

# **Current State of Critical Success Drivers for ERP System Implementation**

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**Abstract-** ERP is one the latest technologies that many organizations have undertaken. Typically, Enterprise Resource Planning (ERP) systems are software packages composed of several modules, such as human resources, sales, finance and production, providing cross-organizational integration of transaction-based data management throughout imbedded business processes support. These software packages can be customized up to a certain limit to the specific needs of each organization. ERP was characterized as the most important development in the corporate use of technology in the 1990s. Unfortunately, many ERP projects have not been effective enough and hence have been unable to achieve all the results envisaged. As the cost of an ERP implementation project is very high, it is critical for an organization to make the project a success and start obtaining benefits out of it as fast as possible. But what is it that makes an ERP implementation project successful. The purpose of this paper is provide the literature study of Enterprise resource planning system and also provides the current state of Critical success drivers of Enterprise resource planning system.

**Keywords-** Enterprise resource planning, Critical success factors.

## **I. INTRODUCTION**

Decision making in the complex business environment characterized by inter functional data flow, timely and efficient procurement of product parts, accounting, inventory management, human resources and distribution of goods and services. In this context, management of organizations needs efficient information systems to improve competitiveness by cost

reduction and better logistics. It is universally recognized by large and small-to-medium-size enterprises (SME) that the capability of providing the right information at the right time brings tremendous benefits to organizations in a global competitive world of complex business practices. A new software have introduced in the late 1980's and the beginning of 1990's to the market mainly for the complex business organizations which is known as enterprise resource planning (ERP) systems. Based on the company's requirements these complex, expensive, powerful, proprietary systems are off-the-shelf solutions requiring consultants to tailor and implement them. In many cases they force companies to reengineer their business processes to accommodate the logic of the software modules for streamlining data flow throughout the organization. These software solutions, unlike the old, traditional in-house-designed company-specific systems, are integrated multi-module commercial packages suitable for tailoring and adding "add-ons" as and when required.

## **II. OVERVIEW OF ERP SYSTEM**

ERP systems are commercial software packages composed of several modules of every organizations specific need up to certain limits. These modules such as human resources, sales, finance and production, providing cross organization integration of transaction based data throughout embedded business processes. There are several definitions from the published literature to further explain the concept given in Table I.

Table I  
Definitions of ERP by various publisher's/author's

Publisher's/Author's	Definitions of ERP
American Production and Inventory Control Society (2001) [1]	ERP systems as “a method for the effective planning and controlling of all the resources needed to take, make, ship and account for customer orders in a manufacturing, distribution or service company.”
Davenport, 1998 [2]	ERP comprises of a commercial software package that promises the seamless integration of all the information flowing through the company—financial, accounting, human resources, supply chain and customer information.
Kumar & Van Hillegersberg, 2000 [3]	ERP systems are configurable information systems packages that integrate information and information-based processes within and across functional areas in an organization.
Tadger, 1998 [4]	One database, one application and a unified interface across the entire enterprise.
O’Leary, 2001 [5]	ERP systems are computer-based systems designed to process an organization’s transactions and facilitate integrated and real-time planning, production and customer response.

Nowadays, new terms have been proposed, such as ERP II, and Enterprise Resource Management (ERM), Gartner Group created term ERP II and it is defined as “a business strategy and a set of industry-domain-specific applications that build customer and shareholder value by enabling and optimizing enterprise and inter-enterprise, collaborative operational and financial processes” [6].

*ERP Historical Account*

The roots of ERP systems can be traced back to the Material Requirements Planning (MRP) in the 70's. These systems evolved to the Manufacturing Resource Planning systems (MRP II). [7] Identifies the five phases in ERP systems history:

The 1960's:- Most of the software packages were designed to handle inventory based on traditional inventory concepts.

The 1970's:- The focus shifted to MRP systems which translated the master schedule built for the end items

into time-phased net requirements for the sub-assemblies, components and raw materials planning and procurement.

The 1980's:- The concept of MRP-II systems evolved, as an extension of MRP to shop floor and distribution management activities.

The 1990's:- MRP-II was further extended to cover areas like engineering, finance, human resources, project management, i.e. the almost complete gamut of activities within any business enterprise. Hence, the term ERP (Enterprise Resource Planning) was coined.

The 2000's:- ERP was further extended in 1990's by ERP vendors into Extended ERP. In this some more modules and functions as “add-ons” are added to core modules. These ERP extensions include advanced planning and scheduling (APS), e-business solution such as customer relationship management (CRM) and supply chain management (SCM).

Historical events related with ERP systems are summarized in fig.1.

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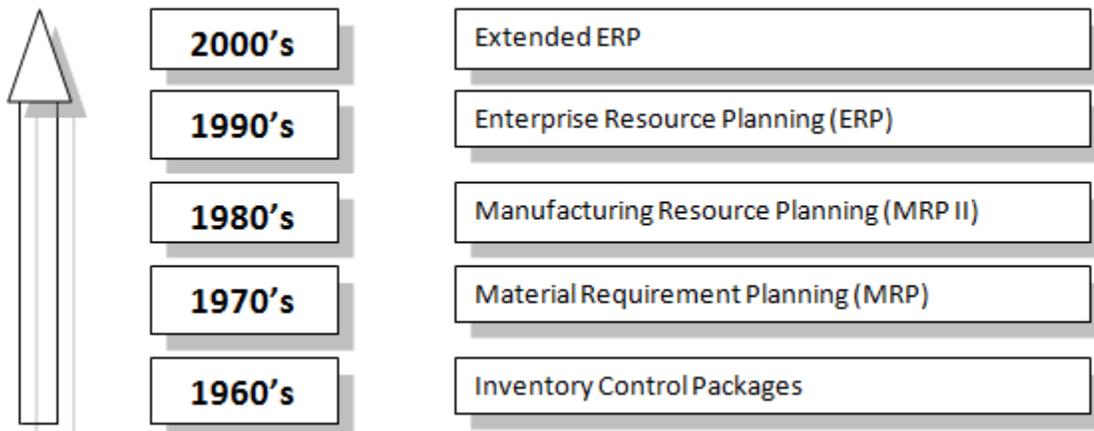


Fig.1 ERP Evolution

### III. LITERATURE REVIEW FOR ERP SYSTEMS

#### *Current State of ERP System*

Nowadays one of the significant competitive advantages of ERP in business is to faster the supply chain. This can happen with a better strategic technology planning and often incorporation of Information System (IS) to manage this process more effective and efficiently. Those IS are the roots of today's Enterprise Resource Planning (ERP) systems. During the 90s ERP systems were the major business generators for the IT sector, while nowadays more companies are oriented towards off-the-shelf solution.

In their research [8] discuss the issues organization face then go for off-the-shelf solutions. Common problems are misfits an ERP system has related to certain business process. These misfits resolution is tradeoffs between organizational changes and IS customization. They also explain that a misfit analysis must be carried out early in the process. Moreover, comprehensive understanding of the critical organizational processes and detailed knowledge of this complex software are required.

ERPs are considered complex and painful to implement mainly because they force an organization to

change its way of working as well as they are considerable expense, with long return on investment value [9]. Implementing an ERP system takes from one to five years. Due to those and other factors some organization found them in situation, where buying an ERP system cost them times cheaper than installing and maintaining it. Often those issues lead organizations to cancel or drop of the idea of implementing particular ERP. As predicted by [7], the functionality of ERP systems has continued to grow and their scope has begun extend from internal processes to collective and external processes in the wider network. This trend led to the term "Extended ERP" or "ERP II" [10], [11] and [12] to refer to add-ons to the core internally-facing ERP system and a shift from transaction-oriented systems to more analytical systems. ERP adopters, having realized the benefits of ERP, are beginning to explore extensions provided by ERP vendors to core-ERP functionality [13]. Here extension to ERP will be explored which are:

- SCM Software
- Advanced Planning and Scheduling Software
- Customer Relationship Management Software
- Other Extension

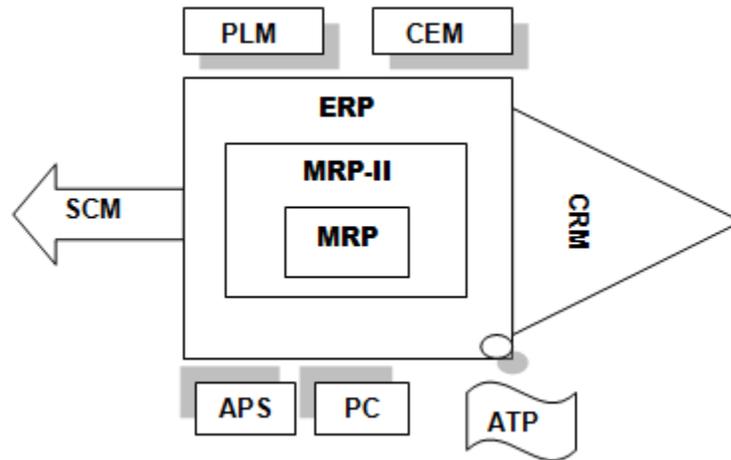


Fig.2 Major Software used in Extended ERP and its extensions

**SCM Software:** Many companies have focused on their core competencies other operations to firms in supply chain. This has increased the reliance on supply chain partners, blurring the boundaries of the firm. As a result, firms are taking an increasing interest in the wider supply chain; software to support SCM has thus been demanded. ERP is becoming the process-oriented transaction backbone of intra and inter-company SCM. The main role of supply chain information integration is in cost reduction and improved efficiency, service and relationship with customers [14].

**Advanced Planning and Scheduling Software:** - According to its name, an ERP system does not concentrate on resolving planning issues, but rather business process management and transaction activities. In contrast, APS systems address manufacturing planning and scheduling problems based on hierarchical planning principles. [14] and [15] describe APS as a company- wide software system making use of analytical approaches to address supply chain and company-wide planning problems.

**Customer Relationship Management Software:** - CRM software has emerged more recently than ERP and SCM but the original concept was introduced as “one-to-one marketing” by [16]. [17] Describes it as a business practice centered on customer needs. Using CRM software, a company can compile data on

customers and analyze it in order to sell more goods or services, and to do so more effectively [18]. CRM-like SCM- is a business strategy, and can be independent enterprise-wide IT system. CRM possesses its own infrastructure and can be implemented and utilize without enterprise system support.

**Other Extensions:** In addition to three key extensions to ERP described above, the following are also reported:

- Collaborative Planning, Forecasting and Replenishment (CPFR) Software.
- Customer Enquiry Management (CEM) Software.
- Product Configuration Software.
- Product Lifecycle Management Software.

#### *ERP Critical Success Factors*

An Enterprise Resource Planning (ERP) system is an integrated software solution, typically offered by a vendor as a package that supports the seamless integration of all the information flowing through a company, such as financial, accounting, human resources, supply chain and customer information [19].[20] Defines the key elements of an ERP system as:

- Large real-time database which reduces data redundancy and improves accuracy.

- Integrated business process that cut across business functions such as supply chain management and
- Seamless transitions between business transactions.

In response to the growing global competition, many companies all over the world have embarked upon ERP implementation. The ERP system market is one of the fastest growing markets in the software industry (Willis and Willis-Brown, 2002). Current major ERP vendors are SAP and Oracle; these two vendors occupy 42% and 25% of the market respectively [21]. MS Dynamics has a market share of 7% while IFS has only 1% from the ERP market [21]. Many researchers have described that there is a noticeable difference between ERP projects and software projects [22]. Most software projects are focused on developing a standalone software system. But an ERP project is composed of software projects as well as business processes.

Nowadays, ERP systems are becoming a trend in Sri Lanka as well. Organizations in Sri Lanka tend to invest heavily on ERP systems seeking for the

benefits promised to gain corporate excellence. In general, ERP systems, if implemented properly, provide enormous benefits to organizations. However, not all ERP implementations deliver the promised enterprise improvements. There are many situations where ERP implementation has become a failure. There have been many difficult and costly implementations of ERP Systems that have adversely affected many organizations. According to [20] the companies that have failed in ERP implementations include FoxMeyer Drug, Dell Computer, Applied Materials and Dow Chemical. According to the evaluation of Standish Group International, 90% of SAP R/3 projects run late [23] and [24] signified that 3/4 of ERP projects were considered as failures and unacceptable. In the case of FoxMeyer Drug, the project has led the company to a bankruptcy proceeding [23]. There may be lots of factors that might affect the success of ERP implementation. There is a literature review of many researcher views about ERP implementation factors in listed below in table II.

Table II  
Literature review of factors affecting ERP implementations

Researcher	Factors affecting ERP Implementation
Somers et al. (2001) [25]	Top management support, Project team competence, Interdepartmental co-operation, Clear goals and objectives, Project management, Inter-departmental communication, Management of expectations, Project champion, Vendor support, Careful package selection, Data analysis and conversion, Dedicated resources, Steering committee, User training, Education on new business processes, Business Process Reengineering (BPR), Minimal customization, Architecture choices, Change management, Vendor partnership, Vendor tools, Use of consultants.
Zhang et al. (2002) [26]	Top management support, Business process re-engineering, Company-wide support, Effective project management, User's involvement, Education and training, Vendor support, Data accuracy, Organizational Culture, Suitability of software & hardware, User satisfaction.
Hui et al. (2005) [27]	ERP package selection, Communication, Process management, Training and education, Project management, System testing, System integration, Legacy system management, Cultural and structural changes, Performance education and management, Management and leadership, Visioning and planning.

Woo et al. (2006) [28]	Top management, Project team, Project management, Process change, Education and training, Communication.
Chung et al.(2007) [29]	Top-management support, Business planning, User training, Software-selection efforts, Team contributions, Consulting capability and support, Information-systems area participation, Output Quality, Job Relevance, Image, Result Demonstrability, Compatibility, System Reliability, Reporting Capability, Subjective Norm, Perceived Ease of Use.
Sawah et al. (2008) [30]	Careful package selection, Business process re-engineering, Minimal customization, Effective project management, User's involvement and education, External support, Organizational culture, Reliance on information, Design of the general structure, Design of lateral links, Company-wide support, Centralization of decisions, High-context communication, Consultants' Support, Vendors' Support, Users' Training.
Gunawardena et al. (2010) [31]	User training and education, User involvement, Managing user expectations, Interdepartmental cooperation, ERP teamwork and composition, Software development, testing and troubleshooting, Project management, Project champion, BPR and customization, Business plan and vision, Top management support, Monitoring and evaluation of performance, Clear roles and responsibilities, Appropriate business and IT legacy systems, Change management programmers and culture, Effective communication.
Upadhyay et al. (2011) [32]	Top management support, Project team competence, Project management, User training and education, External consultants, Proper package selection, Vendor's staff knowledge and support, Clear goals and objectives, User involvement and participation, Project champion, Project cost, Effective change management, Project composition and leadership, Organizational communication, Information flow management, Minimum customization.
Iskander et al.(2012) [33]	Users' involvement, Top management support, Clear definition of needs, Developing clear planning, Realistic expectations, Division project into steps, Project team competency, Ownership of project by stakeholders, Clear visions on project objectives, Motivation and focus of the project team.
Ram J. et al.(2013) [34]	Cultural and structural changes, Project management and evaluation, Business plan and vision, Enterprise wide communication/strong communication inwards and outwards/communication plan, Project champion, BPR and minimum customization/software configuration, Training employees and education, Teamwork and project team composition and competence and compensation, System quality, ERP vendor support, ERP consultants/consultant quality/use of consultants/qualified consultants, System integration, User involvement, User participation and support, Sustained (top) management support, Interdepartmental cooperation, Steering committee, Management of expectations, Careful package selection, Data analysis, conversion and integrity, Charismatic leadership, Fit between ERP and organization, Formal project plan, Organizational transformation and software migration, Implementation approach, Build a business case, Vanilla ERP, Implementation strategy & time frame.
According to my study	Top management support, Project team competence, Implementation co-operation, Clear goals and objectives, Project management, Interdepartmental communication, Management of expectation, Project champion, Vendor support, Careful package selection.

From Table II it is clear that different authors have identified different factors in different research papers. It is important that all the researchers have identified the top management commitment as one of the important factors.

These researchers [20], [35] and [36] have divided ERP implementation process in to different stages depending on various packages and research papers. According to [36] there are three main stages in an ERP implementation:

- Pre-implementation,
- Implementation (also known as during implementation) and
- Post-implementation.

Further these stages can be divided in to sub stages for various purposes such as ease of planning, execution, etc.

According to the study from table II some factors are identified, which are common in all these researchers research. These factors are given in table II conclusion.

#### *Factor 1 Package Selection:*

The clients think that the package selection procedure is good. However, according to the consultants, package selection procedure which clients have been using is poor and not in proper order. They clearly showed that clients who seek ERP systems do not know how to evaluate ERP package available in the market properly. Though clients thought that they were using the correct criteria to evaluate and select an ERP package, consultants see many issues in their selection process.

#### *Factor 2 Objective and goals of ERP:*

Both clients and consultants agree that clients understand and justify the objectives and goals of the ERP well.

#### *Factor 3 Project Planning:*

Even though the clients perceive project planning factor is poor, it is vice versa in the case of consultants, i.e. consultants say that many ERP implementations progressed smoothly as they planned without any delays in achieving milestones and within the budget. But clients say exactly the opposite. The possible reason for

this may be client responses were based on the experience of one implementation which one has experienced in his or her company. But vendor/consultant responses were based on their all implementations, in other words general perception of their whole career. Therefore, based on this situation it's impossible to arrive with conclusions on this contradicting view.

#### *Factor 4 Client commitment:*

[25], [37] and [38] emphasize the importance of the commitment from the client towards the project success. According to the clients their commitment to the ERP implementation is good in Sri Lankan context. Results of the analysis show that clients are dedicated and supportive to the maximum level during the implementation. They might have submitted key project documents such as master data, trial balances, etc on time, given signoffs without any delays, released payments on time and held project review meetings frequently and attended on time in achieving project success. However, according to consultants, client commitment is poor in Sri Lankan ERP implementations.

#### *Factor 5 Project Team Competence:*

The analysis of responses reveals that consultant and client were happy about the competency of project team.

#### *Factor 6 Top Management Support:*

All literature revealed the importance of top management support and commitment for successful ERP implementation. The analysis shows that both the clients and the consultants agree that the commitment from top management is good in ERP implementations.

#### *Factor 7 Implementation Co-operation:*

According to both the clients and the consultants, importance of the implementation co-operation such as IT function within the organization is high according to analysis outcomes. This may be due to the commitment of the top management.

Table III  
Overview of factors analysis in client and consultant perspective

No.	Factors	Client perspective	Consultant perspective
1	Package selection	Think package selection is good.	Not in proper order or poor.
2	Objective and goals of ERP	Objectives and goals of ERP systems are correctly understood.	Correctly understood.
3	Project planning	Project planning is poor.	Project planning is good.
4	Client commitment	Client commitment is good.	Client commitment is poor.
5	Project team competence	Competency is good.	Competency is good.
6	Top management support	Good top management support.	Good top management support.
7	Implementation co-operation	Co-operations such as IT function use are important.	Co-operations such as IT function use are important.
8	Communication support during pre-implementation stage	Communication is poor.	Communication is poor.
9	Management of expectation	Expectations are good.	Expectations are good.
10	Project champion	It is excellent.	It is good.

*Factor 8 Communication support during pre-implementation stage:*

Both the parties agree that communication of support requirements during the pre implementation stage is poor in Sri Lankan ERP implementations. Currently most of the clients tend to discuss the support requirements after the implementation.

*Factor 9 Management of expectation:*

Project outcomes expectation is evaluated by good management. Thus, management of expectation of ERP project is good according to the both parties (client and consultant).

*Factor 10 Project Champion:*

After the project completion, project champion is decided. Project champion plays an important role in the organizations. According to the client it is excellent having a project champion and according to consultant it is also good.

#### IV. CONCLUSION AND FUTURE SCOPE OF WORK

Factors including vendor support, consultant competence, ERP project team member competence, ERP project manager leadership, top management support, and user support was conceptualized and operationalized as a construct of consistency. The empirical results show that consistency in ERP can have a significantly positive effect on ERP implementation success, as well as provide support to our hypotheses based on fit as co-variation of ERP implementation, which suggests that firms that successfully implement ERP programs tend to match external factors with internal factors pertaining to their organizations. The internal and external aspects must be aligned to successfully implement an ERP system.

In terms of external factors, there are at least two participants: consultants and vendors. Consultants communicate with users to comprehend organizational workflow and to identify differences between organizational business requirements and the

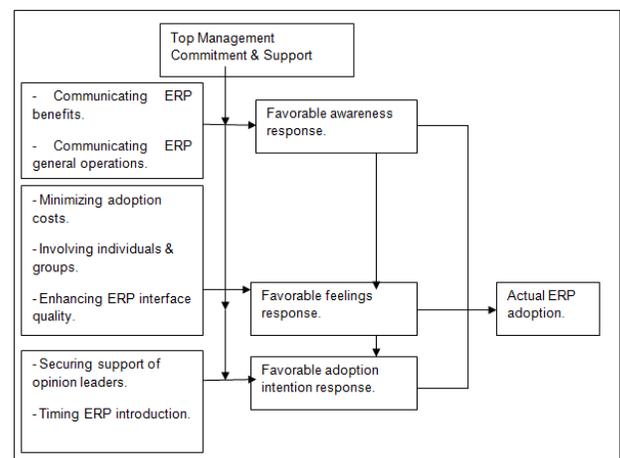
functionality provided by the ERP system. Vendors provide solutions, design, or customization support according to requirement specifications of organizations; install the ERP system, and provide training to users. Internally, when a business firm purchases and implements an ERP system, an internal ERP project team is often made responsible for integrating the ERP system into the firm's operations. Typically, this internal team consists of a project team including top management, IS staff, a project leader, and key users selected from user departments who are both familiar with the business processes and also hold domain knowledge pertaining to their departments. Finally, since ERP system implementation involves all business functions and often requires more than one or two years of effort to complete, decision making and control, as well as efficiency and profitability, to evaluate organizational impact on adopting firms. The most important critical success factors identified in this study are:

1. a clear vision of the strategic goals of the ERP implementation;
2. senior management support;
3. active user involvement;
4. a suitable corporate culture that is open to change;
5. internal communication on the ERP project, both before and during the project;
6. proper management of the ERP supplier;
7. a formalized project approach and methodology;
8. a focus on user requirements;
9. the use of external consultants;
10. user training, both on technical aspects and on business aspects, oriented towards practice;
11. proper project management ;
12. proper project planning, phasing and follow-up; and
13. A project team composed of a mix of users, i.e. internal technical and business experts and external consultant.

Future trends in ERP, including developments such as Web-based procurement applications and outsourcing

of ERP applications. ERP software still requires many resources and efforts to integrate all of the major business functions in the initiating firm. It will impact of ERP on organizational alignment, organizational learning, infrastructure, mass customization, competitive advantage and organizational structure. A customer relation management (CRM) module should be included in the ERP packages.

Since most ERP vendors are moving towards Internet Web-based applications to fulfill the e-commerce era, the development of security issues needs to be addressed. For the future, some researcher proposes a model for formal testing as just shown below.. The model has its roots in the literatures on ERP implementation and marketing. It summarizes the ideas in this report, which provides theoretical specification for generating a cumulative body of knowledge in the ERP implementation area.



First, future ERP implementation studies should consider the “fit” among the critical success factors, instead of examining these critical factors independently/separately in their research models. Second, the impact of the magnitude of each factor on ERP success does not necessarily exhibit a linear positive correlation. It provides an alternative explanation for studies that did not find a significant relationship. Third, the results also open an avenue for future studies on examining the exact extent of “fit” for different types of information systems (e.g. e-commerce, health-care) and the inclusions of other critical success factors. Four limitations should be noted in interpreting the findings of this study. First, this is a cross-sectional study – a longitudinal study may further advance our understanding of the complicated causal patterns of ERP implementation. However, such a theory is limited in terms of specifying a middle range theory that lends itself to empirical testing. Second, while making generalizations from the research sample, the context of Taiwan, itself a newly industrialized Asian country, has to be taken into consideration. This may not prove universally true (e.g. mid-size or small manufacturing firms), yet they remain likely to be applicable to successful ERP implementations in manufacturing industries with similar cultural contexts, and also to manufacturing industries in developing countries that are interested in implementing ERP. Third, only six of the more commonly identified success factors in other studies were included in this study and others may be as appropriate in practice.

## V. REFERENCES

- [1] PICS (2001). American Production and Inventory Control Society (APICS), <http://www.apics.org>.
- [2] Davenport, T.H., Harris, J.G. and Cantrell, S., 2004. Enterprise systems and ongoing process change. *Business Process Management Journal*, 10 (1), 16-26.
- [3] Kumar, K. and Van Hillsgersberg, J. (2000). ERP experiences and evolution. *Communications of the ACM*, 43(4), 23-26.
- [4] Tadjer, R. (1998). Enterprise resource planning. Internet week, Manhasset, April 13.
- [5] O'Leary D. 2000. “Enterprise Resource Planning Systems: systems, lifecycle, electronic commerce, and risk”, Cambridge University Press, 2000.
- [6] Bond B., Genovese Y., Miklovic D., Wood N., Zrimsek B., Rayner N. 2000. “ERP is Dead – Long Live ERPII”, Research Note SPA-12-0420, Gartner Inc., October 2000.
- [7] Bulut Aslan, Mark Stevenson, Linda Hendry 2008. "An Assessment of the applicability of enterprise resource planning systems to make-to-order companies."
- [8] Soh, Kien and Tay-Yap (2000). “Cultural fits and misfits: Is ERP a universal solution?” Vol. 43 No. 4 *Communications of the ACMs*.
- [9] Al-Mashari M. 2000. “Constructs of process change management in ERP context: a focus on SAP R/3”, Sixth Americas Conference on Information Systems, pp 977-980.
- [10] Rashid, M.A., Hossain, L. and Patrick, J.D., 2002. The evolution of ERP systems: A historical perspective. *Enterprise Resource Planning: Global opportunities & challenges*, 1-16.
- [11] Dohetry et al. 2012. “Benefits realization from ERP systems: The role of customization.” *ECIS 2012 Proceedings*. Paper 142.
- [12] Majdalawieh, M., Sahraoui, S., and Barkhi, R. "Intra/inter process continuous auditing (IIPCA), integrating CA within an enterprise system environment," *Business Process Management Journal* (18:2) 2012, pp 304-327.
- [13] Shaul L. 2013. “Critical success factors in enterprise resource planning systems: Review of the last decade.” *CSUR* Vol. 45, Issue 4.
- [14] Hendry, L.C. and Kingsman, B.G., 2008. Customer enquiry management: Part of a hierarchical system to control lead times in make-to-order companies. *The Journal of the Operational Research Society*, 44 (1), 61-70.
- [15] Stadtler, H. and Kilger, C. eds. 2002. “Supply chain management and advanced planning: Concepts, models, software and case studies”, Berlin: Springer.
- [16] Peppers, D. and Rogers, M., 1993. *The one-to-one future: Building relationships one customer at a time* New York: Doubleday.
- [17] Buttle ,F. (2004), "Customer relationship management: concepts and tools". Oxford: Elsevier Butterworth Heinemann.

- [18] Bose, R., 2002. Customer relationship management: Key components for its success. *Industrial Management & Data Systems*, 102 (1), 89-97.
- [19] Davenport, T. H. (1998). Putting the enterprise into the enterprise system. *Harvard Business Review*, 76(4), 121-131.
- [20] Gunasekaran, A. (2007). *Modeling and Analysis of Enterprise Information Systems*, IGI Publishing, USA.
- [21] AMR Research. (2007). *The ERP Market Sizing Report, 2006-2011*, AMR Research Inc, Boston.
- [22] Bingi, P., Sharma, M. K. & Godla, J. K. (1999). "Critical Issues Affecting an ERP Implementation," *Information Systems Management*, 16 (3), 7-14.
- [23] Scott J. 1999a. "The FoxMeyer Drug's Bankruptcy: Was It a failure of ERP." *Americas Conference on Information Systems*, Milwaukee (USA).
- [24] Williamson, M. (1997). 'From SAP to Nuts!,' *Computerworld*, 31 (45), 68-69.
- [25] Somers T., Nelson K. 2001. "The Impact of Critical Success Factors across the Stages of Enterprise Resource Planning Implementations". *Hawaii International Conference on System Sciences*.
- [26] Zhang, L., Lee, M.K.O., Zhe, Z. and Banerjee, P. (2003), "Critical success factors of enterprise resource planning systems implementation success in China", in Camp, O. et al. (Eds), *Enterprise Information Systems*, Kluwer Academic, Dordrecht, pp. 109-16.
- [27] Guang-hui, C., Chun-qing, L. and Yun-xiu, S. (2006), "Critical success factors for ERP life cycle implementation", *International Federation for Information Processing*, Vol. 205, pp. 553-62.
- [28] Woo, H.S. (2007), "Critical success factors for implementing ERP: the case of a Chinese electronics manufacturer", *Journal of Manufacturing Technology Management*, Vol. 18 No. 4, pp. 431-42.
- [29] Chung, W.W., Ko, C.C., Cheung, E.W. and Wong, T.C. (2007), "IT-enhanced order and delivery process of a fast moving consumer goods (FMCG) company: a case study", *Benchmarking: An International Journal*, Vol. 14 No. 1, pp. 123-39.
- [30] Sawah El S. 2008. "A quantitative model to predict the Egyptian ERP implementation success index". *Business Process Management Journal*, Vol. 14 No. 3, pp 288-306.
- [31] Gunawardena, C.N., Hermans, M.B., Sanchez, D., Richmond, C., Bohley, M. and Tuttle, R. 2010. "A Theoretical Framework for Building Online Communities of Practice with Social Networking Tools," *Educational Media International*, 46, 3-16.
- [32] Upadhyay, P., Jahanyan, S. & Dan, P. (2011). "Factors Influencing ERP Implementation in Indian Manufacturing Organizations," *Journal of Enterprise Information Management*, 24 (2), 130-145.
- [33] Zoughi, I. and Laghouag, A: *Assessing Key Success Factors in an ERP Implementation Project: A Case Study in Automotive Industry*. *Information Systems, Technology and Management, communication in Computer and Information Science*, Springer, 402-407 (2012).
- [34] Ram, J., Corkindale, D. and Wu, M.L. (2013), "Enterprise resource planning adoption: structural equation modeling analysis of antecedents", *Journal of Computer Information Systems* (in press).
- [35] Ehie, I. C. & Madsen, M. (2005). "Identifying Critical Issues in Enterprise Resource Planning (ERP) implementation," *Computers in Industry*, 56, 545-557.
- [36] Yu, C. S. (2005). "Causes Influencing the Effectiveness of the Post-Implementation ERP System," *Industrial Management & Data Systems*, 105 (1), 115-132.
- [37] Wong, A., Scarbrough, H., Chau, P. Y. K. & Davison, R. (2005). "Critical Failure Factors in ERP Implementation," *Proceedings of the Ninth Pacific Asia Conference on Information Systems (PACIS)*, Bangkok, Thailand, 2005.
- [38] Rao, S. S. (2000). "Enterprise Resource Planning: Business Needs and Technologies," *Industrial Management & Data Systems*, 1000 (2), 105-116.