



Transnational ERP Systems: three case studies in Brazilian subsidiaries of multinational enterprises

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ABSTRACT

The development of global information systems infrastructure of enterprises offers many challenges, like the need to balance local and global systems requirements. The use of ERP systems (*Enterprise Resource Planning*) arises as a possible alternative for this development. This paper aims to identify aspects involved in the use of ERP systems as transnational information systems, through the analysis of three implementation cases of ERP systems at Brazilian subsidiaries of multinational enterprises.

INTRODUCTION

According to Stephens (1999), one of the main business trends of the nineties was the strengthening of the multinational companies' global action, which, besides the mere export of finished products also began to distribute and diversify activities in their foreign subsidiaries. Such enterprises aim at profit through the carrying out of their activities in places where their competitive advantages can be put to a better use. Among the major challenges faced by these enterprises are integration and coordination of these geographically scattered activities to produce a continued flow of materials, products and information and enhance catering to each market.

One alternative for the implementation of information systems that meet the requirements of coordinating activities that cross national borders is the use of ERP systems, as they include various requisites intrinsic to global systems: they are offered in various languages, they allow the use of different currencies, their suppliers have support centers in different Countries of the world and they enable (and, many times, demand) the standardization of procedures and information throughout the entire organization. However, the implementation of an IT architecture at global scale encompasses managerial challenges that are greater than those of ERP systems shared by different divisions of an enterprise within a single Country.

This paper aims to identify key aspects involved in the use of ERP systems in global enterprises for the purpose of meeting the requirements of transnational information systems. To meet this objective, three case studies in multinational enterprises with subsidiaries in Brazil were performed. The companies surveyed had, at the time of the survey, projects underway for the implementation of ERP systems at world level. In all of the cases the companies were already using ERP systems on a local level, in Brazil and in subsidiaries located in other countries.

TRANSNATIONAL ERP SYSTEMS

According to King and Sethi (1999), transnational information systems are IT based information systems that multinational enterprises employ for the coordination of activities that cross national borders. The major challenge in the development of global applications is the establishment of a correct balance between the global and the local requisites of the information systems. In general, this balance requires high levels of participation and commitment of the local users to the project.

In view of these challenges, ERP systems present some interesting possibilities to the setting up of transnational systems. First, ERP systems may contribute to standardize the enterprise's worldwide information technology platforms, making it more consistent. Second, ERP systems have a world reach as they include characteristics that facilitate their use in different countries, like the possibility of using several languages and currencies, and international support. And third, ERP suppliers seek to expand the availability in more Countries, by providing the software with the functionality needed to meet local requirements.

For Holland and Light (1999), international projects for the implementation of ERP systems are much more complex due to the need for multiple implementations through multiple project teams operating in parallel in multiple regions. According to Roche (1998), one of the difficulties in the implementation of global ERP systems is the fact that the local autonomy of IT departments may deter cooperation. This cooperation may not be easily achieved in business areas that do not wish to loose even the smallest parcel of their autonomy. Table 1 summarizes these and other aspects identified in the literature on global ERP systems.

This paper presents the results of an exploratory research conducted with the objective to identify and deepen the understanding of key aspects regarding the utilization of ERP systems in enterprises' global operations. Three cases of large enterprises, that have already set up their ERP systems at local level and currently are expanding their systems throughout the corporation, were analyzed. The CIO's, which were the person in charge of the

contacts with headquarters regarding the ERP projects, were interviewed in each enterprise. Interviews were done in May/2000.

Benefits/Advantages	Problems/Difficulties
<p>Possibility to obtain consolidated results, from all divisions of the enterprise, in all sites of the world, in a precise and on-line manner</p> <p>Possibility of better coordination of the activities of the enterprise's value chain carried out in different countries</p> <p>Possibility of offering a standardized global service to global clients</p> <p>Lowering of global IT costs</p> <p>Standardizing of the business practices at world level</p> <p>Availability in various countries with the possible use of various languages and currencies</p> <p>Allows IT platforms standardization around the world</p> <p>Shorter implementation time than that of a transnational system developed in-house</p>	<ul style="list-style-type: none"> • Difficulty to create a standard model of the system for the different countries in which it operates • Complexity of the implementation project, in view of its extent and number of teams working in parallel • Various differences (characteristics of the different legacy systems, number of plants, geographical extension, number of divisions) may force the usage of different implementation strategies in each country • Difficulty to accommodate differences in business concepts and practices in the same system • Difficulties in language, calendar and time zones • Differences in the quality and cost of telecommunications between the various countries • Difficulties to adjust the "best-practices" models developed in European and North-American countries to other contexts (Soh, Kien and Tay-Yap, 2000) • Greater risks related to the availability of the ERP system because now the enterprise depends on it at world level • Difficulties with the communication between the project teams members and need for reallocation and travels

Table 1 - Benefits and problems of global ERP Systems

The approach of case study is justified, as according to Yin (1989) case studies are useful in the research intended to contextualize and deepen the study of a theme. Results of the interviews and review of the material collected in each of the enterprises were used for the setting up of reports on each case. The reports were reviewed by the companies and used for the carrying out of this work. They are summarized below (names are fictitious).

THE THREE CASES

The Chemicals Case

Chemicals is an European group of chemical enterprises that markets its products in more than 100 countries, with plants in more than 20 countries and invoicing about US\$ 6.0 billion per year. The group has a decentralized IT management and each subsidiary seeks information technology solutions best suited for its budgets and operations. Although acting independently, the companies of the group are choosing the R/3 SAP system because they understand its has a tradition in the chemical area, especially in Europe, and because various subsidiaries of the company had already chosen it.

Recently, the group began to direct its efforts towards the creation of a standard configuration that would allow the integration of the various implementations of the R/3. As the implementation of R/3 took place independently in the various subsidiaries of the Chemicals Corporation, it was noticed that configuration differences rendered the different installations of the system incompatible. This is a recent initiative and the outcome of a study group on the subject, set up at headquarters. This working team is also undertaking a job of "convincing" all subsidiaries to use the R/3 system.

The group has two main reasons to look for a similar configuration: the perspective of on-line consolidation of data and

centralization of servers. The possibility of consolidation of financial results, as well as on-line access to information on the operations worldwide is of interest to the enterprise, because the management of the group is centralized. Currently, information from different subsidiaries is consolidated in another software that receives data from the local systems by transfer of text files. Regarding centralization of servers, the enterprises perceived that the principal advantage is that operation costs are reduced, as the cost of keeping the different R/3 environments separate is considered high. The sharing of operation and maintenance services can apparently reduce the group's global IT costs.

The enterprise considers that the R/3 system has a design tending towards centralization. The consolidation of data from the various locations, when the system is carried out in a decentralized way, is a complex and expensive task due to the costs of operation, the technical complexity and the difficult administration of the system. Another advantage for the creation of an R/3 world model of Chemicals is the lowering of costs and time of implementation of this system in new acquisitions or enterprises that didn't set it up yet.

The dynamics of the enterprises' business processes in all the Countries is one of the difficulties expected by the group responsible for systems consolidation, as it requires constant local R/3 adjustments. Due to the ongoing changes it may be difficult to reach a point where all the subsidiaries have the same configuration, and so it is expected that the achievement of a standard configuration may only take place in the long term. One of the Brazilian subsidiaries took the initiative of adjusting to global standards, using the headquarters' concepts of business divisions and coding of products and materials, making use of an opportunity brought forth by the migration to a new manufacturer's version and already foreseeing future integration with headquarters' R/3.

The Bubbles Case

Bubbles is an American enterprise, manufacturer of flexible plastic packaging with plants in more than 40 countries, yearly invoicing about US\$ 3.0 billion. In Latin America (LA) the enterprise acts in 10 countries billing some US\$ 250 million per year. In 1997 the enterprise, that had already implemented the R/3 in two of its main USA divisions, called a meeting of a group of 60 representatives of the subsidiaries of the different countries for definition of a world strategy for its information systems. This group defined as world standard the use of R/3, with the long-term objective of implementing the system worldwide. Also a center of global excellence was set up to accumulate the best knowledge and experience in forthcoming implementations of the package.

In the LA subsidiaries the previous system comprised a standard package as directed by the headquarters for the region. This package did not reach the same integration level as the R/3 and was not customized for the year 2000 bug. The package had been distributed to the different localities that operated it and did the maintenance in a decentralized form. The LA system had to be replaced, mainly because of the year 2000 issue, and the option chosen for the region was the R/3, which was in accordance with headquarters recommendations. The system was implemented in Brazil, Argentina and Mexico, and a multinational project team was formed seated in São Paulo, Brazil, comprising users, IT personnel and consultants from the three countries involved in the implementation, besides members of the global excellence center.

The objective of the project was to achieve 80% configuration similarity of R/3 in the three countries, attempting to build a configuration for the region that could afterwards be implemented

in the remaining LA countries. To reach this objective a rule was set forth so that the supposed differences among the countries would be closely checked. To be incorporated to the system, any regional difference had to be justified based upon: local legislation, business practices dictated by local competition or unfeasibility of changes in local processes in order to get adherent with the standard system. The LA project tried to follow the global standards defined by the enterprise's R/3 center of excellence, and justifications were also required if deviations from such standard were necessary. Even without a clearly defined focus for a global project, the team was aware of the integration requirements in the near future.

Part of the difficulties faced by the project's team resulted from the need to use different R/3 versions in the three LA countries initially involved. This happened due to differences in localization (adjustments to the local legislation made by the supplier of the product) in each of the versions. A number of other difficulties resulted from communication problems among the members of the team, impaired by language and culture differences. This required a greater managerial effort than first foreseen, as the solution of problems, including misunderstandings, needed considerable time. The LA implementation project took 20 months, against an initial forecast of 18 months, and some 6 million dollars were spent, considered a high price for the enterprise investments in the region. Part of the investment was justified by the need to meet the standards set by the enterprise. About 20% of the amount was related to reallocation and travel expenses and lodging for the project's team. After the initial project, consulting support was no longer required to implement the R/3 system in Uruguay, Chile and Venezuela.

Once implementation in LA was concluded, a unified IT team was formed for the region. This team, comprising 31 employees distributed in the three main countries, assists in a uniform manner the 700 users in all LA countries. Communication among the team is a fundamental issue for the success of the model and is done by means of dedicated voice channels. The LA R/3 system is located in one single server at the enterprise's headquarters in the USA. Infrastructure, hardware maintenance, basic software maintenance, security and operation costs are apportioned with those of the enterprise in the USA. The server is not the only one, as another one services the United States, but the enterprise intends to definitely unify the systems, aiming at cost reduction and facility for the consolidation of data. It has already been detected that this centralized architecture will have to adjust to quality and offer of telecommunication services and differences in local systems and businesses practices.

Among the benefits perceived by the enterprise is the ease to get on-line information on the LA activities, including consolidation of the region's results, which facilitates headquarters' control of international activities. As the prior system was carried out in different local servers, consolidation, as well as acquiring of information on transactions performed, took much longer. Other benefit expected by the enterprise is a more efficient administration of inventories in LA. The enterprise claims that there is an ongoing trend towards rationalization in its manufacturing centers of the region, each of them seeking specialization.

The AutoParts Case

AutoParts is an auto parts manufacturer, seated in Europe, that has subsidiaries in more than 100 countries and invoices about US\$ 20 billion per year. In LA the enterprise has plants in Brazil and Argentina and sales offices in Venezuela and Colombia. IT management is done independently, which led to a series of different systems and solutions in the various subsidiaries.

In 1996, the company decided to adopt a plan for the global standardization of its information systems using the R/3 system. The objective was to implement it in all of its facilities until 2004, reaching 75,000 users worldwide. The targets of the project are to reduce IT costs and global integration of its activities. The enterprise sells a number of products manufactured only in certain plants and exported worldwide. The enterprise also has factories that use components produced in units of other countries. Due to this type of operation it is foreseeable that the integration of its systems will produce gains in production planning, internal supply and coordination of the activities in the different countries.

This decision interrupted various processes of ERP systems selection, underway at the time, and which were essentially due to the issue of the year 2000. The Brazilian subsidiary was one of the firsts to implement the R/3, precisely because of that issue. In Europe the enterprise has for a long time been using a R/2 version and therefore was not subject to year 2000 pressures. This allowed the implementation of the R/3 version in its plants with an easier time schedule. However, because the R/3 is not available at headquarters, the benefits expected by integration of the activities of its value chain have not yet been felt.

The first series of R/3 implementations in the subsidiaries has taken place quite independently. After the initial implementations (Brazil, USA, Australia and some plants in Europe), the enterprise noticed that to achieve additional advantages, such as consolidation of results, a definition on a standard configuration would be required. Currently the enterprise has a team from headquarters working on the definition of this model, and because the R/3 is actually implemented in some countries, many installations will need a new configuration. One of the concerns of the Brazilian subsidiary is that the design of the standard configuration is being performed by an essentially European team, which may lead to difficulties of adjustment to the local culture and business practices.

The enterprise is centralizing its LA IT activities on the team of the Brazilian subsidiary which is implementing the R/3 in the Argentine plant with a server located in Brazil. In this work a series of differences in the conduction of processes and business came to light, as a result of various factors. For instance, one of the differences in business practice among the two countries is that in Argentina collection by banks is not common, whereas in Brazil it is. In the Argentine configuration of the system an additional control of payment by checks was required.

ANALYSIS OF THE PRESENTED CASES

All the enterprises studied intend to implement ERP systems in their diverse subsidiaries to support the coordination of their global activities. The enterprises are still moving towards the construction of these ERP global systems and the benefits currently achieved are limited, taking into account the possibilities that the effective global integration could, in principle, furnish. Besides the integration of activities, the companies under study seek, in the consolidation of results and IT cost reduction, a justification for the globalized use of their systems. Although these findings are in accordance with those observed by King and Sethi (1999), it must be noted that the obtaining of consolidated reports, for the reasons of headquarters' control, and IT cost reductions with servers centralization were cited as the main objectives in all of the cases, and, although global coordination of activities is viewed as an important matter, it is not the driving force of the three surveyed global ERP projects.

Some aspects related to the difficulties with the management of multinational projects, quoted by Ives and Jarvenpaa (1991),

were perceived in the case of Bubbles, the only one of the surveyed enterprises that effectively implemented the ERP system at global level. All enterprises reported difficulties regarding communication among people in different countries. Eventually, such difficulties even jeopardized the times and costs initially set for the project.

In AutoParts and Chemicals it was concluded that the use of the ERP system as a global infrastructure is following a learning process. Initially the ERP system was chosen, in a centralized manner in the case of AutoParts and in a decentralized one in the case of the Chemicals. The objectives were to solve local technical problems and to reduce IT costs, with no concern for a global planning of its implementation. After a certain moment the enterprises began to envisage the eventual use of the ERP system on a global scale, focusing their efforts in this direction. The negotiation process to take over the change varied between enterprises, however it was and still is a most significant issue. In the case of Chemicals the subsidiaries need to be convinced; in the case of AutoParts headquarters formed a group for setting of standards; in the case of Bubbles, that already managed IT in a globalized way, and had the standards, the R/3 was elected as world standard under headquarters' jurisdiction.

The need for standardization of data and processes on a world scale for the achievement of real benefits and the difficulty to enable this standardization were aspects found in all of the surveyed cases. The degree of significance of these aspects varied because the enterprises ended by using different strategies for the globalization of their systems. In the case of Bubbles from the beginning of the project it had been decided that standardization should be favored, taking into account the future integration of all systems. In the case of AutoParts and Chemicals implementations were independent and led to differences that are being reviewed so that benefits may be achieved.

CONCLUSIONS

ERP systems are an alternative for the implementation of integrated systems. Notwithstanding that this has been an objective since the enterprises started to use computers, it was never achieved on a large scale through in-house systems development. An important reason was that with isolated systems each department seeks to optimize its operation without greater concern for the enterprise's global context. However, in integrated systems, departments are led to seek optimization of the whole enterprise, leaving local issues on the background. In the not integrated situation efforts are isolated and not related to each other, in the integrated one they are collective and linked. This approach is required by the functionality made available in the integrated packages and impels the users to a new behavior. To summarize, in an isolated system optimization is localized with possible global losses, while in an integrated system optimization is global with the losses being local.

This phenomenon is reproduced on a global scale. But, in

this case, there are more encompassing issues than integration between departments. As noted, there are issues of legislation and local culture that also significantly hinder globalization. Differing from the need to integrate the local departments, eventually these hindrances are more difficult to solve and require proper attention. The assessments made do not suggest that the standardization, so insistently pursued by the enterprises, is successful in solving the issue. Clearly, one must live with many more differences in a globalized situation than in that restricted to a single country. The issue of forms and strategies of adjustment for these global differences makes up a very interesting subject for future research.

Just like local implementations, the globalization of systems entails new challenges and requires that new capabilities be incorporated by technology managers and professionals involved. In globalization contexts, to the technical challenges are added those of process management, especially the search for standards and the coordination of project activities. Apparently the difficulties are rooted more in aspects related to language, distance and regional culture than to intrinsic aspects of the subsidiaries that affected local implementations. The assessments suggest that the process of globalization of systems is of an essentially centralizing and authoritative nature and overrides with a certain ease the enterprise's local barriers.

To synthesize, the literature review and the empirical research undertaken suggest that the issue of globalization of systems and especially the globalization supported by means of ERP systems is a not completely explained matter. Nevertheless, technology has currently made it feasible and possibly the enterprises should not disregard this opportunity to search new systems solutions.

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