

Process Orientation through SAP R/3: An Alignment Framework

Dr. Majed Al-Mashari, *Information Systems Department, College of Computer & Information Sciences, King Saud University, Saudi Arabia,*
E-mail: malmashari@yahoo.com

ABSTRACT

Though the application of SAP R/3 as an enterprise-wide information system (EWIS) platform has become widespread, many organisational experiences have shown that resulting outcomes fall short of expectations. Best-practice experiences, however, have proven that effective application is centred on an integrative approach which seeks to achieve a balance between organisational change key areas like strategy, business processes, structure, culture, IT and managerial systems. This paper draws on these practices and discusses a proposed conceptual framework for effective SAP R/3 application.

KEYWORDS

Conceptual Framework, ERP, Process, R/3 Application

1 INTRODUCTION

Enterprise-wide information systems (EWIS) represent sets of business applications which allow for an organisation-wide management of operations (Pawlowski *et al.*, 1999). These systems are currently widespread in the form of more application of enterprise resource planning (ERP) systems, which have become one of the largest information technology (IT) system investments in the 1990s (Chung and Snyder, 1999; Sumner, 1999). ERP is defined (erpfans, 1999) as:

"Software solution that addresses the enterprise needs taking the process view of an organization to meet the organizational goals tightly integrating all functions of an enterprise."

It is also described (DataQuest, 1996) as:

"the finest expression of the inseparability of infotech and business. As an enabling technology as well as an effective managerial tool, ERP has made it possible for many organizations worldwide to integrate at all levels and make reportability a given rather than an imposition."

ERP systems are seen as optimisation and integration tools of business processes across the supply chain (within and beyond organisational boundaries) (Figure 1), implemented through modern information management systems (Stefanou, 1999). This integration provides visibility and consistency across the business functions like manufacturing, finance, distribution and project management. Moreover, ERP helps get the most benefits of databases and ensure that the system environment is built following an open system approach.

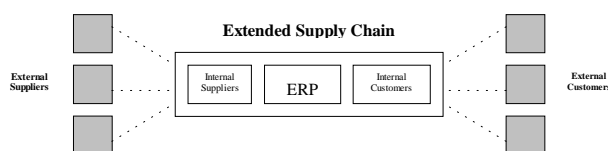


Figure 1. Role of ERP in Supply Chain Management (From erpfans, 1999)

SAP R/3 has been the leader in the ERP market (Bancroft *et al.*, 1998; Jeb, 1996). R/3 application is believed to provide an organisation with several benefits such as improving information quality and reducing costs through retooling common business functions; improving responsiveness and time-to-market through an effective structuring of operations; revamping old systems and processes; and improving integrity and availability of data across the business (Slooten and Yap, 1999).

However, many organisations implementing R/3 have failed to achieve these significant benefits (Bancroft *et al.*, 1998; Pawlowski *et al.*, 1999). The reason is that *"implementation of ERP systems is complex, organizationally disruptive, and resource intensive"* (Volkoff, 1999, p.235), and many organisations (with technical mind-set) are not able to absorb such complexity (Pawlowski *et al.*, 1999) which stems from the wide-scale organisational changes across various organisational dimensions (Bancroft *et al.*, 1998, Volkoff, 1999). Stefanou (1999, p.801) states that *"...for the successful implementation of ERP packages under SCM practices, the required organizational change, through corporate culture transformation, is crucial"*. These changes are results of the transformation of a business to become cross-functionally integrated along the entire supply chain (Davenport 1998, Mahrer 1999).

Based on an integrative perspective, this paper discusses the essential elements in the process of R/3 application, and derives a preliminary proposed alignment framework, backed up by exemplification from currently-reported practical experiences.

2 DISCUSSION OF R/3 ALIGNMENT PROCESS

The following sections discuss the key issues in the R/3 application process. The criticality of these factors is found to be widely supported by the current body of the literature, and endorsed by practitioners and experts in the field.

Planning - In IT-induced process change programmes, a business/IT strategy describes the process of planning business/IT resources, in terms of workflows and tasks, to be used in an integrative process-oriented way (Hammer, 1990; Mitchell and Zmud, 1995). Strategic visioning is the mechanism that links strategies with procedures and actions (Davenport, 1993a), and describes the futuristic state of business processes through imaginative thinking (Barret, 1994). In R/3 projects, strategy development is found to be a crucial stage, as its absence has proved to result in severe poor outcomes (Cooke and Peterson, 1998).

An initial and critical step in the R/3 strategy development process is identifying the drivers for change in business and IT systems, and its benefits, both strategic and operational (Cooke and Peterson, 1998; Stevens, 1998). This process presents a convincing framework for all people affected to realise the need for change, and thus promotes their interest and dedication to it (*Just in Case*, 1998). It is also advantageous in ensuring a business-centric scope and direction for the change efforts (Cooke and

Peterson, 1998; *Just in Case*, 1998). To ensure full alignment, ownership and responsibility for planning and budgeting each targeted benefit area throughout the R/3 implementation cycle, a broad vision has to be continuously maintained at the corporate level and executed at all concerned operational levels until the rolled-out is complete (Cooke and Peterson, 1998; Stevens, 1998). Of highest priority in this process are the areas in which their improvement promises immediate direct impact and quick return-on-investment (*Just in Case*, 1998; Stevens, 1998). In describing the driving forces behind British Aerospace implementation of R/3 (Aerospace Success, 1999), Chris Brautigam, the supply chain and manufacturing process (SCAMP) project manager states:

“Our main reason for installing the R/3 system was to introduce some real change and associated business benefits to the company and to enable Airbus to compete more effectively with Boeing. Our ongoing thrust is to run the best possible processes and use a first-class infrastructure to assist us in doing so. R/3 will enable our business processes, simplify the systems architecture, reduce complexity and provide better operation ability.”

The strategic vision and plan can be shaped through external orientation based on customer research and competitive analysis, which together highlight areas of deficient performance (Davenport, 1993). Through a process of continuous learning from customers, competitors and other organisations' experiences (Carr, 1993) on both their process architecture and R/3 application, appropriate actions for determining and prioritising areas of improvement (Zairi, 1995) can be taken. This process is beneficial in enabling the transference of leading technical and business knowledge and practices within and amongst the various business units (Eriksen *et al.*, 1999).

An application strategy should contain a full description of the what, why, who, where, how and when issues related to all change details (Martin and Ching, 1999), depending on the scope of improvement and the business level at which a particular R/3-related change occurs. Items that a R/3 strategy may describe include, for instance, implementation objectives; implementation philosophies, methodology and scale; project management style and time-plan; organisational change management policies; a top-level R/3 deployment plan; and a performance assessment scheme (Bancroft *et al.*, 1998; Cooke and Peterson, 1998; Gibbs, 1998).

Examples on how strategic visioning and planning process is approached in reality can be drawn from several organisational experiences. Kodak defines its vision as to operate using a single business model supported by one global set of configured code for the entire company (Stevens, 1997). On the other hand, Farmland Industries Inc. (Jesitus 1998) carried out a gap analysis exercise to examine how other companies (agricultural or from other industries) were managing their business and IT. Another example can be seen in the case of The University of Newcastle-upon Tyne in the UK (University of Newcastle 1997) which defines a set of qualitative statements specifying the targeted benefits in each of its business units. A consumer products company (SAP Case Studies 1999) defines its case for change as building an integrated material planning and production control approach which enables on-line access to data, reduction of product costing, and a holistic view of the business. The University of Nebraska (Sieber, et al. 1999) creates guiding principles and a strategic vision relating to the integrity, flexibility and effectiveness of the business environment. Bay Networks (Technology Strategies 1999) develops its strategy along four

major dimensions, namely growth, global ordering administration, financial reporting and process redesign.

Improving Business Processes - Unlike other functional system applications, the application of R/3 aims essentially to improve business performance through supporting the integration of the various business processes across the different functional areas (supply chain), and beyond organisational boundaries. This integration facilitates the design of an organisational structure which allows for efficient information flow within the organisation itself, as well as between the organisation and its suppliers and customers (Laughlin 1999). This feature of R/3 presents a great opportunity to transform a business to an integrative, cross-functional and customer-oriented design. Such a transformation through tools like business process reengineering (BPR) is found to be the most powerful method for business improvement (SAP Software, 1996). R/3 system enables BPR since it provides a full integrated environment that uses a common IT infrastructure, and is built based on an open systems architecture, thus enabling data sharing and communications to support all business processes (Bhatt, 1996; Broadbent *et al.*, 1999; Tony, 1995). Both business situation and degree of improvement desired by an organisation are the determining factors for deciding when BPR should take place in R/3 implementation (Bancroft *et al.*, 1998). However, it is repeatedly advised that BPR is best implemented following the R/3 model (Slooten and Yap, 1999). In BPR implementation, it is important that a systematic and structured methodology is followed, integration is established with other ongoing process improvement initiatives, and a business-centred performance measurement scheme is developed and adopted. These issues are demonstrated in the case of the State of Kentucky uses R/3 as a tool to streamline government administrative procedures, change business processes, and cut costs (Henry, 1998). In a different case, Geneva Pharmaceuticals (Bhattacharjee 1999) follows a different approach and categorizes its business processes into supply and demand groups, where processes in each group were redesigned and the two groups were integrated.

Software Deployment- The R/3 deployment represents a critical and expensive stage (Gibbs, 1998) in the application process, as it deals with the installation phase of R/3 modules. In fact, the effectiveness of R/3 depends on the degree of alignment and fit between various application elements (strategy, structure, process, R/3 modules) in the deployment process (Bancroft *et al.*, 1998; Buck-Emden, 2000). This involves activities of defining detailed technical plans addressing issues of contracting with suppliers for outsourcing the software package, analysing current IT infrastructure, designing new architecture for R/3, customisations, transition, testing and maintenance (Wolti, 1999). A key to success in this process is following an integrative approach that ensures that business strategies are reflected in the R/3 business model adopted, and that an auditing scheme is firmly established along the deployment cycle stages to allow for necessary corrections and repositioning to be made (Keller and Teufel, 1998). Central to this approach is the appropriate selection of adequate R/3 architecture that aligns with the organisational technical (network, database, web-enablement) and managerial (decision-making style, data ownership, end-users' skills) capacity (Chan, 1999).

Several organizational experiences illustrates the R/3 deployment various issues. In an example, Owens Corning ensures that its network infrastructure was ready to migrate to the R/3 environment (Romie, 1996). A consumer products company (SAP Case Studies 1999) selects an implementation partner based on

its track record of implementing similar projects, project management skills, technical skills, support capabilities, and cost effectiveness of the quotation. The University of Nebraska (Sieber, et al. 1999) makes its decision to select the R/3 system based on a recommendation of replacing current financial and human resource systems which results from the feedback of an assessment activity carried out at each campus.

Project Ownership- The business-wide coverage and functional-crossing nature of R/3 application enforces the contribution of all entities (internal and external) involved in this process from different sites and levels (Cooke and Peterson, 1998). It is therefore imperative that a well-defined project organisation and administration procedures and networks are developed effectively (Bancroft *et al.*, 1998). This involves designing a full profile of what and how different roles and responsibilities will be allocated and shared amongst project members before, during and after the R/3 implementation (Welti, 1999). In particular, leadership style (Berrington *et al.*, 1995), forms and means of communication and dispute resolution mechanisms (Davenport, 1993), project teams' structuring and training (Barrett, 1994), and performance appraisal (Guha *et al.*, 1993) are essential elements in defining an appropriate R/3 project organisation. Owens Corning forms many full-time teams from its worldwide business, representing all subjects to customise the SAP system. (Bancroft *et al.*, 1998).

Managing Change- In R/3 application, the changes in business processes have to be complemented with organisational changes in structure and management systems (Pawlowski *et al.*, 1999). The effective management of such changes minimises possible opposition of the new R/3 environment. The absence of an adequate organisational change management attitude can easily result in a total failure of the entire R/3 initiative (Bancroft *et al.*, 1998) regardless of how competent the organisation is technically. Evidence has shown that organisational change has to be managed prior to, during and after R/3 implementation (Cooke and Peterson, 1998). Organisational change management concerns all human, social and cultural alignment techniques (Carr, 1993). This requires the support and commitment of top management, and involves several activities, such as revision of reward systems, communication, empowerment, people involvement, training and education, creating a culture for change, and stimulating receptivity of the organisation to change, amongst other (Bancroft *et al.*, 1998).

Examples on organisational change is managed effectively in reality can be seen in many organisational experiences. For instance, Lucent ensures strong commitments made by team leaders to operate under extensively reduced budgets (Francesconi, 1998). Monsanto (Sumner 1999) succeeds in securing management commitment and approval for the project, as well as creating a championship role to sell the change to all concerned. A Canadian food manufacturer (Volkoff 1999) succeeds in changing the mindset of users from focusing on their functional domains to understanding a wide range of information and operations belonging to other departments. Monsanto (Sumner 1999) communicates project scope, objectives and activities to all people involved. Samsung Heavy Industries (Bancroft, et al. 1998) develops a partnership model, in the UK, with the employees of the parent company, in South Korea, to set up the R/3 environment.

3 PROPOSED ALIGNMENT FRAMEWORK

The effective application of R/3 requires attention to the key elements discussed above, their inter-connectedness and in-

tegration. Figure 1 illustrates this dynamic relationship through a proposed conceptual framework based upon an integrative perspective. The framework's major elements are described briefly in the following list.

- **Strategic Visioning & Planning** - Determining objectives and guidance on how the R/3 system can be best applied. This is achieved through identifying change drivers, performance gaps through scanning leading practices, and defining implementation approach and plans.
- **Process Improvement** - Determining how business function should be designed into processes that are in line with the R/3 architecture.
- **R/3 Deployment** - Dealing with the technical issues of transforming legacy systems into the R/3 environment.
- **Project Organisation** - Defining a profile of all roles and responsibilities of all parties involved in the R/3 application process.
- **Organisational Change Management** - Considering the soft side of change needed for effective R/3 application.

As can be observed from Figure 2, there are two types of alignments important to ensure a fit between all elements of the framework, namely strategic and organisational. Strategic alignment works at reconciling the strategic vision with R/3 deployment, process improvement and organisational change management. Organisational alignment ensures that business processes, R/3 modules and organisational structure are well integrated through a common business model. Process improvement and R/3 deployment activities are aligned through a business model that is commonly defined across the various business sites.

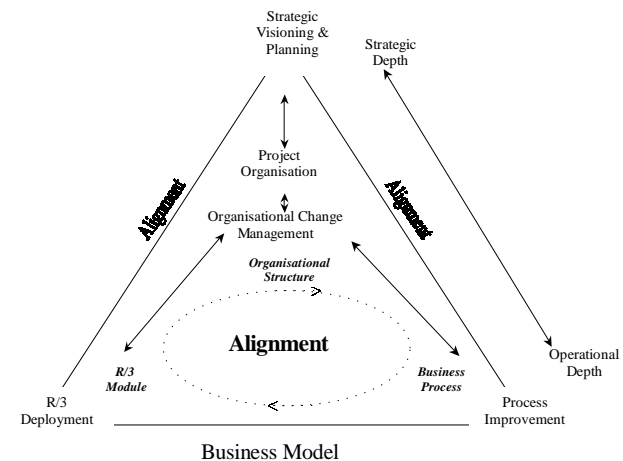


Figure 3: Alignment Framework for R/3 Implementation

4 CONCLUSION

The proposed framework presented in this paper aims to show that at the heat of effective application of R/3 system, an integrative and balanced approach has to be followed. In particular, business processes, organisational structure and R/3 modules have to be aligned with each other to ensure optimum impact on performance measures. Essential prerequisites for this process to be successful are adequate change strategy and project management; effective use of organisational change management techniques and tools; and competency in aspects of integrating IT into business processes.

The proposed framework provides a foundation for further empirical studies across several dimensions, including scrutinising the dynamic interaction between various implementation components, and determining the implementation variables

upon which a particular approach can be selected for a particular project context. Of particular interest also is the alignment process in the context of R/3 application, which may be drawn from the work of Henderson and Venkatraman (1993).

5 REFERENCES

1. Aerospace Success, 1999. British Aerospace Airbus takes off with R/3. URL: [http://www.sap.com].
2. Bancroft, N, Seip, H. and Sprengel, A., 1998. Implementing SAP R/3: How to introduce a large system into a large organization. Greenwich: Manning Publications Co.
3. Barrett, J., 1994. Process Visualization: Getting the Vision Right Is Key. *Information Systems Management*, Spring, 14-23.
4. Berrington, C. and Oblich, R., 1995. Translating Reengineering Into Bottom-Line results. *Industrial Engineering*, January, 24-27.
5. Bhatt, G., 1996. Enterprise Information Systems Integration and Business Process Improvement Initiative, URL: <http://hsb.baylor.edu/ramsower/acis/papers/bhatt.htm>.
6. Bhattacharjee, A. "SAP R/3 Implementation at Geneva Pharmaceuticals," *Teaching Cases*, URL: [http://www.isworld.org], 1999.
7. Broadbent, M., Weill, P. and St.Clair, D., 1999. The Implications of Information Technology Infrastructure for Business Process Redesign. *MIS Quarterly*, 23(2), 159-182.
8. Buck-Emden, R., 2000. The SAP R/3 Systems. Essex: Addison-Wesley.
9. Carr, D., 1993. Managing for Effective Business Process Redesign. *Cost Management*, Fall, 16-21.
10. Chan, S., 1999. Architecture Choices for ERP Systems. *Proceedings of AMCIS'99*, 210-212.
11. Chung, S. and Snyder, C., 1999. ERP Initiation – A Historical Perspective. *Proceedings of AMCIS'99*, 213-215.
12. Cooke, D. and Peterson, W., 1998. SAP Implementation: Strategies and Results. Research Report 1217-98-RR. New York: The Conference Board.
13. DataQuest (1996), "ERP: The New Mantra for Competitive Edge", URL: <http://www.dgindia.com/apr1596/3hd1141101.html>
14. Davenport, T. "Putting the Enterprise into the Enterprise System," *Harvard Business Review*, July-August, 1998, pp. 121-131.
15. Davenport, T., 1993. Process Innovation: Re-engineering Work through Information Technology. Boston: Harvard Business School Press.
16. Eriksen, L., Axline, S. and Markus, L., 1999. What Happens After "Going Live" With ERP Systems? Competence Centers Can Support Effective Institutionalization. *Proceedings of AMCIS'99*, 776-778.
17. erpfans (1999), "Enterprise Resource Planning (ERP)", URL: <http://www.erpfans.com>
18. Francesconi, T., 1998. Transforming Lucent's CFO. *Management Accounting*, 80(1), 22-30.
19. Gibbs, J., 1998. Going live with SAP, *The Internal Auditor*, 55(3), 70-75.
20. Guha, S., Kettinger, W and Teng, T., 1993. Business Process Reengineering: Building a Comprehensive Methodology. *Information Systems Management*, Summer, 13-22.
21. Hammer, M., 1990. Reengineering Work: Don't Automate, Obliterate. *Harvard Business Review*, 68(4), 104-112.
22. Henderson, J. and Venkatraman, N., 1993. Strategic Alignment: Leveraging Information Technology for Transforming Organisations. *IBM Systems Journal*, 32(1), 4-16.
23. Jeb, C., 1996. Enterprise resource planning software offers EHS execs a strategic platform for business, compliance improvement. *Environmental Management Today*, 7(2), 23-25.
24. Jesitus, J. "Even farmers get SAPed," *Industry Week*, (247:5), 1998, pp. 32-36.
25. *Just in case*, 1998. *Industry Week*, 247(15), 28.
26. Keller, G. and Teufel, T., 1998. SAP R/3 Process-Oriented Implementation. Essex: Addison-Wesley.
27. Laughlin, S., 1999. An ERP Game Plan, *The Journal of Business Strategy*, 32-37, Jan/Feb.
28. Mahrer, H. "SAP R/3 Implementation at the ETH Zurich- A Higher Education Management Success Story." In *Proceedings of AMCIS*, 1999, pp. 788-790.
29. Martin, M. and Ching, R., 1999. Information Technology (IT) Change Management, *Proceedings of AMCIS'99*, 103-105.
30. Mitchell, V. and Zmud, R., 1995. Strategy Congruence and BPR Rollout. In Grover, V. and Kettinger, W., eds., *Business Process Change: Reengineering Concepts, Methods and Technologies*, London: Idea Group Publishing, 428-452.
31. Pawlowski, S., Boudreau, M. and Baskerville, R., 1999. Constraints and Flexibility in Enterprise Systems: A Dialectic of Systems and Job. *Proceedings of AMCIS'99*, 791-793.
32. Romei, L., 1996. New Technology strengthens new commitment, *Managing Office Technology*, 41(7), 18-19.
33. SAP Case Studies "SAP Case Study 2: Consumer Products," URL: [http://www.horizonscompanies.com/], 1999.
34. *SAP Software implementation works best with reengineering*, 1996. *Chemical Marketing Reporter*, 250(8), 16.
35. Sieber, T., Siau, K., Nah, F. and Sieber, M. "Implementing SAP R/3 at the University of Nebraska," *Teaching Cases*, URL: [http://www.isworld.org], 1999.
36. Slooten, K. and Yap, L., 1999. Implementing ERP Information Systems using SAP. *Proceedings of AMCIS*, 226-228.
37. Stefanou, C., 1999. Supply Chain Management (SCM) and Organizational Key Factors for Successful Implementation of Enterprise Resource Planning (ERP) Systems. *Proceedings of AMCIS*, 800-802.
38. Stevens, T., 1997. Kodak focuses on ERP. *Industry Week*, 246(15), 130-135.
39. Stevens, T., 1998. Proof positive, *Industry Week*, 247(15), 22-28.
40. Sumner, M., 1999. Critical Success Factors in Enterprise Wide Information Management Systems Projects. *Proceedings of AMCIS*, 232-234.
41. Technology Strategies "The Perils of ERP," *Technology Strategies*, October 1998, pp. 23-27.
42. Tony, B., 1995. Where systems integration ends, does outsourcing begin? *Software Magazine*, 15(11), 54-60.
43. University of Newcastle "SAP announces move into higher education market with Newcastle University contract win," URL: [http://www.sap.com/uk/success/newcastl.html], 1997.
44. Volkoff, O. "Using the Structural Model of Technology to Analyze an ERP Implementation." In *Proceedings of AMCIS*, 1999, pp. 235-237.
45. Volkoff, O., 1999. Using the Structural Model of Technology to Analyze an ERP Implementation. *Proceedings of AMCIS*, 235-237.
46. Welti, N., 1999. Successful SAP R/3 Implementation – Practical Management of ERP Projects. Essex: Addison-Wesley.
47. Zairi, M., 1995. The Integration of Benchmarking and BPR: A Matter of Choice or Necessity? *Business Process Re-engineering & Management Journal*, 1(3), 3-9.

0 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage:

www.igi-global.com/proceeding-paper/process-orientation-through-sap/31676

Related Content

Information and Its Conceptual Perspectives

José Poças Rascão (2018). *Encyclopedia of Information Science and Technology, Fourth Edition* (pp. 4422-4435).

www.irma-international.org/chapter/information-and-its-conceptual-perspectives/184150

A Hybrid Approach to Diagnosis of Hepatic Tumors in Computed Tomography Images

Ahmed M. Anter, Mohamed Abu El Souod, Ahmad Taher Azarand Aboul Ella Hassanien (2014). *International Journal of Rough Sets and Data Analysis* (pp. 31-48).

www.irma-international.org/article/a-hybrid-approach-to-diagnosis-of-hepatic-tumors-in-computed-tomography-images/116045

ICT4D

Sherif H. Kamel (2015). *Encyclopedia of Information Science and Technology, Third Edition* (pp. 3972-3980).

www.irma-international.org/chapter/ict4d/112839

Laws Related to Web and Digital Application Accessibility

Holly Yu (2015). *Encyclopedia of Information Science and Technology, Third Edition* (pp. 3011-3020).

www.irma-international.org/chapter/laws-related-to-web-and-digital-application-accessibility/112725

Efficient Cryptographic Protocol Design for Secure Sharing of Personal Health Records in the Cloud

Chudaman Devidasrao Sukte, Emmanuel Markand Ratnadeep R. Deshmukh (2022). *International Journal of Information Technologies and Systems Approach* (pp. 1-16).

www.irma-international.org/article/efficient-cryptographic-protocol-design-for-secure-sharing-of-personal-health-records-in-the-cloud/304810