently and effectively.

ERP systems have been increasingly adopted by various industries and any company wants to enhance competitiveness by most effectively using all assets including information. One of the major components of the competitive strategy of many businesses is the communication technologies and the strategic emphasis has made it possible for managers to integrate information and communication technologies throughout the organization and link all business units together [2].

The popularity of ERP software began to rise in the early 1990s and has grown to become one of the most widespread software applications used in managing enterprise wide business processes [3]. One of the dominant features of the ERP market is that enthusiasm for ERP systems in the industrial area such as chemicals, IT, electronics, textiles, and even in the public sector [3]; [4]. Today's ERP system is an outgrowth of Materials Requirement Planning (MRP) systems. As MRP evolved to MRP II, it began to incorporate financial control and the measurement, master production scheduling, and capacity planning. Now, ERP has been extended not only to capture entire functions in the enterprise but also to be integrated with additional functions such as business intelligence and Decision Support Systems [5].

During the 1970s, MRP packages were extended with further applications in order to offer complete support for the entire production planning and control cycle. MRP II was initiated with long-term sales forecast to encompass new functionality such as sales planning, capacity management and scheduling [6]. Then in the 1980s, MRP II was extended towards the more technical areas that cover the product development and production processes. As in fig.1 Computer Integrated Manufacturing (CIM) supplied the entire conceptual framework for the integration of all business administrative and technical functions of a company such as financials (accounts receivable and

payable), operations and logistics (inventory management & shipping), sales and distribution (order management & sales management), and human resources (personnel planning)[6].

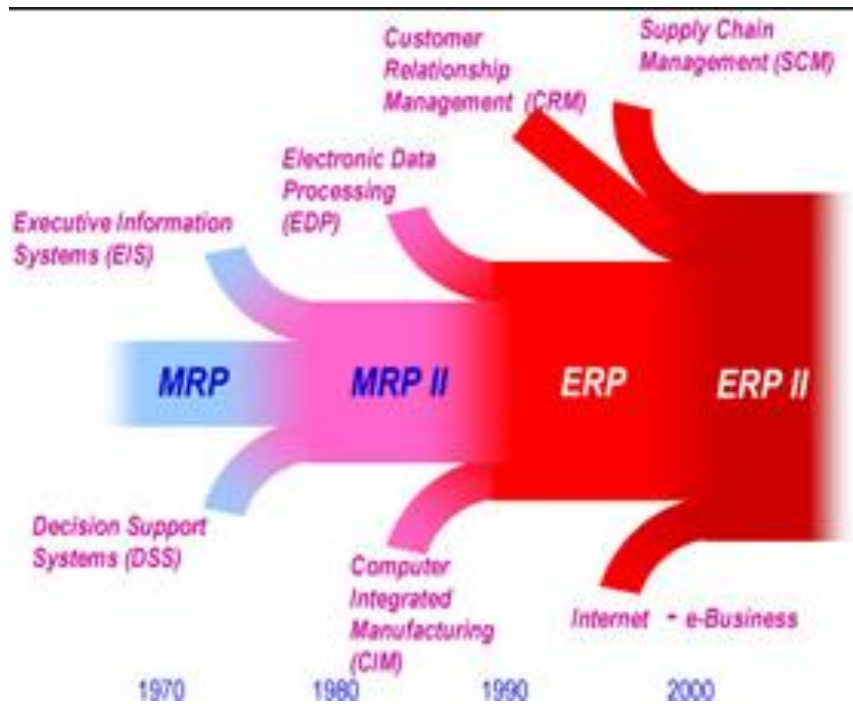


Fig 1: The evolution towards enterprise resource planning (Source: H. Klaus, 2000)

Satisfying customers' needs is the ultimate goal of the ERP System. Companies around the world using ERP systems to provide customers right products, in the right time, right quality, and right price. ERP system provides organizations with the integrated manufacturing operations, placing a new emphasis on a customer satisfaction involving quality.

A. CHALLENGES AND PROBLEMS

ERP implementations are complicated projects. They require good management for the different contributions from the functional departments, consultants' business partners, and vendors involved in the project [7]. Literature review shows that some organizations perform inadequate research, both in terms of time and spending, before choosing an ERP system. The main problem areas identified were: Inadequate financial research; Time constraints and; Skill constraints.

B. CRITICAL SUCCESS FACTORS OF AN ERP SYSTEM

An ERP system can help organizations to reduce costs, reduce rework, and better decision making. ERP systems implementation is a complex exercise in technology innovation and organizational change management [8]; [9] and it is not an easy task. It requires the coordination of many activities of an organization and a close cooperation of employees, managers, IT specialists, business analysts, consultants, and trading partners [10]. Furthermore, the ERP systems implementation differs from the traditional systems implementation in scale, complexity, organizational impact, user's participation, cost, and business impact [11]. Additionally, there is a lack of proven scientific theories and experiences on the implementation of ERP systems in developing economics.

Many authors have defined the critical success factors that affect the implementation of ERP systems in business organizations [12]; [13]; [14]; [15]; [16]; [17]. Table 1 presents the selected critical success factors for ERP systems implementation that are mentioned in the literature. One of the most prominent of these success factors is, clear understanding of strategic goal: Key people in the organization should create a clear vision on how the company should operate in order to satisfy customers, empower employees and facilitate suppliers for the next three to five years [18]; [19].



ISSN: 2319-5967

ISO 9001:2008 Certified

International Journal of Engineering Science and Innovative Technology (IJESIT)

Volume 4, Issue 2, March 2015

Table 1: Critical success factors for ERP systems implementation according to different authors

Somers and Nelson (2001) [18]	Hairul, Nasir, and Sahibuddin (2011) [16]	Alaskari, Ahmad, and Dhafr (2012) [12]
<ol style="list-style-type: none"> 1. Top management support 2. Project champion 3. User training and education 4. Management of expectations 5. Vendor/customer partnerships 6. Use of vendors' development tools. 7. Careful selection of the appropriate package 8. Project management 9. Steering committee 10. Use of consultants 11. Minimal customization 12. Data analysis and conversion 13. Business process reengineering 14. Defining the architecture 15. Dedicated resources 16. Project team competence 17. Change management 18. Clear goals and objectives 19. Education on new business processes 20. Interdepartmental communication 21. Interdepartmental co-operation 22. Ongoing vendor support 	<p>People-related factors</p> <ol style="list-style-type: none"> 1. Effective project management skills/methodologies (project manager) 2. Support from top management 3. User/client involvement 4. Skilled and sufficient staffs 5. Good leadership 6. Committed and motivated team 7. Good performance by vendors/contractors/ consultants <p>Process-related factors</p> <ol style="list-style-type: none"> 8. Clear requirements and specifications 9. Clear objective/goal/scope 10. Realistic schedule 11. Effective communication and feed-back 12. Realistic budget 13. Frozen requirement 14. Proper planning 15. Appropriate development processes/methodologies (process) 16. Up-to-date progress reporting 17. Effective monitoring and control 18. Adequate resources 19. Risk management 20. Effective change and configuration management 21. Good quality management 22. Clear assignment of roles and responsibilities 23. End-user training provision <p>Technical-related factors</p> <ol style="list-style-type: none"> 24. Familiar with technology/development methodology 25. Complexity, project size, duration, number of organizations involved 26. Supporting tools and good infra-structure 	<ol style="list-style-type: none"> 1. Top management support 2. User training and education on software 3. Business process reengineering 4. Project management 5. Effective communication 6. Change culture 7. Clear goals and objectives 8. Use of consultants services 9. Interdepartmental cooperation 10. Upgrading infrastructure 11. Financial resources 12. Project team organization and competence 13. Legacy system management 14. Change management 15. Vendor support 16. Project champion 17. System technological 18. ERP package selection 19. Data accuracy 20. Sponsorship 21. Minimal customization 22. Project manager

II. METHODOLOGY

Number of research methods and techniques were used in the study, this include the use of questionnaires, interviews, observation, and the review of the company documents. The researcher used both Quantitative and Qualitative research. In Quantitative, closed ended questionnaires were used, because it is appropriate when the variable is known, and all respondents were exposed to the same categories of responses, example: grouping employees with occupational level. Closed ended questions are easy to analyze, can be more specific, and it does not take too much time of the respondent. The researcher asked all the respondents similar questions and divided them into two sections. The researcher designed closed ended questions. The final version of the questionnaire was sent to the company after reproductions of 100 questionnaires were distributed, 75 questionnaires came back from the company, and they were analyzed.



ISSN: 2319-5967

ISO 9001:2008 Certified

International Journal of Engineering Science and Innovative Technology (IJESIT)

Volume 4, Issue 2, March 2015

III. FINDINGS

The paper has presented results of the investigation conducted on the implementation of ERP and its impacts in a Libyan Company. The findings of the study revealed that the majority of the respondents are aware of what ERP is all about, and they are also aware about critical issues in the implementation of ERP. The findings pertaining to ERP implementation lessons were that:

1. Failure to select committees needed for the successful implementation of ERP can be a problem to successful implementation of ERP.
2. Inadequate financial budget and resources can lead to failure of ERP implementation.
3. Failure to use knowledgeable consultants can hamper successful implementation of ERP.

Qualitative Analysis

The qualitative analysis involved responses to eight sections seeking for open-ended responses. This was followed by interviews of some of the respondents to confirm the information obtained through triangulation. The aim was to get the views of the respondents in order to measure the impact of ERP system in a Libyan Company.

What is your understanding of ERP? – Most of the respondents understood ERP to be an integrated system that allows financial, logistics and manufacturing transactions. Some indicated that ERP as a tool helped in improving the performance of the organization. The majority of the respondents indicated that ERP assists in organizing, codifying and standardizing the business processes. The respondents displayed a good understanding of ERP.

What were the reasons for introducing an ERP system?

The respondents indicated that there are many reasons for introducing ERP system for example some of the responses were as follows:

- It was introduced due to necessary technological changes as demanded by customers and suppliers
- The introduction of new and faster computer systems compelled the company to change dramatically in the world of technology
- The company was forced to introduce ERP to improve and develop its operations to cope future needs.

Looking at the implementation of ERP system, do you have any regrets, or do you think it was the right decision, and why? (Things that make them happy and the things that make them worry about the implementation of the ERP system and why?) - The majority of the respondents did not regret the implementing ERP. Some of the reasons were as follows:

1. Short time to implement. It took them only months to implement the local version of ERP.
2. There was minimal business interruption.
3. The benefits of the system were apparent immediately; it enhanced and speeded responses to inquiries.
4. Businesses processed were re-aligned in a way that improved performance and work procedures.

How does it feel to use ERP system in your company today, any benefits? - The respondents were happy to use the ERP system. Some of them indicated that they realized many of the benefits claimed for ERP systems. The majority of the respondents indicated that it was easy to amalgamate different operations and functions in the company using ERP system. It made access to information easier. Some respondents claimed that the ERP system speeds transactions and responses to inquiries, and they indicated that since the introduction of ERP, customer service had improved greatly. Communication with customers and suppliers has become faster and easier.

What would you say are the progress and success factors in the implementation of the ERP system? – It was noted that top management found it easier to understand the business due to enhanced visibility. They also in the process understood their role in the implementation of ERP and other related business procedures in a way that improved total company operations and systems. Furthermore, ERP improved the smooth running of the business.

What are some of the challenges or problems faced in the implementation of an ERP system? How are these problems or challenges affecting your company? - There are many challenges which were identified by the respondents in the implementation of ERP. Some of the main challenges identified were as follows:

Adaptability: The majority of the respondents indicated that some employees are failing to adapt to the new system. At first most of the employees were afraid to use the system thinking that it might crash and stop working.



ISSN: 2319-5967

ISO 9001:2008 Certified

International Journal of Engineering Science and Innovative Technology (IJESIT)

Volume 4, Issue 2, March 2015

Initially many employees were afraid of this new and unknown system and of the changes that would result. At some point the system was seen as an enemy of the organization. This changed as the people got used to operating it realizing the benefits that resulted. Some of the employees were not eager to embrace the necessary change. Initially employees were not ready for change and this was the greatest challenge for the implementation of ERP. The young generation in the organization was eager for change whereas the older generation was not eager for change. This conflict was a setback during the implementation of ERP in the organization and slowed down progress. Furthermore, the change in the Material department particularly in purchasing section and warehouse was a nightmare because the people in that section were most resistant, not ready to face the necessary changes. Insufficient time was allocated for the implementation of ERP and this posed many serious challenges. Employees were not given enough time to fully understand and to implement the ERP system. Initially top management did not offer enough support. However when these issues were addressed it took the company less than a year only to move to the new system. What do you think could be done to address these challenges? Who should play a role on addressing these challenges/problems? - The majority of the respondents indicated that both employees and all levels of management should adhere to the change. Furthermore, respondents indicated that there should be workshops on change management. "If employees and top management had attended change management workshops, it could have assisted the company to have a better understanding of ERP implementation". Another area that needed to be attended to according to the respondents is the allocation of adequate time for the implementation of ERP. To strengthen the implementation of ERP, respondents suggested that the top management should provide sufficient resources for the project. All the respondents indicated that it is the responsibility of the Project Implementation Team, with full support from the top management, to address these challenges and problems.

IV. RECOMENDATION

The following were identified as the recommendations for addressing challenges and problems in the implementation of ERP:

1. Project Management Team should be provided with enough time for the implementation.
2. Allocate sufficient resources for the proper implementation of ERP.
3. The Project Management Team should lead in change management.

The paper has presented results of the investigation conducted on the implementation of ERP and its impacts in a Libyan Company. The findings of the study revealed that the majority of the respondents are aware of what ERP is all about, and they are also aware about critical issues in the implementation of ERP. The findings relating to ERP implementation lessons and recommendations were presented in table 2.

Table 2: The findings pertaining to ERP implementation

ERP implementation lessons	ERP implementation recommendations
<ol style="list-style-type: none"> 1. ERP permits for information sharing assisting in organizing, codifying and standardizing the business process. 2. ERP handles the different functions of a company like manufacturing, logistics, distribution, inventory, administration and financial. 3. Inadequate financial budget and resources can lead to failure of ERP implementation. 4. Failure to select committees needed for the successful implementation of ERP can be a hindrance to successful implementation of ERP. 5. Failure to use knowledgeable consultants can hamper successful implementation of ERP 	<ol style="list-style-type: none"> 1. Top management should support the implementation of ERP 2. Clear understanding of strategic goals that necessitate use of ERP 3. Excellent project management 4. Organizational change management is needed. 5. Adequate budget and competent human resources. 6. Use knowledgeable consultants in training. 7. Put strong leadership to lead in the implementation process. 8. The company should put in place a strong implementation team. 9. Sufficient support from the top management. 10. Implementers should be trained. 11. Training should be tailor made so that it should address the needs of the company and the implementers 12. There should be enough budgets for monitoring and evaluation of the system. 13. The implementers should articulate the common goals which should help both parties to rise above their differences.



ISSN: 2319-5967

ISO 9001:2008 Certified

International Journal of Engineering Science and Innovative Technology (IJESIT)

Volume 4, Issue 2, March 2015

ACKNOWLEDGMENT

The author is grateful for the support provided by the management and staff of Libyan Petroleum Institute in conducting this research study.

REFERENCES

- [1] P. B. Seddon, G. Shanks, & L. (Eds.) Will cocks, "Second-wave enterprise resource planning systems", New York: Cambridge University, 2003.
- [2] C. Yang, and Y Su, 'why are enterprise resource planning systems indispensable to supply chain management', European journal of operational research, production, manufacturing, and logistics, 2009.
- [3] C. Holland, P. Kawalek, & B. Light, 'Beyond ERP systems: innovative strategies for competitive advantage', In Proceedings of the Seventh European Conference on Information Systems. Copenhagen, Denmark: Copenhagen Business School, 1999a.
- [4] S. I. Chang & G. A Gable, 'Delphi examination of public sector ERP lifecycle implementation, management and support issues', Journal of Decision Systems, Special Issue on ERP and their implications for Decision Making, 2001.
- [5] V. A. Mabert Soni, & M. Venkataramanan. 'Enterprise resource planning survey of US manufacturing firm', Production and Inventory Management Journal, vol.41, no.2, pp. 52-58, 2000.
- [6] H. Klaus, M. Rosemann, and G. G. Gable, "What is ERP?", Information Systems Frontiers (2:2), pp. 141- 162, 2000.
- [7] K. G. Sandoe, C. Corbit and T. Boykin, "Enterprise Integration", New York Wiley, 2001.
- [8] V. Kumar, B. Maheshwari, & U. Kumar, "ERP systems implementation: Best practices in Canadian government organizations", Government Information Quarterly, no.19, pp. 147–172, 2002.
- [9] M. L. Markus & C. Tanis, "The enterprise systems experience-from adoption to success", In fram in the domains of IT research: glimpsing the future through the past, Zmud, R. W. (Eds.), Cincinnati, OH: Pinnaflex Educational Resources, 2000.
- [10] V. Sambamurthy, & L/ J. Kirsch, "An integrative framework of the information systems development process", Decision Science, vol.31, no.2, pp.391-411, 2000.
- [11] S. V. Grabski & S. A. Leech, "Complementary controls and ERP implementation success", International Journal of Accounting Information Systems, vol. 8, pp.17 – 39, 2007.
- [12] O. Alaskari, M.M. Ahmad, N. Dhafr, & R. Pinedo Cuenca,"Critical successful factors (CSFs) for successful implementation of lean tools and ERP systems", Proceedings of the World Congress on Engineering vol.3, 2012.
- [13] C. C. Law,, C. C. Chen, & B. J .Wu, " an aging the full ERP life-cycle: Considerations of maintenance and support requirements and IT governance practice as integral elements of the formula for successful ERP adoption", Computers in Industry, vol.61, pp. 297–30, 2010.
- [14] P. L. Liu, "Empirical study on influence of critical success factors on ERP knowledge management on management performance in high-tech industries in Taiwan", Expert Systems with Applications, vol.38, pp. 10696–10704, 2011.
- [15] E. W. Ngai, C. C. Law & F. K. T. Wat, "Examining the critical success factors in the adoption of enterprise resource planning", Computers in Industry, vol.59, pp. 548–564, 2008.
- [16] M. Hairul, N. Nasir & S. Sahibuddin,"Critical success factors for software projects: A comparative study", Scientific Research and Essays, vol.10, pp.2174-2186, 2011.
- [17] T. M. Somers & K. Nelson, "The impact of critical success factors across the stage of ERP Implementation", Proceeding of the 34 Hawaii International Conference on System Sciences HICSS-34), vol. 8. Washington: IEEE Computer Society, 2001.
- [18] E. Ziemba & I. Oblak, "Critical Success Factors for ERP Systems Implementation in Public Administration Interdisciplinary Journal of Information, Knowledge, and Management, vol.8, pp. 1-19, 2013.
- [19] A. Amid, M. Moalagh & A. Z. Ravasan, "Identification and classification of ERP critical failure factors in Iranian industries", Information Systems, vol. 37, pp. 227–237, 2012.



ISSN: 2319-5967

ISO 9001:2008 Certified

International Journal of Engineering Science and Innovative Technology (IJESIT)

Volume 4, Issue 2, March 2015

AUTHOR BIOGRAPHY

Redha M. Elhuni is a Researcher working for Libyan Petroleum Institute (LPI)- Libya. He received his PhD of Manufacturing Engineering at Teesside University, UK in 2014. He received his Master of Engineering and Manufacturing Management from Coventry University (UK) in 2005, and did his Bachelor's degree in Industrial Engineering at Garyounis University (Benghazi/Libya) in 1997. His research interests include quality management and performance measurement.