E-Business and ERP: Bringing two Paradigms together

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1 Objective

Numerous papers and reports have been written on E-Business and how this concept will change the way companies do business.

However, little information is available on how to successfully integrate E-Business projects with ongoing ERP implementation or already productive ERP systems. As more and more companies realize that they need to open themselves to their customers and suppliers over the Internet, integration with ERP systems becomes a critical issue.

The purpose of this paper is to highlight commonalties as well as differences between E-Business and ERP implementations and point out some of the pitfalls, which can jeopardize the success of E-Business projects. The intended audience is professionals faced with the challenge to implement E-Business applications in an ERP environment.

The impact E-Business has for business processes, people, technology and organization in an ERP environment will be discussed as well the alignment of those dimensions with respect to ERP and E-Business implementations. The business process focus is on Supply Chain Management in the procurement area.

2 Current situation

2.1 Definition of E-Business

The PwC definition of E-Business is 'an enterprise designed for success in the Information Economy. E-Business brings into play an organization's resources and partners in new and innovative ways to create clear strategic advantage. The potential of E-Business goes far beyond new technologies – to impact and engage all aspects of a business – strategy, process, organization, and systems – to extend the business beyond its own boundaries – where there are no boundaries...'

2.2 Projections for E-Business

According to interviews conducted by Forrester Research with 40 senior IT and eCommerce executives, Electronic business will explode by 2002 because they expect 78% of their customers and 65% of their trading partners to have global electronic connections with them, up from 40% and 43% respectively. Online revenue growth has quadrupled each year. In 1998, it totaled $35 billion inter-company and $15 billion retail, worldwide. In 2000, out of 256 million users, 53 million buyers will average $4,090 each in e-commerce business (combined inter-company and retail). By 2003, online revenues will exceed $1.3 trillion.

2.3 Challenges for established companies

The new technology offers a company the opportunity to build interactive relationships with its customers and suppliers, improve efficiency and extend its reach, all that at a very low cost.

Companies, which fail to seize those opportunities, become vulnerable if rivals establish themselves first in the electronic marketplace. They may eventually be forced to participate in Internet commerce by competitors or customers. For example, GE estimates to save $500 million to $700 million of its purchasing costs over three years and cut purchasing cycles by as much as 50%. Eventually, the company expects to buy the majority of its purchase through its Web-based bidding system.

Faced with these challenges, a company might feel compelled to act fast in order to avoid loosing ground against competitors.

A common mistake is to simply establish a website with a narrow focus to support an established business process, possibly as an add-on to an ongoing or productive ERP implementation. Establishing an isolated web-presence is likely to waste time and financial resources. Instead, an Internet presence or channel will

only be a successful investment if it is integrated with existing systems, typically an ERP system. It needs to be part of an overall strategy that encompasses the transformation of the entire value chain down to the process level towards truly integrating the enterprise with customers and suppliers. The development of the strategic plan is not subject of this document, however it cannot be overemphasized that it needs to be in place prior to embarking on E-Business.

3 E-Business and ERP: Bringing two Paradigms together

3.1 Benefits derived from ERP Implementations

Main benefits derived from ERP implementation include:

- Bringing people and processes which traditionally were physically and/or logically separated together in a collaborative environment
- Replacing inventory with information by being able to produce more accurate forecasts
- Relieving users from routine tasks and freeing them up to focus on value adding activities
- Standardizing of business processes across the enterprise on a global basis
- Centralized control of system configuration and master data ensuring data integrity
- Eliminating disintegrated legacy systems by replacing them with an integrated ERP system
- Introducing a common business language across the enterprise
- Deriving strategic benefits – benefits that typically reflect underlying business drivers from the improved quality, quantity, access and use of information;
- Reducing costs through greater financial management, both in the personnel and technology area

3.2 Benefits derived from E-Business Implementations

The reasons why companies in all sectors of the economy are embarking on E-Business projects is the need to derive benefits attributed to E-Business which are necessary to stay ahead or at least keep abreast with competitors in an increasing fast-paced environment.

Those benefits are

- Gathering information about customers that will enable the business to anticipate and satisfy customer's needs
- Increasing customer loyalty by focussing on customer relationship management across the entire life cycle, using techniques such as real-time dynamically customizable web-pages created from self-generated preference profiles
- Establishing a global reach to both customers and suppliers, cutting purchasing costs and broadening market share
- Reducing dramatically the costs of transactions with business partners (customers and suppliers)
- Reducing dramatically the time it takes to complete a transaction with a business partner
- Easy sharing of information with business partners, thus reducing the need for high inventory levels
- Enabling collaboration between business partners to work jointly on solutions/products for the marketplace, reducing cycletime

It becomes immediately clear that there is a large overlap in the benefits of both ERP and E-Business projects.

In fact, an E-Business project that is built on strong foundation of an ERP system which can provide information for the business partners via the web-site and can process incoming information from the business partners is much more likely to succeed than one lacking this foundation.

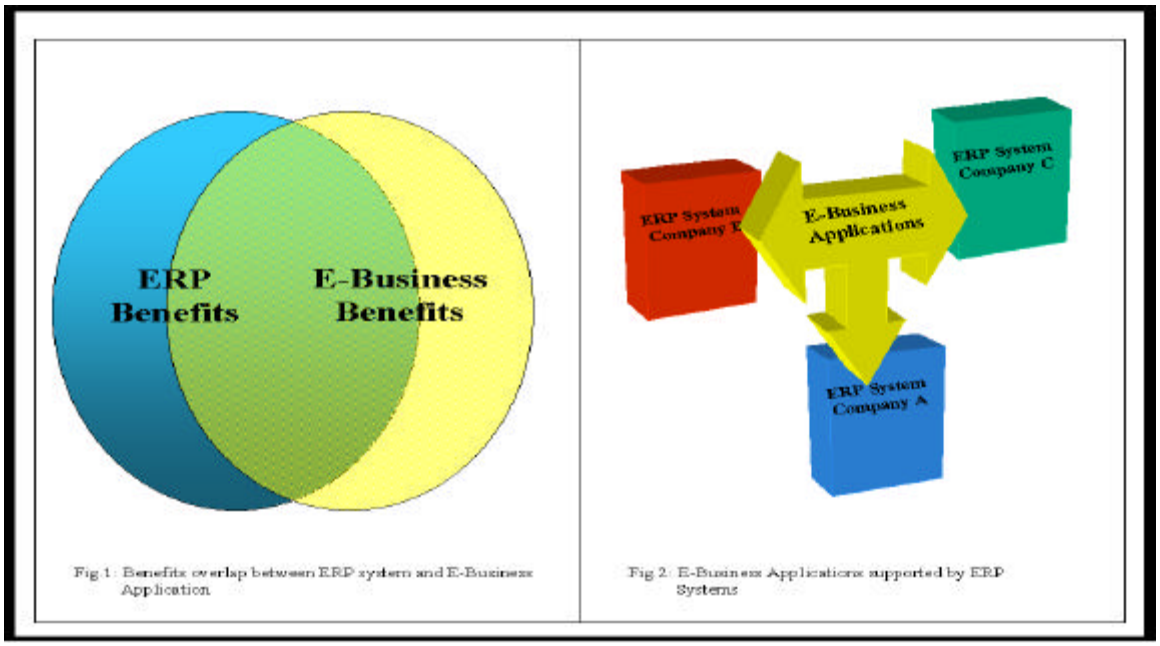

Fig 1: Benefits overlap between ERP system and E-Business Application

Fig 2: E-Business Applications supported by ERP Systems

3.3 Commonalities and Differences between ERP and E-Business Implementations

While many of the benefits derived from ERP and E-Business implementations are similar or even identical, the nature of those implementations is quite different. To achieve the maximum level of benefits from both, it is important to understand from the outset what the commonalities and the differences between them are.

3.3.1 Commonalities between ERP and E-Business Implementations

Both E-Business and ERP implementations are undertaken with similar strategic goals in mind. They both need to be part of the same enterprise-wide strategy to be successful because they have an impact on almost every business process, spanning Financial management, Order-to-Cash, Production Planning and Logistics and Requisition-to-Cash process chains.
In many cases, both implementations need to interact with the same external partners, such as suppliers and customers since traditional communication channels such as EDI will co-exists with E-Business communication over the Internet.

3.3.2 Differences between ERP and E-Business Implementations

The differences between ERP and E-Business implementations can be categorized into

3.3.2.1 Technology

ERP implementations are based on complex packages of standard software, running on company (or service-provider)-owned client/server architectures.
E-Business implementations are supported by components such as webservers, commerce servers, firewalls and gateways. They utilize the ERP system's transaction server and database server by connecting to them through middleware.
The customization of the ERP system takes place largely using its proprietary development environment whereas E-Business application development utilizes open standards such as HTML and Java. This leads to different skillset requirements for the developers and configurators.

While the ERP system is in most cases maintained in-house, E-Business implementation more often include long-term partnerships with external service providers who may develop, maintain and even host the company's web-presence

3.3.2.2 Partner orientation

The audience (and stakeholders) of an ERP system is potentially every employee in the company as well as key suppliers and customers. Typically, an ERP system in its final rollout will replace the majority of legacy systems and interface with the remaining systems. To the outside world however, the ERP system will be largely transparent, as it communicates with suppliers and vendors using traditional media or standard EDI transactions.
An E-Business implementation is from the onset aimed at integrating business processes with outside business partners and is built on and supported by the ERP foundation. The main focus of the implementation will therefore be the integration of cross-company value chains using E-Business tools.

3.3.2.3 Implementation Framework

An ERP Implementation has a defined lifecycle of typically 12-24 months depending on the scope and other parameters. After the initial implementation, upgrade and functional enhancement projects follow in irregular intervals.
E-Business implementations need to be significantly faster than initial ERP implementations. However it can be expected that activities will continue on an ongoing basis to accommodate changing relationships with business partners and enhanced functional and technical scope of existing relationships.

3.3.3 Potential risks of E-Business/ERP Implementations

As discussed above, while the goals and audiences of E-Business and ERP implementations overlap, the implementation frameworks are quite different. This poses a risk if it ERP and E-Business projects are not well coordinated.
While the nature of an ERP implementation normally will ensure that it is firmly embedded in the enterprise-wide strategy, this is not necessarily the case with E-Business projects. E-Business implementations are typically a lot smaller and of shorter duration than ERP projects. Single departments or initiatives might event want to undertake an E-Business project on their own. However, uncoordinated efforts will potentially create an inconsistent image of the company to its external partners. Furthermore, the success of the E-Business implementation depends on its integration in the value chains embedded in the ERP system. If integration is postponed, significant additional work will be created for internal staff, eliminating many of the anticipated benefits. A lack of integration with the ERP system is also likely to increase rather than decrease the time it takes to process a transaction, thus resulting in dissatisfied business partners and poses a threat to the credibility of the E-Business readiness of the company.
The resulting damage is not limited to the immediate problems but more importantly the delay in establishing a credible E-Business presence. It is the nature of the E-Business that the time it takes to build the new value chains is one of the most important measures of success. To recover lost ground is very difficult in a highly competitive environment. A company needs to strike the right balance between taking shortcuts and risky implementation approaches and a too traditional and slow approach.
It is important that an E-Business project is not viewed as a technology project. Ownership needs to be assumed by the business leadership which requires that business strategy and IT strategy are unified.

3.4 Aligning business processes, people, technology and organization between ERP and E-Business

To make an E-Business implementation successful, it must be aligned with the ERP foundation on which is being build. It is more than likely that adjustments to the strategy, processes and technology, which support the ERP system and vice versa will be necessary so they can meet the needs of E-Business.

3.4.1 Business Process

E-Business will enhance existing value chain to cross company boundaries in many ways. For example, in the procurement area, B2B procurement will streamline internal processes such as requisition approval and purchase order creation as well as external processes. Suppliers will be able to monitor inventory

levels and improve their own ability to forecast, thus truly integrating themselves in the value chain. It is likely that some suppliers will emerge better equipped and willing to participate in this collaborative environment than others.
New tools using the Internet as enabler make more efficient sourcing a reality in the area of competitive bidding. Online intermediaries like FreeMarkets.com and InsWeb bring buyers and sellers together, forcing firms to share processes like how to make a quote online.

It is difficult to imagine how those concepts will function if they are not supported by an ERP system-like foundation. Each E-Business process needs to be linked with it ERP supporting processes and while technical integration may not be part of the initial rollout, the design should provide for it.

When designing new E-Business processes, the compatibility with existing processes should not be overlooked. Implementation time is a limiting factor in the age of E-Business and a process design, which would require a redesign of the supporting ERP system would be off target. Process owners need to be assigned who have responsibility across supporting platforms (ERP/E-Business). They need to work closely together with their counterparts in the value chain forming a team to design the integrated value chain.

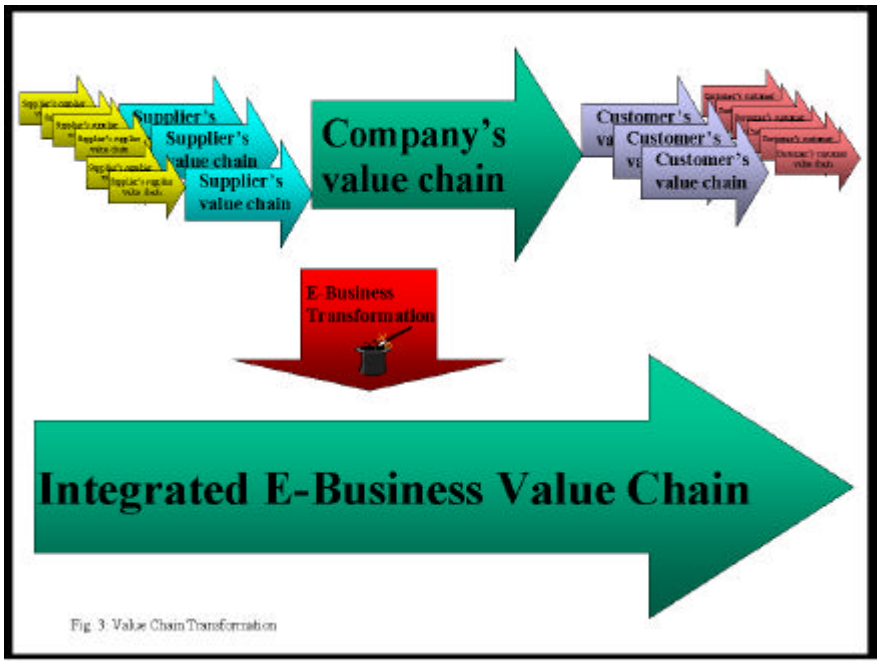

Fig. 3: Value Chain Transformation

3.4.2 People

The emergence of E-Business as a new differentiating factor between companies changes the skill requirements for the both the people implementing E-Business solutions and those who are using the enhanced value chain.
Exclusively technical or business oriented staff will need to cross train in the other discipline as the borders between technology and business blur.
At the same time, change management skills becoming more important because employees will have to work in frequently changing environments and teams composed of both internal and external resources.
The integration of the ERP system with E-Business application will require that staff which supports the ERP system and is responsible for applying changes to it adjusts to the 'speed of E-Business'. ERP systems are often 'protected' by a set of rules, which are strictly enforced and often add weeks to the process of making a change. This is not compatible with the needs of E-Business. While it is imperative that system integrity is enforced, established procedures, which slow down the integration of E-Business and ERP, need to be adjusted. Oftentimes, the adjustment is less a change to the procedure but an education of the staff who enforces it.

In terms of alignment of the skillsets required for ERP and E-Business implementation, it seems apparent that E-Business takes the enhancement of skills, which began with ERP implementations a step further. While in an ERP environment, the combination of technical skills and business knowledge is a strong advantage, it becomes a necessity in an E-Business environment.

3.4.3 Technology

Development and deployment never stops in the transition process to an E-Business environment. The pace of change affecting technology, competitive landscape and business model means that companies have to plan for more rapid life cycles for their E-Business applications than their ERP systems. This creates a problem for aligning the two platforms, which from a business prospective need to work seamlessly together.
Future scalability and maintenance are of utmost importance when choosing the approach to build E-Business applications.
The best answer to this challenge is to rely as much as possible on predefined application interfaces (e.g. SAP's BAPI's or PeopleSoft's Message Agent API) provided by the ERP vendor and architect the solutions around them. Developing custom-interfaces will often result in a short-lived solution, which either needs to be abandoned or requires constant re-work and maintenance.
The same approach holds true for the development of the E-Business solution. Few companies will want to spend their resources on constantly updating and re-inventing their E-Business models. By choosing a software vendor who has been certified by the ERP vendor for a certain E-Business application, the company can mitigate a large risk area. There is a variety of software products on the market including Sun's NetDymanics PAC, Netscape's NAS for SAP and PeopleSoft.
Whatever decision is taken, it effects the way the ERP system and the E-Business application will work together. Any unilateral approach, which does not take the other side into consideration, is bound for failure.

From on overall design prospective an inventory needs to be made of all enterprise applications which eventually will be part of the E-Business architecture. Depending of the landscape, it may be more advisable to choose an ERP independent platform to integrate all those systems rather than selecting the offerings from the ERP vendor which is exclusively geared towards the ERP package. The rationale for this is that a web-front-end offered by the ERP vendor does not have the capability to integrate with other applications. While it will offer a robust web-enabled interface from the ERP application to the Internet, it falls short on supporting the E-Business vision.

Security considerations gain importance the more the E-Business applications are integrated with the company's ERP system. Traditionally, an ERP system has very limited and tightly controlled interface to the outside word, such as EDI connection via private networks.
The additional channels, which will be established to send and receive data from and to the ERP system, need to be clearly defined and the need for security has to be addressed. A trade-off between protection on the one hand and functionality, ease of use and performance will be the result and ownership and accountability needs to be established.

3.4.4 Organization

3.4.4.1 Support Organization

ERP systems are best supported by a central IT organization. This is due to the nature of an ERP system, which operates with a centralized database and – in a client/server environment – is accessed through application servers, which physically may or may not be in a central location. While communicating with outside business partners, there is no need for the IT organization to support their systems as those communication channels are managed by the provider of the service, e.g. the VAN.
E-Business on the other side spans by definition business processes across companies and possibly across the globe. The applications are changing at a rapid speed and requirements are likely to be different by location. Procurement for example is governed by different laws in the US and the European Union.
The right mix to support an E-Business application will include

- mainly business focused staff which will provide the business direction

- mainly content focused staff which will ensure that the content of the websites is current, organized and designed consistently
- mainly technology focused staff which provides technical support and development and works with the before mentioned groups and external service providers

These functions do not have to be provided by the company itself. External service providers can provide especially technical support and development as well as content support in terms of design consistency and updating.
The traditional IT organization is not equipped to support heterogeneous systems with different local requirements on a global scale.
A best practice to manage the new processes is to focus on the support of the foundation of E-Business, the ERP system and employ specialized service providers, such as CommerceOne or IBM Global Services to ensure that business requirements are met and E-Business applications are integrated with each other and the ERP system. The IT organization will need to work closely with the business process owners and manage the service-providers. Teams will be set up with representative of all members of the value chain and the service providers and system integrators.

3.4.4.2 Project Structure

Executive Sponsorship is one if not the most critical condition for project success. The sponsor needs to be able to both create the business vision and drive the implementation. He or she will work with senior management in establishing teams, which cover the end-to end business processes both within and outside the boundaries of the company.

The project could be structured by process chain. One team could be customer focused, the other supplier focused if both areas are part of the scope.
Supporting the project would be a development team and infrastructure team.
While this structure does not seem to differ very much from ERP project, the staffing of the teams is a departure from the ERP approach. While ERP project teams typically were staffed by the implementing company, the integrator and to a lessors extent, the software vendor, E-Business project teams need to represent all stakeholders. In addition to company staff and the integrator, key customers and suppliers as well as service providers need to be part of the teams.

The process teams need to include

- Business process owner, empowered to make process decisions. Responsible for both ERP and E-Business supported processes
- Business process expert (internal), user of ERP system, knowledgeable of local requirements (if applicable)
- Customer/Supplier representative from each key business partner included in initial roll-out
- Integrator representative providing process/industry knowledge and project management expertise
- ERP process expert
- Service provider representative focusing on managing intercompany processes (if applicable)

Similarly, the development team and the infrastructure team should have representation from any service provider involved, the key customer and supplier whose systems will be integrated with the E-Business application and the integrator.
The following diagram does not imply a certain headcount for the project. Depending on the size of the organization and the scope of the project, each box can represent more than one team member or, one team member can fulfil multiple function within the project.

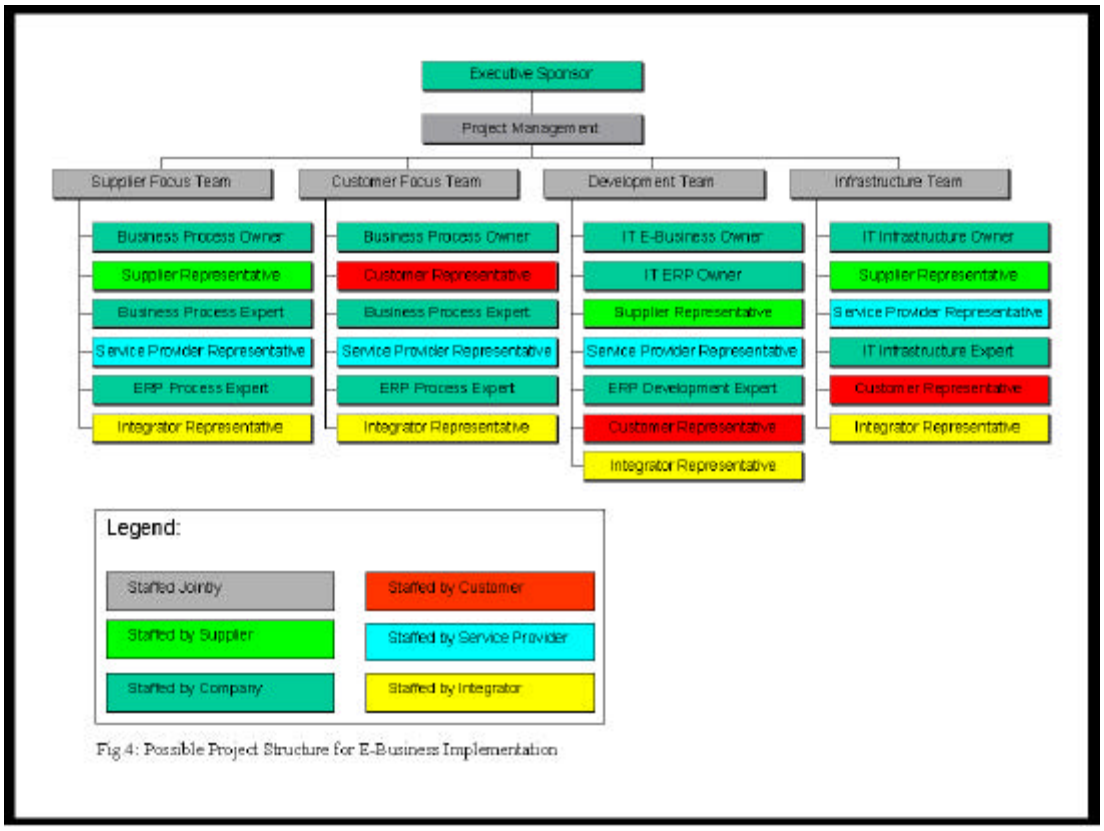

Fig 4: Possible Project Structure for E-Business Implementation

4 Conclusions

The emergence of E-Business as a driving force to redefining business processes and value chains poses a challenge for traditional approach to implementing systems to support the business requirements. Upon examining the commonalities and differences between traditional ERP implementations and E-Business implementations, it becomes clear the benefits and business goals between the two are largely identical or complementary.

ERP and E-Business applications are enabling technologies, which need to be part of a company-wide strategy

E-Business implementations will be the more successful, the better they are supported by and integrated with ERP systems and other E-Business relevant applications.

Rather than viewing them separately, companies should from the beginning make sure that both efforts are well aligned with each other. The alignment should address the levers of business process, people, technology and organization.

This should manifest itself in a project structure for E-Business implementation that includes active participation and ownership of all stakeholders, namely, suppliers, customers, service provider and integrators.

5 Further Reading

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