ERP + E-BUSINESS = An emerging relationship

Himanshu sharma[1],Dolly Lavania[2], Nidhi Gupta[3]

Assistant Professor, GLA University Mathura
himanshusharma19@gmail.com
dolly_lavania@rediffmail.com
nidhi0208@gmail.com

Abstract *– E-business has changed the definition of enterprise systems.ERP focuses on core business functions, while E-business pushes the ERP from inside core of the organizations to the network edge. By making use of E-business approaches, organizations can have the ERP integration benefits of flexibility, reduction in cost, more effective and quick responses etc.By integrating ERP with E-business, a new extended ERP system emerges that creates business which is more lively, more focused and highly competitive than traditionally structured business. By using Internet and WWW services, organizations are implementing PDM(Product Data Management),SCM (Supply-Chain Management) and CRM(Customer-Relation-Management capabilities.These systems enable companies to link their operations seamlessly with customers and suppliers. In this paper we have done an analysis on the limitations of traditional ERP under E-business and then we have presented a specific integration approach of ERP with E-business.*

Keyword: *CRM ; E-business ; ERP ; PDM ; SCM*

1. INTRODUCTION

E-business stands for "electronic business," which involves communications and doing business electronically through the Internet. E-business is defined as "the use of electronically enabled communication networks that allow business enterprises to transmit and receive information"[7]. E-business provides the ways for an organization to improve productivity, improved customer service, reduced costs, commercial competitiveness and streamlined business processes. By using Internet and WWW services, organizations are implementing PDM(Prodcut Data Management),SCM (Supply-Chain Management) and CRM(Customer-Relation-Management capabilities. These systems enable companies to link their operations seamlessly with customers and suppliers.

Traditional ERP systems take care of internal value chain (i.e., within a company) whereas e-businesses establish the value chain across the market and the industries. So ,it is necessary for the organizations a more efficient ERP system under E-business. More and more organizations construct their systems' architectures by integrating ERP systems with e-business. They use Web based interface (corporate portals) with outside entities plus add-on modules such as CRM, SCM, etc. in the integration.

The use of the Internet and WWW for communication, collaboration, and trading with customers and business partners is causing a fundamental shift in how organizations define and manage their business processes. As a result business systems and processes can no longer remain isolated and

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disparate; they must consider their trading partners and customers. As a result, they need systems that support e-business transactions. ERP systems make use of Internet technology and the component-based architectures of the newer software to simplify the purchasing process, new ways of entering sales order building an shipping products. In addition, Internet and web-based procurement give benefits to companies, allowing them to reduce costs by controlling purchasing habits, leveraging total spending power, and reducing the number of suppliers they must manage.

Many companies were developing their system designed by integrating ERP systems with E-business. The companies were using web based interfaces with outside parties and integrate modules such as SCM, CRM ect. Thus we have eSCM, B2B, eProcurement and customer relationship management (CRM).Research shows that ERP systems can improve efficiency, information integration for better decision making, and faster response time to customer queries and reduces costs to organizations and enforce a discipline of best practice and consistency. ERP helps in improving organizations internal processes and they are focusing how ERP and the Internet could help them improve processes that reach customers, partners, suppliers and employees worldwide.

2. ISSUES WITH TRADITIONAL ERP

The scope of traditional ERP is limited to an enterprise, which cannot cross the boundaries of other organizations. Thus there is no effective communication with other business parties and thus organization cannot make quick responses to the market changes through cooperations.In traditional ERP systems the focus is still on product instead of whole value chain that comprises of customers, suppliers and other parties. As the traditional ERP is internal management system, it can only realize the internal management of logistics, information and fund flow. But it does not include the information about the customers. Thus it can't instantly reflect the demand and the relevant financial changes.In many organizations ERP is separated from E-business which weakens planning and designing phases of ERP implementation. Also purchasing data is not incorporated with financial and distribution data which leads to data inconsistency and data integrity problems. Due to incompatibility between software, hardware and data, there is increase in cost and a lot of memory space is wasted.

In a traditional business process, after a customer order is received, the order information flows from one department to other department through order entry, manufacturing, warehousing, distribution and finance until the product is delivered to the customer and the payment is received. The key elements of the value chain have been controlled by separate and disparate information systems that could not communicate with one another. Not only did the companies not take an integrated view of their own business processes, but they also had an equally vague understanding of how their systems relate to the systems of their suppliers, competitors, business partners, distributors and customers. Hence, these transactions are typically carried out with minimal or no shared business processes.

3. FOUNDATION OF INTEGRATION

The initial ERP systems were standalone systems that contained the modules like Financial, Manufacturing, Human Resource, Material Management, Production planning etc. Slowly technologies like SCM, CRM, PLM, BI etc began to be interfaced with ERP systems to improve efficiency, effectiveness and competitiveness of the systems.

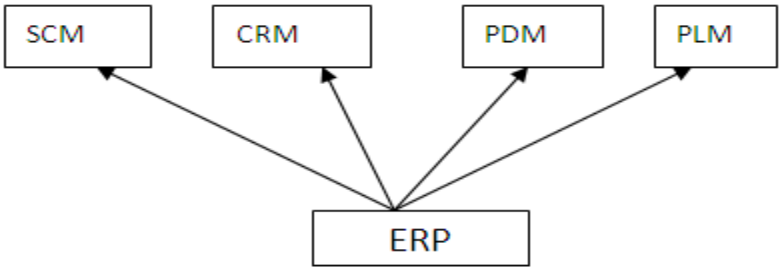

Figure 1.Integration Model of ERP with other technologies.

Product data management (PDM) is the use of software or other tools to track and control data related to a particular product. The data tracked usually involves the technical specifications of the product, specifications for manufacture and development, and the types of materials that will be required to produce goods. The use of product data management allows a company to track the various costs associated with the creation and launch of a product.

Customer Relationship Management (CRM) is a new type of management system aimed at improving the relationship between enterprises and customers. The main purposes of CRM is customer relationship setting up, development and maintenance .So it is just the objects that they focused on are different. CRM is more concerned about markets and customers compared with ERP.

Product life cycle management (PLM) is the succession of strategies used by business management as a product goes through its life cycle. The conditions in which a product is sold (advertising, saturation) changes over time and must be managed as it moves through its succession of stages.

Supply chain management is the systemic, strategic coordination of the traditional business functions and the tactics across these business functions within a particular company and across businesses within the supply chain, for the purposes of improving the long-term performance of the individual companies and the supply chain as a whole.

4. BENEFITS INTEGRATION

The Integrated ERP can interact automatically with suppliers and customers by information interchange, thereby enhance the efficiency of entire procurement and customer relationship management, at the same time, link to a third party Business to Business (B2B) website, implement E-Business, and then reduce the costs of intermediate links, enhance enterprise competitiveness in the market. Whichever method is used, as long as the front-end and back-end of enterprises is integrated seamlessly, network implementation of order entry and quotation will be easier. Since this is equivalent an extension of front-end software opened only for the sales staff to the network. As long as the existing customers or potential customers of Enterprises can access the following information from the network interface like product catalogues, unit prices, discount rates and inventory information, they can decide whether or not to place an order. The

orders input by customers on the network is the same as the orders entered by sales, and the information about orders can be immediately transmitted to ERP at the background. Then the ERP system will do calculating after receiving them. At last, the results data on the order price, order number and the amount of discount etc. will be sent back to the network interface. If customers record the information, they can track this order at any time through the Call Center, or by contacting with sales staff.

CRM integrates with back-end production, financial and logistics systems can play a real role in customer services and information analysis. The enterprise using CRM can be fully aware of the interaction data and transaction data about customers, and then it will analyze customer contributions to the business and decide whether to enhance the quality of services

5. ERP SYSTEM BASED ON E-BUSINESS MODEL

Under the present market circumstances with intense competition, enterprises have need to promote themselves continually to adapt the exterior circumstance variations. At present, the main issue in ERP and E-business integration is the interface of operation layer. As ERP integrates core business functions such as logistics, finance, human resources and sales-order administration, there are still many business processes that ERP cannot address. ERP falls short of meeting today's demands from customers for better services. With WWW and Internet technologies, information can move seamlessly through the value chain, making companies concerned to add functionality to implement specialized applications that can meet their needs. The management software of the new generation should have the ability both to support redefinition of business flow path of a project as minor matter and annexation, separation, reconstruction of enterprise, reformed operation of the virtual enterprise as major matters.

ERP system Based on E-Business model(EEM) can help enterprise to be adapted to new circumstances, ERP can be designed in individualization based on the difference of company business development, can make enterprise adopt more flexible & scientific management mode in the intense market competition. Especially, it can make organization adapt the changes in commercial circumstances under comprehensively applying the Internet, information share and interactive conditions. In addition, facing the huge exterior information and its rapidly changing, enterprise would change its traditional attention to the management & application of its interior resources into that of its exterior resources and change the organization's interior integration into the business cooperation among enterprises. After all, those mentioned above can not be apart from the application of ERP system. The EEM model can sufficiently support the interior & exterior reconstruction of the enterprise.

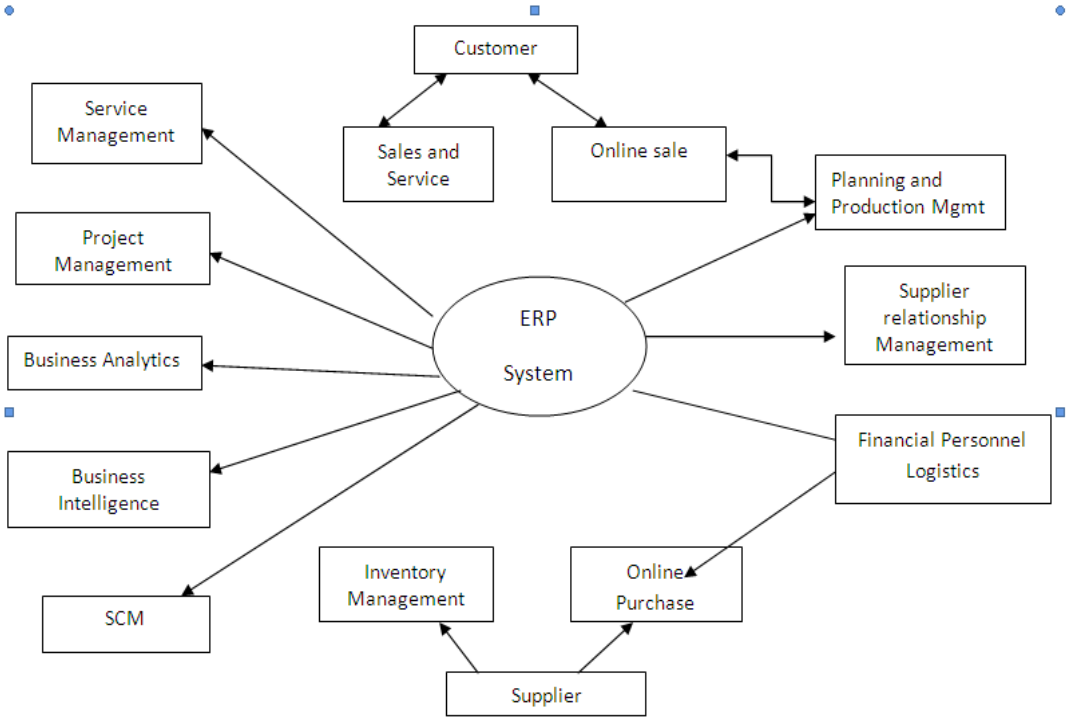

Figure2.Integration Model for ERP and E-business

The main focus of E-business is on efficiency and effectiveness of external, cross enterprise processes. While ERP systems support business strategy, new strategic opportunities are made accessible E -business , which makes ERP to take one step further to move from the standalone ERP system model to the extended ERP system model. The bridge between companies and their business partners is provided by Web technology to make E-business possible, while E-business makes the ERP system more transparent and outward. Instead of thinking about ERP within a company, we may view the ERP system along the value chain of companies in the same industry, or across industries. Organizations are now rotating their attention outward to engage in business with customers, suppliers and business partners through the use of the Internet and WWW services. As most of the core business processes are being carried out on Web so, ERP functionality has to move onto the Web.

Thus the whole extended system provides a vision of business processes that cover multiple businesses and enterprises, which is possible when E-business is integrated with ERP,. Thus, organizations must be able to connect distinct platforms, applications and data formats across the value chain, including not only suppliers, but also customers as well. Furthermore, companies should retain the flexibility to change and add functions to applications as business needs evolve. Companies need to be able to adapt their ERP systems to the emerging world of e-business. One of the essential design elements is componentization(CT) which can be highlighted by specialized components for supply chain management (SCM), customer relationship management (CRM), electronic commerce (EC) and supplemented by knowledge management (KM) ,data mining (DM) and data warehouse (DW) tools. It is the action of dividing up a large, monolithic ERP

system into sub-modules that would work together. Components are pieces of code that can be interchanged between applications.

Each functionality of ERP can be viewed as a separate encapsulated entity and treated as a component. This is according to object-oriented concept. As components are independent , it is easier to manage, upgrade and modify a component-based ERP system. Granularity, scope boundaries and internal cohesion are important attributes of a component. A fine-grained component will be simple to upgrade because it involves fewer relationships but requires more management since there is likely to be many more parts needed to meet the requirement. In contrast, a larger component may be easier to manage but would require more effort to modify and implement because the scope of the functionality is much broader and the impact of changes is much greater. Since the components encapsulate individual business processes that other components can freely access, companies can more precisely control individual business processes. This divide-and-conquer approach allows the companies to do rapid concurrent development[6].CT breaks large-scale business processes into self contained units of manageable size and thus makes it easier to deploy ERP systems in an E-business environment.

ERP and E-business applications can be assembled from Web-based components such as Online Analytical Processing (OLAP) components, batch components, application components and database components. An organization implementing an ERP system would be able to select different modules or components from different vendors instead of picking a single vendor. Since an ERP system can be broken down into components by functionalities, it is possible for the vendors to quickly fix or add functionality to ERP systems. Thus it is possible to enhance the individual component of ERP without affecting any other functional components. IBM research shows that only 20% of companies use a single ERP vendor. Almost 80% of companies use multiple vendors [12]. The incremental release and upgrade process are the major advantages of component-based ERP . This will help in the initial implementation as well as ongoing enhancement. For achieving these results, many ERP vendors and existing customers underwent considerable upgrade paint. The main goal is to develop ERP components that are compatible with one another and that can be easily integrated with E-business and other applications such as SCM, CRM, PDM,PLM etc.

The system modeling has the following features:

1) Third party software can be integrated into ERP by making use of Business Application Programming Interface (BAPI) . This is a standardized open interface. Thus using BAPI , user can apply ERP system through browsers and E-mail exchange and user can take these software modules to mix and match with non- ERP software for application as well.

2) Depending upon user requirement, user can renew any module, but there is no need to upgrade the system comprehensively in order to enhance a certain function. Thus without replacing the whole system user can apply the method of renewing the module one by one to enhancing the functions of the system.

3)The new system which we developed by integrating ERP an E-business can be split into five layers application layer, database layer, operating system layer, network layer and physical layer.ERP and E-business integration requires reassembling and integration of all modules of

application layer. They also need support of database layer and operating system layer. Access among different operating system and database connectivity offer a solid platform for integration.

6. COMMON ERP/E-BUSINESS PLATFORM (ORACLE & SAP)

SAP

SAP ERP is a world-class, fully integrated application that fulfills the core business needs of midsize companies and large organizations across all industries and market sectors. It helps enterprises to manage financials, human capital management, procurement, logistics, asset management, and corporate services.

SAP ERP supports a wide range of business processes. These include financial management, human capital management, procurement, asset management, logistics execution, product development, manufacturing, sales, service, and corporate services. Using the robust functionality that SAP ERP provides for these business processes, we can:

- More tightly link business operations and improve visibility
- Improve financial management and reporting
- Effectively manage workforce – both locally and globally.
- Achieve superior flexibility for addressing new business requirements
- Gain easier access to enterprise information and reports
- Give employees tools to perform their jobs efficiently
- Take advantage of software designed for adaptability that grants you the freedom to innovate

ORACLE

Today's ERP software needs to be scalable, affordable and easy to use. Oracle, the number one player in ERP, and the dominant supplier of relational database to the Windows NT and Unix market, became a leading independent software company worldwide. Oracle's Internet Platform provides a comprehensive solution for ERP integration. Based on the popular hub-spoke-adapter architecture, Oracle uses XML to extract information from legacy and ERP applications. The information will be renderable through "Portlets" on the desired site. NDS Systems has met this challenge by creating Oracle-based ERP applications for small to mid-sized organizations in the manufacturing, distribution and fulfillment industries. Established in 1985 and based just minutes from the Tampa/St. Pete area in Clearwater, Florida, the NDS ERP Oracle system is designed for scalability and ease of use. Built on powerful Oracle technology, the NDS ERP Oracle software application has the backbone you need to run your organization. Whether you're a manufacturer, distributor or fulfillment company, it's strong enough to support your overall business operations. Its E-business (WebDB) platforms have the following functions:

i) Better employee access to tools, applications and data :Due to change in business requirements over the years has lead to inextricably linked applications in a confusing tangle of connections across departments and business segments. However, no company can scrap its entire IT infrastructure and begin jam scratch again. Therefore, the portal platform has been used to reduce complexity from interlinked applications and packages data.

ii) Cooperation among heterogeneous legacy applications: Legacy applications want to coexist with best-of-breed supply-chain, knowledge management and customer-relation applications on the Internet. It serves as a consistent mechanism for inter application communication that facilitates cooperation among heterogeneous legacy applications.

iii) Globalization of operations'-business breaks the boundaries of regions and countries. All operations are globalized. The portal platform is a better way for the companies to link applications and business processes to achieve their E-business goals.

7. CONCLUSION

In today's scenario, ERP systems are required to address more than the processes taking place within the walls of an enterprise. In the modern competition, enterprises are exploring new theories and methods to adapt to social change. E-business is the solution to dictate a successful information economy. ERP and E-business integration can be regarded as a disposal countermeasure. The companies that have successfully implemented the ERP systems will become the masters in helping other suppliers to integrate ERP and E-business to create a Web-enabled ERP environment that will make the entire value chain very powerful.

The implement technology of ERP system Based on E-business model is embodied in the performance of information system integration. So only integrated with E-business, the ERP can follow the market change. The Integrated ERP can interact automatically with suppliers and customers by information interchange, thereby enhance the efficiency of entire procurement and customer relationship management, at the semen time, link to a third party Business to Business (B2B) website, implement E-business, and then reduce the costs of intermediate links, enhance enterprise competitiveness in the market. New e-business models are emerging as companies in all industries are transforming themselves to compete in the Internet economy. Successful transformation requires new E-business strategies and processes, as well as robust and scalable application and technology platforms.

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