THE PLACE AND KEY SUCCESS FACTORS OF ENTERPRISE RESOURCE PLANNING (ERP) IN THE NEW PARADIGMS OF BUSINESS MANAGEMENT

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ABSTRACT

This study examines the impact of ERP solutions on the paradigms of business and management. The objective is also to see the positioning of ERP today and its role in relation to new solutions and technology, notably Supply Chain Management (SCM), Customer Relationship Management (CRM) and Electronic Commerce in conjunction with ERP. In addition, critical success factors in the implementation of ERP projects are being identified with a special emphasis on management issues.

Keywords*: Enterprise Resource Planning (ERP); E-Commerce; Customer Relationship Management (CRM); Supply Chain Management (SCM); Business Paradigm.*

CONTENT

Introduction

Enterprise Resource Planning solutions appeared on the market from the early 1980's. Generally they comprised modules for Finance, Logistics and Manufacturing, allowing for the management of purchases, sales, stocks, production etc. These solutions were referred to as Enterprise Resource Planning since they permitted the stage elaboration and integrated administration of the company major resources (finance, fixed inventory, materials, human resource) and the associated processes. [ING BARING 1997].

Before ERP, the purchased or in-house developed software, more or less interfaced, were the only solution offered to companies to manage their activities while respecting separation between departments, tasks, input and databases. For example in a French affiliate of a U.S. based company, one could find a Management Accounting section and a General Accounting section. The first would ensure an input of accounting documents according to an American Chart of Accounts, while the second would ensure an input with the same documents on the basis of a French Chart of Accounts (in order to allow a French fiscal declaration).

In his book, Jean-Louis Lequeux [LEQUEUX 1999] gives an ERP definition which distinguishes ERP from other types of software by suggesting that it must possess simultaneously at least the three following characteristics :

- the effective management of various company activities;
- the existence of a common database;
- the capability to react quickly to operating rules.

Five major editors share the ERP market with SAP by far the leader : SAP, ORACLE Applications, PEOPLESOFT, J D EDWARDS and BAAN [KUMAR, VAN HILLEGERSBERG, 2000]. During the 1990's, they were able to get the attention of industry leaders, leading to a cumulated turnover for these five editors of 14 billion dollars. However in 1999 and 2000, a certain market saturation was noticeable resulting in operational losses among certain of the editors, a drop in share value, and press articles predicting the end of ERP.

To understand this phenomenon, we analyze the reasons which led deciders at each point in time to choose an ERP solution.

1. Why purchase an ERP solution ?

As indicated below, the motivation for the purchase of an ERP solution has evolved with time .

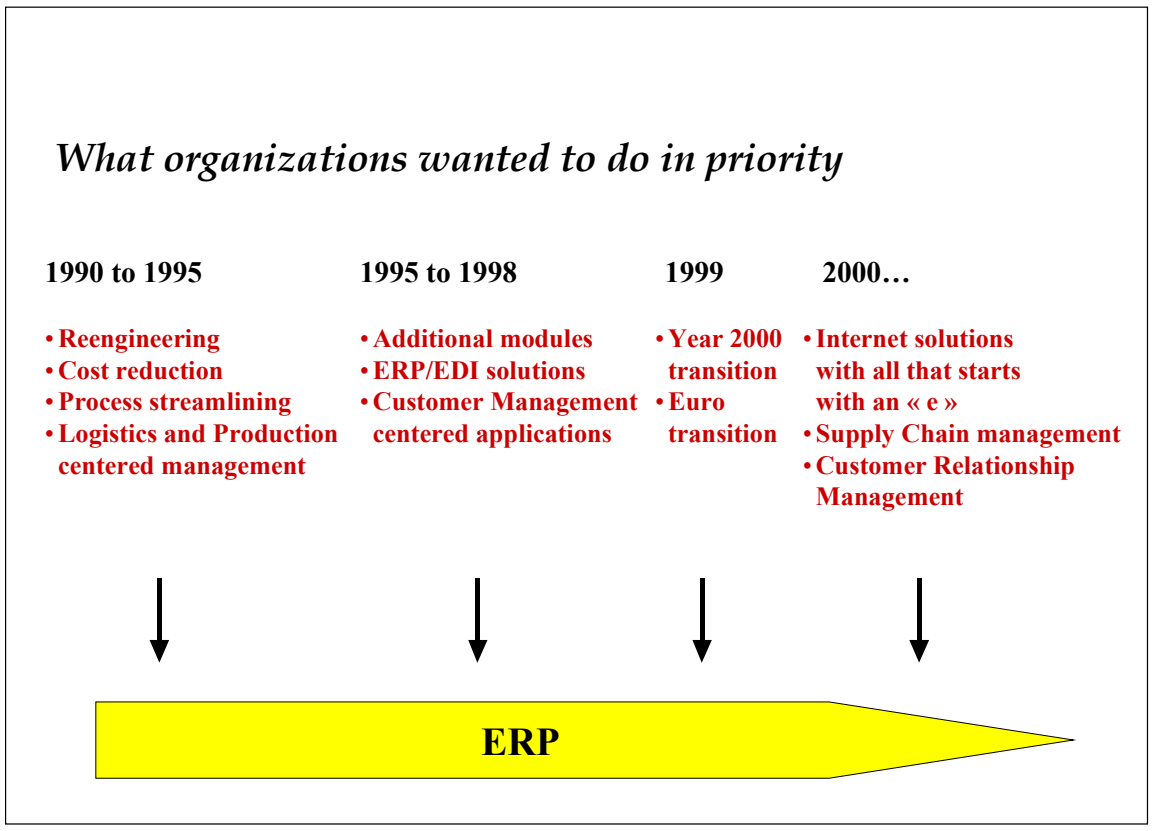

Figure 1: The motivations for the purchase of an ERP solution over time.

The period 1990 - 1995

During the period 1990 to 1995, company management even for companies showing strong growth and profitability, were focused on cost reduction, with as a favorite target salary and welfare charges, which translated into reduction in the number of jobs. “Reengineering” [HAMMER, CHAMPY, 1993] was all the rage. To reduce costs, the solution was to rationalize the processes, with a centralized management of Logistics and Production. Gradually, the multinational companies put the investment priority on European factories and distribution centers rather than on country by country units. In time the notion of Globalization became the norm [MINC, 1997]. These tendencies were reinforced by the notion of “outsourcing” and progressively the idea was to displace

production to those countries where competence existed but where salary and welfare charges were a fraction of those of developed countries.

In this context, the offer of the ERP software editors, which promised a strategic I.T. solution “one-stop-shop” was perfectly timed. In the marketing and sales pitch, it was understood on the one hand that a reduction in I.T. personnel would ensue, especially those involved in in-house development; and on the other hand a single data input would mean a reduction in administrative tasks and therefore jobs related to these tasks. This would in turn ensure the payback on the software investment and its implementation. It is of note that these costs accumulated and to an extent remained hidden and unseen over a number of years. Also worth noting is that management now are satisfied with their ERP solution, even though no Return On Investment was calculated and even though the total cost had never been estimated ! Dilip Wagle has proposed judgment criteria on that [WAGLE,1998].

Another ERP sales argument was the fact that it forced the application of standards and of uniformity in management practices. Thanks to ERP, a multinational’s headquarters could have complete visibility, for example of stocks, irrespective of where assets were to be found physically. Management rules were applied universally, the chart of accounts and product codes were the same: only local particularities for legal, fiscal and business practice reasons were permitted to what was otherwise a global corporate model.

One can understand why ERP became so successful for multinational managements, and the I.T. management standard for the 1990’s. In the future it is likely that historians will attribute importance to ERP in the evolution of management practices, even if today the next stage of Internet technology applied commercially means there is a tendency not to look in the rear-view mirror.

The period 1995 -1998

Those companies who implemented ERP in the years 1990 to 1995 noticed aspects that were missing in terms of a really integrated solution to their business management needs. For example, Marketing and Sales were not catered for sufficiently by ERP.

In this period 1995 - 1998, ERP improved these functionalities missing from earlier versions. Supplementary modules were offered as an add-on, for example for use by the sales force in the field, or to accommodate EDI which allowed companies to communicate with their wholesalers, their larger customers, their suppliers. As customization to ERP was heavy and costly, the solutions proposed were often products of ERP editor strategic partners.

Editors organized regularly conferences to explain their strategy, announce new versions of their product, listen to user experiences and organize, simultaneously in separate rooms, meeting points where partners could offer add-on solutions. In time, these conferences became subject to media attention and luxurious with golf tournaments,

banquets and amusements. Hundreds, if not thousands of persons attended and Editors competed to choose the most prestigious of conference venues.

User companies realized progressively that their ERP choice imposed a life long marriage with their Supplier/Editor, and that a divorce was not an option from an economic viewpoint. Editors profited from this situation by imposing practices: version changes of their software each 12 to 18 months, with several updates between versions became a norm. Often the user companies assisted by the Editor formed groups by region or by vertical sector of activity. These User Groups were created to lobby for Editor future development [LANDRY, 1999].

The purchase motivations of prospect customers, and the requirements of their existing customer base, had rapidly changed and ERP providers had to adapt. What now was important was an integrated solution for finance/logistics/production. And in addition modules adapted to vertical sector industrial and commercial needs, responding also to Marketing and Sales , etc.

The period 1999 - 2000

The year 1999 was characterized by Year 2000 projects, allowing company automated systems to pass to the year 2000 [ROSS, 1999]. Also, to be able to accommodate the Euro, Editors had to offer the appropriate version of their software. But a pause was needed to implement these new versions and effort and investment was concentrated on this priority. For the first time ERP editors found their sales line platforming out and their profit line showing a downward curve.

Those companies who did not have an ERP solution hurried to implement, those who had a solution hurried to be on the right version. For all, the question was the same : does your solution get through Year 2000 ? Can it accommodate the Euro (and not only as just another currency but in respect of all the directives in application)?

2. The consequences of ERP on companies, on the work of individuals and on the management practices.

2.1 The implementation method.

It was especially the implementation method used by the Editors which impacted on the organization and the jobs and management practices (paradoxically more than the ERP product itself) [CONNOLLY, 2000][CALDWELL, STEIN 1998].

Once the ERP choice made, the classic method was to create a project team with the following tasks :

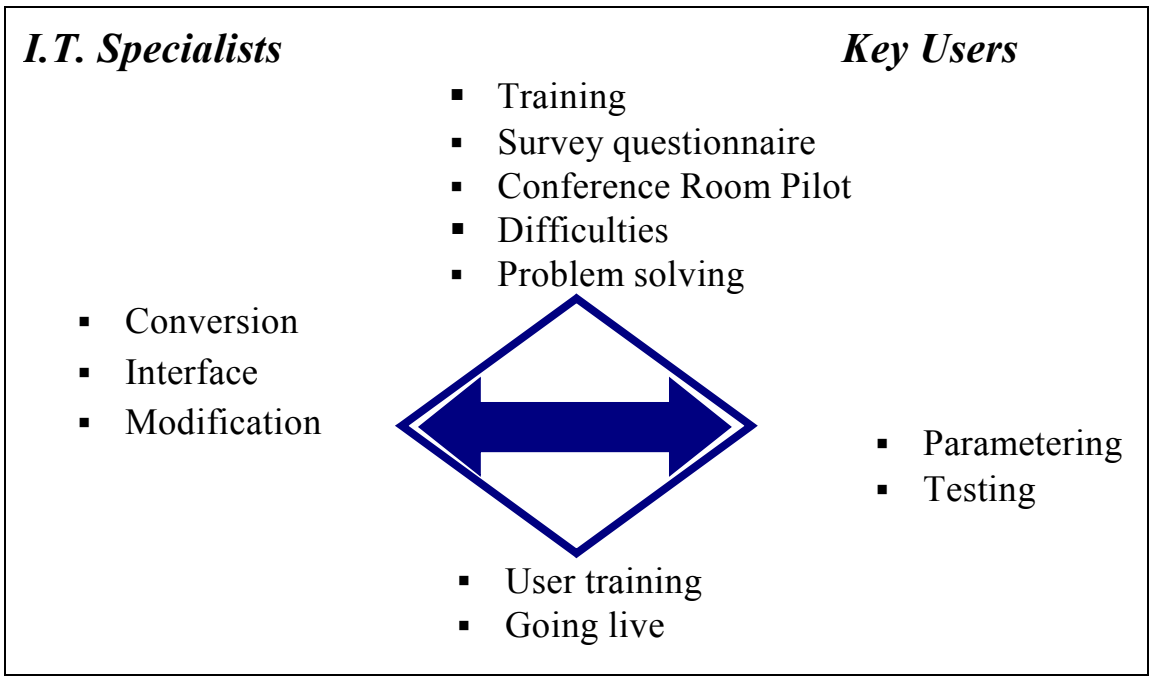

Figure 2: ERP implementation steps

The project team was formed of software I.T. specialists and key users for each module. Often members of this team were those persons key for daily operations and transactions. The first challenge was to free them up from their daily routine by the use of temporary or short term contract staff for example.

The team had to first be trained intensively in the ERP software in group sessions animated by the Editor consultant.

Then, the consultant conducted interviews so as to have a better understanding of the profession and working practices of the company. This dialogue also allowed user department managements and the project team to better understand ERP.

The phase Conference Room Pilot was the occasion to test each transaction type using the ERP solution and real data in a test environment. The objective of this critical phase was to identify all problems and classify them for solution at a later date.

The I.T. specialists then, for their part, started the work of data conversion, interface with other applications and appropriate/necessary custom development . In parallel, it was often necessary to upgrade the central computer (for example an AS/400) because one of the characteristics of an ERP was to require more computer power…

Simultaneously , key users prepared the set-up/parametering, each in the area for which they were expert: finance, logistics or production. To parameter the system meant using detailed management rules foreseeing each possible situation. For example to determine who and for what function the right to system use be given for which type of request, modification, addition to data ? Who was to define and control the master files for articles, for clients, etc ? Which account applied to which cost center, associated with which business unit and with which legal entity ?

The key users validated the choices made by I.T. in terms of conversion, interface and modification, and worked in tandem on the solution of issues that had been raised in the Conference Room Pilot.

As the target Live date approached, the end users were trained for their respective tasks. The technical and user documentation was edited and measures taken to ensure regular update. The documentation needed to be the reflect of legislation and guidelines in force. In addition, companies often wished to obtain certification ISO 9000 or pass inspections for their sector of activity (for example FDA Food and Drug Administration). For this reason, attention needed to be paid to documentation accuracy and pertinence.

The Live date was a critical moment which was achieved with more or less success according to the degree of preparation beforehand. This was especially evident if the migration choice was a cutoff from the old systems to the new. The alternative of a period of two systems in parallel for several weeks or months was often considered too heavy to handle [SCAVO, 1998]. Better prepared companies used risk analysis techniques and put in place contingency and continuity plans, before Live.

ERP has always an important impact on the organization and on management practices, due in particular to the fact that it imposes the same treatment method whatever the organization’s activity , as well as a standardized and rigorous implementation procedure.

2.2 The effect of an implementation.

The changes in time are not necessarily dramatic, even if for certain companies and for certain individuals the ERP implementation process was painful or badly perceived. On the other hand, observed over a longer period, say five years, the changes between before and after ERP are radical.

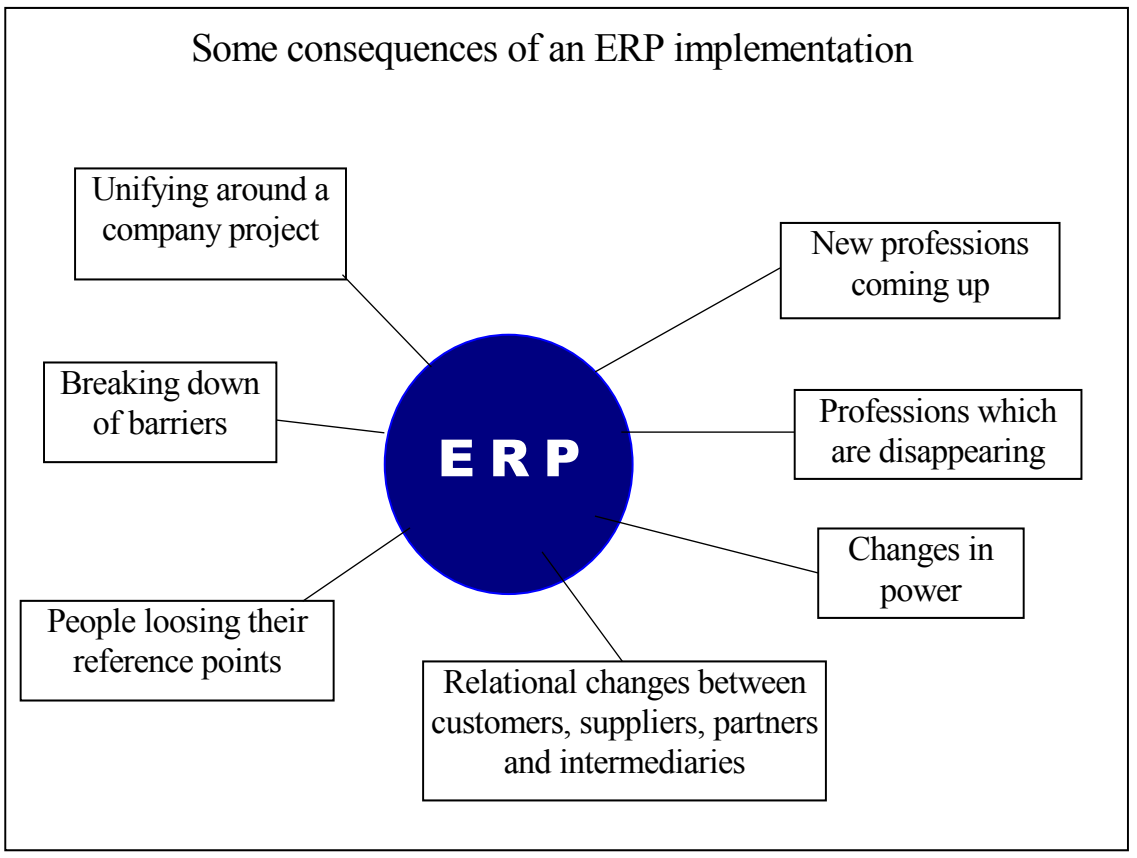

Figure 3: The consequences of an ERP project

Unified around a company project.

First of all, the ERP implementation, often perceived as an I.T. project, becomes rapidly a company wide project of large proportion. The efforts and resources mobilized are significant, the decisions to be taken need consensus among different department managements, the organization working methods have to be at the outset reviewed and rationalized, and the implications of ERP have a ripple effect throughout all the company's activities…

For many companies, staff and employees at different levels rallied around the project team of I.T. specialists and key users. By combining their knowledge of the old and new

I.T. system and their experience of the business and organization, they were able to truly judge their profession, company and its processes. This synergy , encouraged by the Steering Committee, led to the definition of best practices and a reduction in superfluous tasks, double input, and a redesign of databases which may not have been up to date, with redundant data managed by different departments, etc.

The ERP implementation often presented an opportunity to take the time to reflect on company operations. Sometimes the way of working was for historical reasons which no-one present could justify. In this way, the simple fact of explaining certain company procedures to outside persons such as the ERP consultant, often put the spotlight on a number of dysfunctions.

Breaking down of barriers.

Barriers is perhaps too strong a term, but it is true that divisions, departments and services were brought together since an integrated software implied that finance (accounting and management reporting), logistics (order processing, warehouse, expeditions, after sales service) or production needed to use a common database and system.

For this reason, directors, I.T. specialists and key users had to concert to discuss management rules and the contents and control of databases. This continued working together and consultation became a fundamental element of success and ERP project advancement.

Persons who lost a point of reference.

For certain, and irrespective of their level in the hierarchy, the changes provoked by ERP had a destabilizing effect. For example:

- For a user, comfortable with a certain method for reregistering transactions, it may appear to be destabilizing to convert to a new system.

- For an I.T. specialist, used to developing solutions as and when users required, may find difficult to revise this practice.

- For a director, in the habit of controlling information and examining figures prior to reporting to head office, it may be hard to adapt to receiving information not necessarily in the same format and information which could be consulted by his/her superiors in real time.

For this reason of instability and the resulting latent resistance, many projects saw their budget costs and delays explode. The notion of Coaching, Change Management now

became a part of implementation methodology. One had come far from a simple I.T. project .

New professions.

With ERP, certain professions appeared for the first time, others evolved. For example :

- The SuperUser: this person defined the parameters, wrote the user manuals, carried out tests and training and became the reference point for end users.

- The I.T. software specialist: instead of developing as a prime task, this person managed conversion, interface, modification and the integration of new versions and complementary products.

- The database administrator: this person from the I.T. or user population ensured the integrity of databases - for example that master files were correct and up to date, and looked after the reregistering of new clients, articles, etc.

These new professions, often perceived as temporary at the outset of the ERP implementation, progressively became a permanent feature. The temporary and short term contracts hired to fulfill the daily operating tasks were often transformed into long term positions. Key users never returned to transaction work, nor did I.T. specialists return to program lines; all change now !

For the most part, everyone benefited for the demand for persons competent in ERP (SAP, JDE and others) growing in recruitment advertisements, with salary levels relatively high.

Professions which disappeared.

- The internal Software developers, who transformed user needs into lines of program disappeared. They were reconverted after RPG training to development around a standard ERP, or to program quick, easy and often throwaway solutions in *VisualBasic* to respond to a function not yet catered for in standard.

- The ERP characteristic of one only input of data, and the fact a level of internal control was built-in, led to a simplification of processes and a resulting reduction in clerical functions.

It is difficult to establish a correlation between the arrival of ERP and a reduction in headcount. Certain managements were motivated to adopt an ERP solution to reduce overheads (and by the same token headcount). When redundancies did take place, the companies - at least those which survived - may have been obliged to hire again at a later date. For the companies in rapid expansion, ERP had a leverage effect - the company

could absorb extra volumes of business without a linear increase in new salaries. It is likely that the concurrent policy of globalization with the concentration around fewer plants and distribution centers and the outsourcing to less developed countries providing less expensive salary and welfare charges had a more dramatic effect on employment than the implementations of ERP.

If the objective was to reduce headcount simply thanks to ERP, or to flatten hierarchies so that a head office had more control over its affiliates, then the successes have not been clearly demonstrated.

Changes in power

ERP has had the effect of reinforcing communication and the speed of this communication. For example, a reporting at the end of a financial period could now be done immediately. Top management and even shareholders could receive information practically in real time. Information could not be easily hidden or delayed.

Staff and employees were more directly implicated. The notion of Empowering the employee became popular - i.e. the idea that there could be delegation, within certain limits, of supervision or management tasks at an employee level.

The information available to an employee were more complete and rapid to obtain. For example for Order Processing, an employee could see on screen if a product was available or not, the credit situation of the customer, the normal addresses for shipping and invoicing, etc. In other words, the employee could reply directly on the telephone to various questions.

On the other hand, a user or I.T. specialist could no longer master all information. Before ERP, and with in-house developments, it was relatively easy to isolate a program chain to intervene and correct. ERP however was too complex and its source code rarely available.

The ERP editor and its consultants became omnipresent among their customers. It became commonplace to see consultants and programmers to the extent it was confusing as to who was visitor and who was employee !

Changes in the relation between customers, suppliers, partners and intermediaries.

During the 1990’s decade, one could see developing changes in relations between company partners. First of all, were the EDI solution tended to create stronger links.

But it was the use of Internet technology in a commercial sense and the advent of Electronic Commerce which brought in a new dimension to business dealings and the

relations between the company and its environment. In fact, ERP is an fundamental element of B to B (Business to Business).

An argument would be to say that to benefit fully from B to B, the two following conditions need to coexist: a) a rethinking of business processes and b) the realizing of an ERP solution using a methodical and disciplined implementation method. For example, once a sale is registered, there needs to be the follow through to ensure the physical logistics and to provide an exemplary customer service at each step. It is the people involved, the processes, and a proven ERP solution, which will ensure the response level demanded.

3. The place of ERP in the new management practices.

One begins to see contradictory articles in the specialized press concerning ERP, certain announcing its irrelevance and replacement by Electronic Commerce, others on the contrary suggesting ERP's continued growth and pertinence in the form of XRP (eXtended Resource Planning).

It is clear that the ERP market is in a difficult phase, and will evolve [AMR, 2000]. Certain editors are in difficulty : SAP announced operating losses for the fiscal year 2000, BAAN came close to bankruptcy and was bought in extremis by INVENSYS, etc. At first the explanation of freezing of I.T. budgets at the time of gearing up for 2000 and the Euro was offered as the reason for the slowdown in ERP sales. But the sales curve is slow to turn upward and the prognostic unclear.

Certain authors even consider that ERP is ancient history and focus attention on Electronic Commerce [HOSTACHY, 2000].

A more moderate approach would be to consider ERP as a transitory phase towards Electronic Commerce, a term which will also become obsolete in its turn, and which is not a final destination either.

<u>ERP contribution to the way companies are managed.</u>

What are the real contributions of ERP to the company ? In what way is ERP the foundation on which an Electronic Commerce solution can be built ?

- Reduction in effort for the collect and input of data : immediate input at the moment of the transaction.

- Possibility to interrogate in real time and at distance integrated information from different functions.

- Discipline and uniformity applied to processes and working methods.
- Breaking down of function and geographic barriers.
- Real time aid to decision-making; for example better visibility of stocks, leading to higher service level to the customer.
- Integration of activities, from the taking of the order through to the planning of production; from warehouse picking and dispatch through to invoicing; the transactions being automatically recorded in an accounting format.

A successful ERP implementation led to a simplification of management processes [LEGNER, ANDERSON, OSSENBERG, OESTERLE, 1998], [GARTNER, 2000].

It is the reason for which even the larger multinationals have been able to profit from new technologies with the same speed of adaptation as the start-ups. Even the ERP editors were surprised.

In time, and with marketplace corrections, those of the new actors who lack resources for the investments necessary or who are not profitable in the long term will be eliminated, and in a few years, the larger traditional companies will form the basis of Electronic Commerce. The stakes are high, the Gartner Group estimating that Electronic Commerce Business to Business will represent $ 7290 milliard and 7 % of all sales in 2004 [GARTNER, 2000]

The real role of Electronic Commerce is to act on applications such as Supply Chain Management (SCM), ERP, and Customer Relationship Management (CRM) - a stretching of the company on the one hand to its supplier, on the other to its customer, as well as other partners such as employees, State, etc. (See figure 4 below).

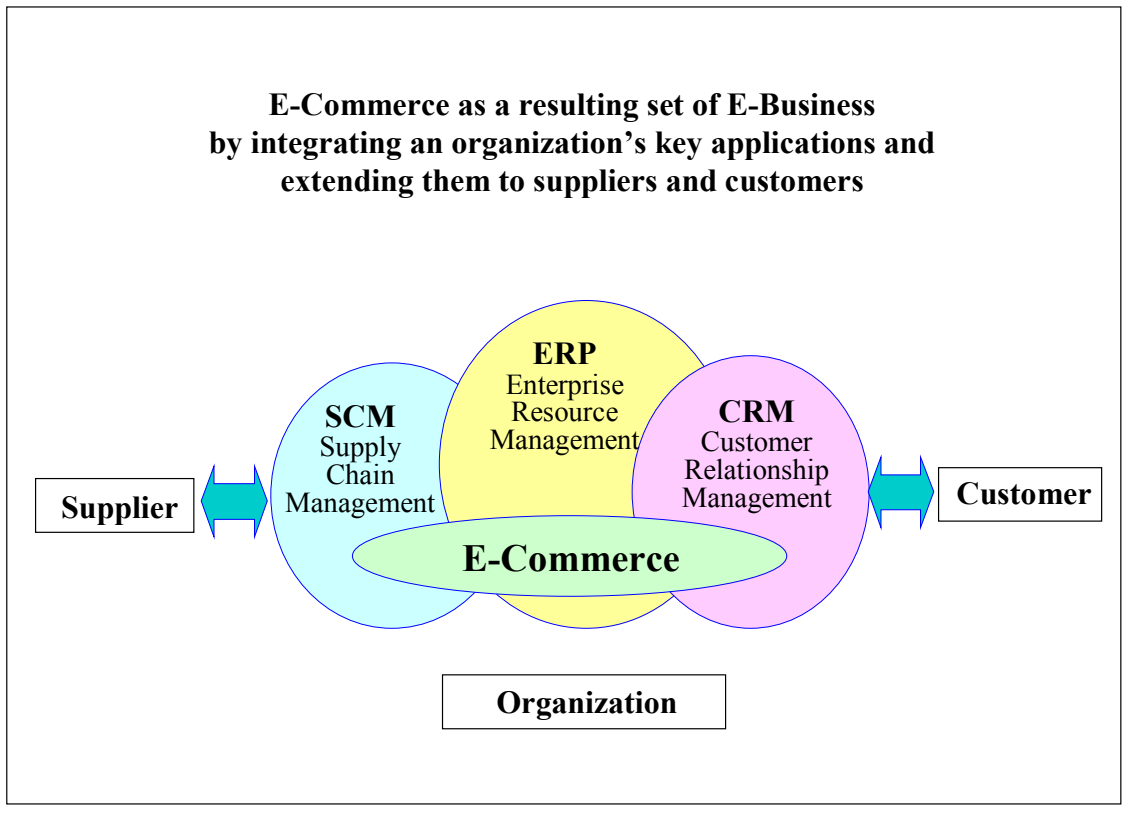

Figure 4: The relation ERP, SCM, CRM, E-Commerce and E-Business

A weakness of ERP standalone was that by design it looked inwards. It is the company looking at its mirror reflection and changing to become more efficient. All attention is directed toward the interior of the organization, even if the customer satisfaction was still an important objective. For many companies, this looking inwards and correction was an obligatory step. Recall the ERP definition already mentioned - the three characteristics which need to coexist : the effective management of different company activities; the existence of a common database; the capability to react quickly to operating rules.

In fact, without knowing it, ERP created the conditions to fully benefit from the opportunity provided by Internet, and the use of Internet for commercial purposes (in the larger sense of the term). It is **from this moment** that companies can realize a real return on investment of those efforts for putting in place ERP. Up to now no-one has challenged the time and expense if ERP has had beneficial effects or the methods made sense. On the other hand, those who had heard the Editor's initial sales arguments, who were involved in the efforts of implementation, who saw the counter increasing (with no end in sight) on various expenses (hardware, software licenses, maintenance, training, consultants, etc) and through several annual accounting periods, these persons could be forgiven for asking if it was really worth it… And if the Live of ERP was the be all and end all, the answer might have been "No".

4. Key success factors in the implementation of an ERP solution

4.1 At the outset.

Right at the start of the Project Life Cycle, i.e. at the moment of the thought “Wouldn’t it be nice to …” (however this arises) success factors arise which can impact heavily the implementation at different stages. The origin of these decisions can seem arbitrary, and Professor Goetschin at the University of Lausanne in the early 1980’s used to marvel at the fact that many hugely important decisions could originate on the golf course or in idle conversation between captains of industry. In the early 1990’s there was not the media attention that exists today concerning ERP solutions. Upper management did not know in detail what they were in for. Certain had heard of companies moving beyond Materials Requirement Planning (MRP), a known, to a more progressive catch-all solution ERP.

There was an expectation that this would help toward optimization of management of stock, a simplification of administrative work (thereby a reduction in the number of personnel and a corresponding reduction in General and Administration overhead costs or an ability to handle increasing business without an exponential rise in staffing). But little was known at this time as to the eventual cost, time, organization and business process impact of such a project. The dialogue with the Editor tended to an underestimation, sometimes a flagrant underestimation.

Nowadays, and with the benefit of hindsight, there is a consensus among authors as to key success factors at this Project Life Cycle first stage.

The need for a Project Sponsor

Satish Kamath [KAMATH 1999] refers to this as to asking the question “Who is the Project Champion ? ”

If the project, the ERP implementation, is associated with a person - a person with management clout, a person responsible for a business unit concerned, a person who hierarchically and by personal charisma is forceful, known , respected, liked throughout the company this helps to assure project success. This person is seen to be associated and permanently associated with the project, irrespective of perceived success or failure at any moment in time.

Some companies did not have a champion and the project became an I.T. project among others, or an imposition from Head Office, etc.

A first success factor is therefore the identification of a strong internal owner. Stephen P. Laughlin classifies this as one of six key success factors [LAUGHLIN 1999].

A strong management commitment

The Sponsor and later the Project Team, to be effective, needs a strong and maintained management commitment.

Herb Krasner [KRASNER 2000] sites top management involvement as a factor. Christopher P. Holland/Ben Light consider top management support as fundamental [HOLLAND & LIGHT 1999] . Franc Scavo [SCAVO 1998] points to intense management commitment as one of the characteristics of fast and successful implementations. Gilles Serpry [SERPRY 1999] suggests that the ERP project should mobilize the Management Committee. Stephen P. Laughlin [LAUGHLIN 1999] says that the first order of business is to gain the full commitment of senior executives.

Top Management, and their continued involvement, support, commitment, mobilization is vital. In other words if the Managing Director does not have the successful ERP implementation as say one of his/her six personal major objectives (of the year in question) there is already a handicap.

Identification of a Project Coordinator

Neither the Project Sponsor nor the General Management can be expected to motor the project through, even if their implication is key. They will provide vision and impetus.

To manage the day-to-day, to manage the detail of the budgeted costs and delays, the identification and interdependence of tasks, the allocation of persons to task, the reporting, the animation of meetings, etc. necessitates a Project Coordinator. Often this was the I.T. Manager and often he or she had to combine this role with I.T. Department Management. This makes sense as I.T. is highly involved and later will be instrumental in data conversion, interfaces and modifications.

But Dilip Wagle [WAGLE 1998] warns against the label of ‘just’ an I.T. Project, and Joanne W. Ross [ROSS 1999]suggests that the best people be assigned to the project 100% of time.

A compromise if the I.T. Manager is Project Coordinator would be to make the Project Coordination function a priority, and provide assistance so that both Department supervision and Project Coordination can be maintained. The Project Sponsor being a Business Unit leader should lessen the risk of the project being I.T. driven.

Herb Krasner [KRASNER 2000] identifies rigorous project management as an important success factor.

A strong business case for the Project.

Another Outset Success Factor, especially in hindsight, is the need for a strong business case for the implementation.

If the reason for adopting an ERP solution is purely to align an affiliate with a Head Office choice, or with a hidden or open agenda to reduce the number of personnel, to centralize control and reporting so that a local management is brought to line or if simply the business needs are secondary - these ‘motivations’ can add to resistance either from the start or at a later date. This resistance can be manifest or latent; in both cases the consequences in terms of cost, delay, implementation quality could be major.

This may seem self-evident, but these errors were committed time and again. A takeover, maybe a hostile takeover, and with personnel and middle management concerned for their future was not always helped by say a decision to go from one Editor to another simply to suit the new owner.

An ERP choice to replace disparate systems, to impose a corporate product coding, to impose a corporate set of accounts, while laudable, encountered considerable resistance if local business practices, fiscal and legal needs were ignored. Incidentally the resistance might not have been only internal - tax authorities, auditors, suppliers and customers may also have been vocal in their objections.

What we are now seeing is that if the motivation came genuinely from a strong business need, clearly identified and common to all, then the Project could be ‘sold’.

This aspect of resistance is important and highlighted by various authors.

Herb Krasner [KRASNER 2000] demonstrates that in obstacles prior to going Live, 62 % relate to people, 16% to business process issues and 12% to I.T. technical issues. Although difficult to quantify, it can be assumed that a part of the 62% relates to resistance. John S Reel [REEL 1999] points to the need to watch the resistance from Users. Stephen P. Laughlin [LAUGHLIN 1999] identifies organizational resistance as a factor that can derail an ERP implementation.

The business case could be an overriding factor such as Year 2000 if existing systems could not accommodate, or the handling of the Euro. And/or the need to absorb growing business, or of streamlining order processing , inventory management and expeditions. Joanne W. Ross [ROSS 1999] stresses this need to develop a clear business case that clarifies performance objectives.

A mistake often made was not only to see the ERP implementation as ‘just’ another I T project, but as a finality in itself. If no business case was associated and as management and personnel discovered that the project was painful, costly, time-consuming - the momentum would stall…

Another reason why this success factor was underestimated was the option taken by many companies to tailor the actual ways of working to the ERP solution, rather than to use the implementation as an opportunity to reengineer and align on best practices.

Clear vision

Patrick Verger of CXP (in [HEITZ 1999]) maintains that a good definition of objectives at the outset is fundamental. The effect of ERP was to put the house into order. But to achieve what?

While company deciders in the early 1990's did not necessarily foresee the extension of their ERP project to include Suppliers or Customers in the sense of respectively Supply Chain Management (SCM) or Customer Relationship Management (CRM) or the commercial usefulness of Internet in complement or as an alternative to EDI, a success factor is the clear vision to get the momentum going.

Patrick Verger goes further in suggesting that the vocation of ERP is to bring rationality, logic and order to a company. Leo Apotheker [APOTHEKER 2000] says that ERP was designed to accelerate the company processes (stock management, client satisfaction, etc.). James Connolly [CONNOLLY 1999] notes that the appeal of ERP may come less from its cash benefits and more from its ability to untangle snarled business practices and systems. Bruce Caldwell and Tom Stein [CALDWELL & STEIN 1998] go further *"ERP forces discipline and organization around processes, making the alignment of I T and business goals more likely in the post ERP era"*. Authors tend to concur on this contribution of ERP. Joanne W. Ross says the challenge is that ERP installs discipline into an undisciplined organization.

The success factor of clear vision is the conjugation of this logic, clear mind, discipline, etc. with a clear idea of what is wanted as an end result. These objectives will translate later into needs requirements, into measures checks and balances control, and a means of calculating a return on investment (financial/non-financial).

This means company deciders asking the question "What are we doing this project for, and how does it fit into the larger picture of our business and vision ?" [KAMATH 1999].

Re engineering, Rethinking; Change and Change Management; Benchmarking and Best Practices.

Again out the outset, and before leading into the Needs Requirement definition, a success factor is the lateral thinking ability of top management.

Those who embraced change instead of avoiding it, who were willing to critically study how things were being done and remove duplication, redundancy, illogicality. Sometimes a way of doing things had evolved historically and might have made sense at one time but no longer did today.

To be a success factor this openness needed to avoid the notions of Reengineering as purely an excuse for cost cutting, job reducing.

Herb Krasner [KRASNER 2000] points out that an ERP first step is to re-engineer, downsize, rightsize or otherwise streamline business processes in pursuit of a competitive edge or greater efficiency. Sameer B. Desai [DESAI 1997] identifies an attitude which stresses on business transformation instead of process automation as a success factor. He cites another as cultivating an approach which brings about the proper integration of people, process and technology through effective management of change.

And management of change includes education, training and communication. It means understanding and communicating the implications of ERP on corporate culture and decision-making.

In summary, these outset success factors demonstrate the important role of Top Management. Their responsibilities at this stage include:

- identify a Project Sponsor,
- ensure a strong management commitment,
- identify a Project Coordinator,
- have and communicate a clear vision,
- federate around a strong business case,
- allow even encourage a revamp of existing structures and methods where appropriate …

An abdication of these responsibilities could lead to Project failure even before the Life Cycle started.

4.2 Needs Requirement

Many authors stress the importance of a Business Needs Requirement prior to the selection of an ERP solution. Armand Gambert recommends a formal document (in [DRUART 1999]). Peng S. Chan and Carl Land [CHAN & LAND 1999] propose the development of an 'ideal' system. Clear detailed requirements are a critical success factor as stressed by Andrew Taylor [TAYLOR 2000].

There are various reasons for a Needs Requirement :

- It will be a factor in choosing the right ERP solution. The Gartner Group [GARTNER 2000] recommend that if 85 % of functionality required does not figure in the ERP solution under study, then another solution ought to be envisaged.

- The Needs Requirement will be a reference point for the crucial implementation phase of *Conference Room Pilot*. The Conference Room Pilot provides the opportunity for the Project Team of Key Users and I.T. specialists to test each transaction type through the ERP solution against a prepared script.

However, many authors warn against the Needs Requirement becoming too rigid. Paradoxically, a failure factor in ERP implementations can come about if the ERP solution is expected to fit the business requirements rather than vice versa. This can be difficult for the Management and Staff to accept. The tendency is to want to reinvent the ERP solution to match exactly how things are done or how things ideally should be done.

Also, there is perhaps a fear to align on a mediocre solution along with competitors all putting in ERP solutions of one kind and another and a desire to remaining individual: 'the way things are done round here'. But this thinking means perhaps not taking into account best practices built into the solution by the ERP Editors resulting from research across a wide number of industries and individual companies. Also, moving away from standard, means not benefiting from the advantage of an integrated system with one input of transaction data. The impulsion to customize the ERP solution extensively leads to removing the advantages that had been sought for in the first place. As Joanne W. Ross illustrates *" you are more likely to reap benefits if you mold your business processes to fit the system rather than the other way round"* [ ]. She adds that ERP is like concrete : *"easy to mold while being poured, nearly impossible to reshape after it is set"*. Frank Scavo goes further saying that a characteristic of fast/successful implementations is to change the business to fit the system and zero modifications. Certain companies had zero modifications as a corporate rule. Stephen P. Laughlin suggests that a company must change its existing processes to conform to Editor assumptions about management philosophy and business practices.

In a study benchmarking SAP implementations by the University of St. Gallen Switzerland , the conclusions are that best performing companies use SAP as a core system, use SAP functionality where applicable, and add functionality or use

functionality outside the SAP system where necessary [LEGNER, ANDERSON, OSSENBERG & OESTERLE 1998]. If we link this to the aforementioned Gartner Group comment, then the customization should be less than 15 % ideally.

Patrick Verger of CXP (in [HEITZ 1999]) points out that the ERP product needs to adapt to the enterprise, but the enterprise has to adapt also to the ERP product. The ERP software is flexible through the parametering or set-up choices it allows, and by complementary modules or products (sometimes through strategic alliances with other Editors) for enhancements to the software in standard, addressing a particular need or business requirement. The complementary products often concerned tools for the Sales Force, After Sales Service, Marketing or Reporting associated with but removed from core functionality such as Accounting, Order Processing, Inventory Management etc.

The University of St Gallen study explains that the highly integrated nature and complexity of ERP systems requires common working practices and standardization of processes. This becomes even more important in the context of multi site implementations across borders. There needs to be common choices as to for example Chart of Accounts or Global Product Codes, and as much ERP solutions standard as possible.

The exceptions would be due to local business practice, fiscal or legal constraints. Also, the aspects of Needs Requirement for the particular company which are not catered for by the ERP solution in standard and need to be customized - an example might be batch traceability enhancements for a Pharmaceutical company.

Another success factor is to be prepared to continually re-look at the Needs Requirement through the rest of the Project Life Cycle stages and beyond Live. *"You have to treat it like an organic system"* says Erin Callaway [CALLAWAY 1997]. Frank Scavo recommends significant post-implementation work. The University of St Gallen study points to best performing companies continuously work on integrating SAP use and business processes.

Conclusion

In summary, ERP is the foundation of present and future success of Electronic Commerce Business to Business. It is probable that the term ERP (never very explicit) will disappear, that the editors too will disappear if they cannot reinvent themselves . But **the transformation toward new business paradigms will be achieved by the combination of a rethinking of processes, a performing ERP solution, and the Internet technologies.** These elements taken separately do not explain the transformation we are witnessing today. It is the synergy of a combined effort process, ERP and technology which leads to this transformation.

It is in fact the first time that the company has the requisites to really situate the customer as sovereign.

As far as critical success factors, the Needs Requirement had to be formal, detailed and lead naturally to an ERP solution choice. It also set a framework for scripts, tests, in later implementation phases.

But there needed to be a certain humility and flexibility so that the benefits of the ERP solution be optimized. The Customer had to say I want this, this and this, but also listen carefully when the Editor said I can deliver this, this and that. Unless there was an overriding business, legal or fiscal reason, the economic path was one of compromise. A 'failure' factor could be either not sufficiently expressing objectives, needs, constraints clearly; or having done so, sticking to them so rigidly that the ERP solution was customized or interfaced to death.

The success factors to this point in time, i.e. at the outset of the project implementation, often dictated whether the project would ultimately be in line with budget costs, delays and expectations. To use the concrete metaphor already cited, the errors made at this stage would be difficult to correct (remold) later on.

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