

Overcoming the Limitations of the ERP Paradigm: A Latin American Exploration

Eitel J. M. Lauría

School of Computer Science & Mathematics, Marist College, Poughkeepsie, NY, USA, eitel.lauria@marist.edu

Pablo Iacub

Calipso S.A., Buenos Aires, Argentina, piacub@calipso.com

Dan Rozenfarb

Calipso S.A., Buenos Aires, Argentina, & Departamento de Computación, Facultad de Ciencias Exactas, Universidad de Buenos Aires, Buenos Aires, Argentina, dan@calipso.com

ABSTRACT

This article explores the issues of implementing Enterprise Resource Planning (ERP) systems in Latin America. The research highlights the main obstacles faced by the traditional ERP systems in this context, proposes an alternative paradigm to address with more flexibility and cost effectiveness the idiosyncrasies of the region, and describes some of the struggles associated with the development and implementation of such paradigm shift. Preliminary results suggest significant gains relative to traditional ERP implementations (*).

INTRODUCTION

After a decade of unprecedented growth, the Enterprise Resource Planning (ERP) paradigm is showing signs of crisis. A natural evolution from manufacturing systems (MRP and MRPII), ERPs were released to the market in the early 1990s to fulfill the promise of system integration and automated business process reengineering.

ERP systems became the de-facto standard for replacement of legacy systems in large, and particularly multi-national companies (Parr and Shanks, 2000). The decision making process was accelerated by Y2K's apocalyptic threat, paving the road for thousands of ERP deployments in the last decade, where cost seemed not to be an issue, and implementation results were somewhat erratic. But the end of the 1990s saw a severe correction in the market, and ERP's triumphal march was stalled. This worldwide symptom had special repercussion in developing regions like Latin America.

From our perspective, the problems that ERPs are currently facing do not derive from its assumed role as the corporate information backbone; rather, they arise because companies are still using the same paradigm of enterprise resource planning and integration developed in the mid 1980s to deal with the complexities and challenges presented by a global, networked economy twenty years later.

Single monolithic pieces of software, ERP products have grown dramatically in complexity and sophistication driven by the increase in demand, but also due to the numerous ancillary modules and updated features with which its core functionality has been supplemented (e.g. customer relationship management, supply change management). This tremendous generality and enormous complexity make them prone to glitches and low performance, difficult to maintain, and nightmarish to implement (Vogt, 2002). Implementation-to-license cost ratios are usually very high (1:3 or more).

Although ERP systems are packaged software applications, the majority (70+ percent) of project cost is devoted to setup, installation, and customization of the software, services typically provided by external consultants such as Accenture or EDS (Dolmetsch et al, 1998). Installation takes 21 months on average, with benefits starting to accrue in an average of 31 months (O'Leary, 2000). Numerous cases document ERP implementation failures (Davenport, 1998), some with disastrous results.

In this work we set out to show that a new ERP paradigm can provide an adequate solution framework to deal with complex business contexts as those described before. Section 2 details the challenges faced by ERP implementations in developing regions like Latin America. Section 3 describes the motivations that have led to the development of an alternative paradigm, and depicts the proposed architecture. Section 4 discusses some of the issues associated with the development of the proposed paradigm and presents some preliminary results. We conclude in Section 5 and provide some pointers for continued research.

Table 1. Critical Challenges of Implementing ERPs in Latin America

Dynamic Context	The frequent economic turmoil and political crisis that affect the region have a direct impact on organizations, giving way to abrupt changes in the manner in which companies conduct their business, that in turn need to be mapped onto the software applications within a very short timeframe.
Tax Evasion issues	Although there are variations across countries and sectors, tax evasion is endemic in Latin America. It is ingrained in the popular culture, a socially acceptable practice seen by the population as a way of compensating for poor and corrupt government administration, and adopted by many companies as an additional (or sometimes the prime or sole) source of profit. In Argentina, for example, evasion of personal income taxes is estimated in 45% to 50%. Libonatti (2000) calculates VAT evasion rates of 30%.
Complexity	The combination of the two previous factors, paired with convoluted tax strategies carried out by most governments to enforce more stringent evasion controls, or promote new sources of fiscal income, have proved to be bloodcurdling to most traditional ERP implementations.
Heterogeneity	Europe and especially USA, consider Latin America as one homogeneous region. Indeed, nothing could be further from the truth. The diverse cultural origins in each country and the lack of regional policies conspire against regional standardization. Typically, what is true in one Latin American country does not apply in any of its neighbors.
Reduced IT Budgets	Latin American companies are usually much smaller than those representing the archetypical ERP customer in first world countries. Their IT budgets are smaller, as well as the percentage of total revenues that companies are willing to invest in IT. US and European companies invest 1.5% to 3% of their revenue in technology, whereas in Latin America, these figures drop below 1%. Besides, the rollercoaster economy that characterizes the region introduces an additional dimension of uncertainty that affects product licensing, as well as maintenance and support contracts.
Lack of scalability	The compounding of heterogeneity and reduced IT budgets makes it difficult for ERP companies to find markets with enough potential to justify investing in costly customizations of their products.

WHY HAS THE ERP PARADIGM FAILED TO DELIVER IN LATIN AMERICA?

Similarly to what happens in military science, where each battlefield scenario demands the use specialized weaponry, successful business software must satisfy the specific needs of the industry and organization where it is implemented.

ERP companies have moved into providing solutions for vertical industries in many different countries. But this has given way to problems of regional adaptation and customization. ERP companies find it difficult to move away from the comfort zone of “one size fits all” and adapt to the constant change in business rules with which the modern business world confronts them.

Where is the traditional ERP paradigm no longer valid? Answer: in those markets with product tailoring requirements (e.g. service companies), that give way to lengthy implementations and skyrocketing costs. This has become especially evident in developing regions like Latin America, where IT budgets are usually constrained, and where the need to implement a dynamic assortment of accounting and tax regulations and policies leads to complex and costly customizations. This becomes a twofold problem: companies lack the financial resources to gain access to tailored world-class ERP systems; and ERP companies are not prepared to deal effectively with the customization processes that these markets require. Table 1 depicts some of the challenges faced by ERPs in Latin America.

GIVING BIRTH TO A NEW PARADIGM

A new paradigm developed in and for Latin America should address the challenges described in Table 1. This is the basic premise that has steered the design of the new framework, expressed in the following set of rules: a) the framework should help reduce implementation time; b) the framework should not have a steep learning curve; c) the framework should be flexible enough to allow substantial changes in business processes and tax regulations, and vertical market customizations with relative ease; d) the framework should be platform independent.

The proposed paradigm, decomposes business administration in terms of a rich set of basic abstractions, and uses them to structure a business objects’ framework. This general framework is subsequently applied to model a specific company context (e.g. tax policy, workflow management, business rules).

As seen in Figure 1, a central idea behind this approach is to divide the functional configuration of the ERP system in well-defined layers. The Technology Layer isolates the other two layers from the specifics of the software and hardware platform in which the ERP is implemented. The Business Objects Layer includes the set of basic abstractions that handle administration tasks, along with a toolbox of engines and utilities (e.g. workflow engine). The object-oriented nature of the design helps capture the right abstractions, which are invariant with respect to both localization and to the specifics of the business processes (e.g. customers, accounting records, inventory items). In such manner, the Business Objects Layer constitutes the core of the ERP application.

Figure 1. ERP Layered Architecture

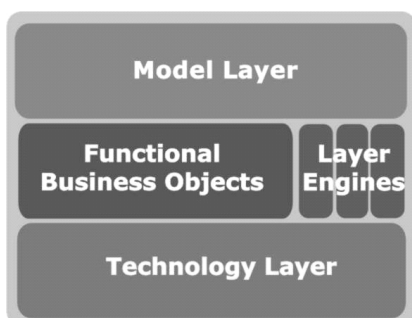
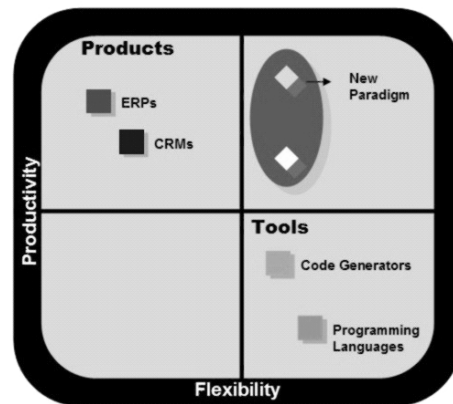


Figure 2. Typical Dilemma: Flexibility vs. Productivity



The Model Layer, in turn, takes care of modeling the particular business requirements and does this by invoking the necessary objects and tools from the Business Objects Layer, and specializing them to meet the needs of each specific business process. This “modeling” task is typically performed by implementers or trained end users, knowledgeable of the functional aspects of the organization. This design is purely conceptual and business process oriented, extricated from any specific reference to the underlying IT platform. By focusing on the functional aspects, the learning curve is low (no special IT skills are required) and implementation times are greatly reduced. By dealing with a homogenous set of abstractions of the real world, modelers and end users attain increasing flexibility and productivity, especially when compared with traditional parameterizations of ERP systems (see Figure 2).

A critical design feature is the decoupling of layers, which means having each layer totally independent (and oblivious) of the inner workings of the other. This decoupling between layers is attained by allowing the careful choice of abstractions of the business objects layer drive the cutoff between both layers.

By following this design criterion, the Business Objects Layer can be transparently upgraded to a new release or development platform without affecting the investment or requiring subsequent customizations of the Model Layer.

TRIALS, TRIBULATIONS AND OUTCOMES

As could be expected, the inception of this new conceptual framework gave way to a variety of problems and issues that had to be addressed from the start. Both the sales force and the implementers were reluctant to accept the new paradigm and this resistance to change was somehow transferred to the customer base.

Furthermore, the initial versions of the software did not reveal substantial performance improvements. On the contrary, the lack of maturity of the software, paired with the fact that this was a brand new development with no best-practice templates at hand, required that the first set of implementations were dealt in a similar manner to custom made software development, with the consequent loss of productivity (note: on the average, these implementations demanded up to five times the amount of work required to setup previous versions of the software, that followed the design of traditional ERP systems).

These issues were addressed and eventually worked out. The accumulated experience of developers, implementers and end users was put in practice to develop appropriate methodology. The effort was focused on improving the productivity of business modeling. A continuous improvement approach was followed, in which a simple business model (‘first step’) was initially implemented that enabled the end users to operate the product, and gradually refine the implementation.

With most of the aforementioned problems dealt with, the advantages of the new conceptual framework have manifested:

- The time required to complete an implementation has plummeted, reaching productivity ratios of 3:1, when compared to standard implementation times of world class ERPs (e.g. SAP, JD Edwards) of comparable size. In terms of cost of implementation, the gains are even more substantial: the cost of implementing the software based in this new paradigm is roughly 1 to 1.5 of the license cost, considerably below the standards of traditional ERP implementations.
- The flexibility bestowed by the decoupling of layers has simplified the conversion of the software to multiple operating system platforms and has eased the migration to new releases without altering the customers' business models.
- The developer company has been able to rapidly expand its customer base, penetrating new vertical markets (telecommunications, banking, and government), and reaching out to other countries in South America, with a sustained growth of 20% per year.

CONCLUSION

The new paradigm presented in this paper has created a foundation that has already exceeded the scope that the developer company had initially envisioned. The outcomes of current implementations have shown substantial gains both in terms of productivity and flexibility when compared to traditional ERP systems. Modern organizations will inevitably try to leverage their existing business models. This ERP conceptual framework provides a testbed and baseline to build applications that radically simplify the process of abstracting the business functions of an organization, and substantially reduce implementation time and cost.

() This paper provides an overview of the shortcomings of implementing traditional ERPs with special focus on Latin America; lays out a new paradigm based on a business objects' abstraction; and briefly discusses the issues of designing and implementing the new framework as well as some preliminary results. We recognize that much more could be written about each of these topics, but due to space limitations, we settle for just overviews at this time. We apologize if we've inadvertently left out any material desired by prospective readers. However, we will provide more complete coverage of these topics at the conference*

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