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Issues with implementing ERP in the public administration

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Abstract

As governments work to transform their environments from an internal resource optimization to a process integration and external collaboration focus, integrated systems stand at the forefront of solutions that will achieve this goal. Enterprise Resource Planning (ERP) is proven to significantly increase efficiency, improve information access, reduce total cost of ownership, and help government achieve the highest levels of accountability and constituent service.

Yet implementing ERP in a manner that achieves its promises is no easy task. Public sector organizations often rationalize their ERP modernization initiatives within the context of budgetary constraints and are faced with multiple ERP providers that, on the surface, are difficult to discern. In addition, adjudicating between competing ERP solutions on their functional merit is not only difficult because of the complexity of ERP systems, but it is further complicated by the intricacy of the government acquisition process. Therefore, it is particularly important that the business value be sold at the executive and political levels of government and, to be successful, that government embeds the ERP solution within its culture and processes. What's more, the level of detailed analysis required to map functional requirements to ERP solutions is an arduous task that, even if done thoroughly, hasn't always delivered a successful implementation.

In this article, we will address these issues by examining the evolution and shortcomings of ERP solutions; by defining the features and functionality needed to address government transformation; and by recommending the steps to take to position for success.

Introduction

ERP systems are application packages [FOTA2004, p.18] including several modules supporting all operation areas: planning, production, sale, marketing, distribution, accounting, financial, human resources, project management, stocks, service and maintenance, logistics and e-business. System architecture facilitates transparent module integration, guaranteeing, at the same time, the information flow between all enterprise functions in an extremely transparent manner. The choice of an adequate ERP system enables the beneficiary to implement a single integrated system, by the replacement or redesign of the existing operation systems. There is no successful ERP without process reengineering.

There is the wrong preconceived idea that ERP system implementation means the 'implicit' solving of all organization problems and an 'over night' productivity increase. Cost reduction and activity improvement expectations depend on the extent to which the chosen ERP system matches organization functions and on how well (re)defined and configured processes adjust to the organization structure, culture and strategy.

The increased interest in ERP systems is obviously the result of the promised advantages, mainly the much hoped for functional integration, the absorption of the best

economic-technological practices, the provision of information "wealth" and the guarantee of a direct real-time access to information for all the organization members. Notwithstanding technological and infrastructure changes, the main ERP success is due to the changes of economic processes, of organizational structure, of the parts and skills of the employees, as well as in the knowledge management activities.

The four stages of interaction between IT and organizations

Each decade a major business idea surfaces and dominates the business spotlight for several years. Influenced by the publications, workshops, seminars and programs that are offered, managers and the actions of management are greatly influenced by these trends. The 1960s and 1970s were predominantly periods of corporate strategy, in which firms wrestled with issues of experience curves, portfolio planning, and value chains. The 1980s become more operationally focused as Operations Strategy, Quality Management, and Information Technology grabbed the attention of business leaders.

The first IT initiatives took place in the 60s. These continue in the 70s and their main characteristic is connected with the applications' isolation, as they were separate, dispersed programs.

Therefore, **the 1st stage** can be entitled *Islands of Automation*: organizations continue to function and produce as before having just automated a small fraction of their processes, with no organizational change.

In the following period of the 80s the first organizational transformations took place, as the functional applications were implemented (today they are called "legacy applications", as they managed to resist in the 2000s). Even if it had represented a step forward, it was described for short as "Making the same old mess run faster".

The 2nd Stage – *Automated Process Chains*: organizations produce the same products and services as before but with changes in the way the organization functions, with a minimum of re-engineering accompanying IT introduction.

For the public sector, functional applications (see Figure 1) can be described by the following characteristics:

- minimum horizontal information flow;
- vertical information flow following the bureaucratic model;
- creation of stovepipes, organizational and informational silos.

The most important drawbacks of functional systems are:

- applications are not coordinated and there is no communication amongst them;
- lack of a coherent and comprehensive business view.

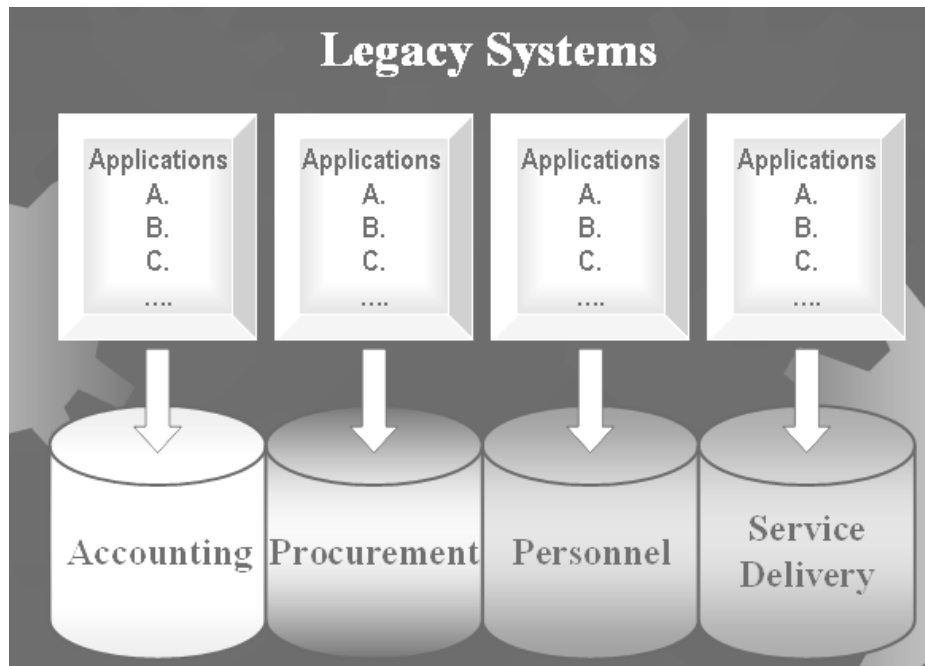


Figure 1. The functional applications

It is the third stage that we like to talk about. It started in the middle 90s, when integration became the organizations' focus.

In the 3rd Stage – *Reengineering through Information Technology*, organizations produce the same products and services as before but in a completely innovative way that affects all internal functions, information flows and structures. At this stage, reengineering is extended.

The implementation of the 3rd stage had to struggle with the incompatibilities between the organizational layer and the IT characteristics (see Figure 2).



Figure 2. Incompatibilities between organizational and technological layers

Major changes occur in:

- the processes that the organization executes (process reengineering);
- the way that communications occur both internally and with the external environment (information systems reengineering);
- the way tasks and power is distributed inside the organization (roles);

- the way all the above-mentioned are mapped into new organizational structures (organizational redesign).

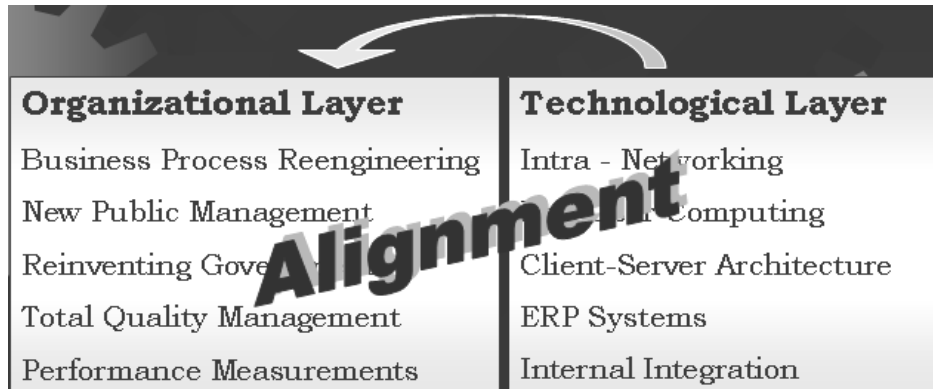


Figure 3. Alignment of organizational and technological layers

The alignment between organizational and technological layers depends on (see Figure 3):

- business process reengineering
- new public management
- reinventing governance
- total quality management implementation

The main realization of this stage is information integration due to ERP system implementation and it can be represented as in Figure 4.

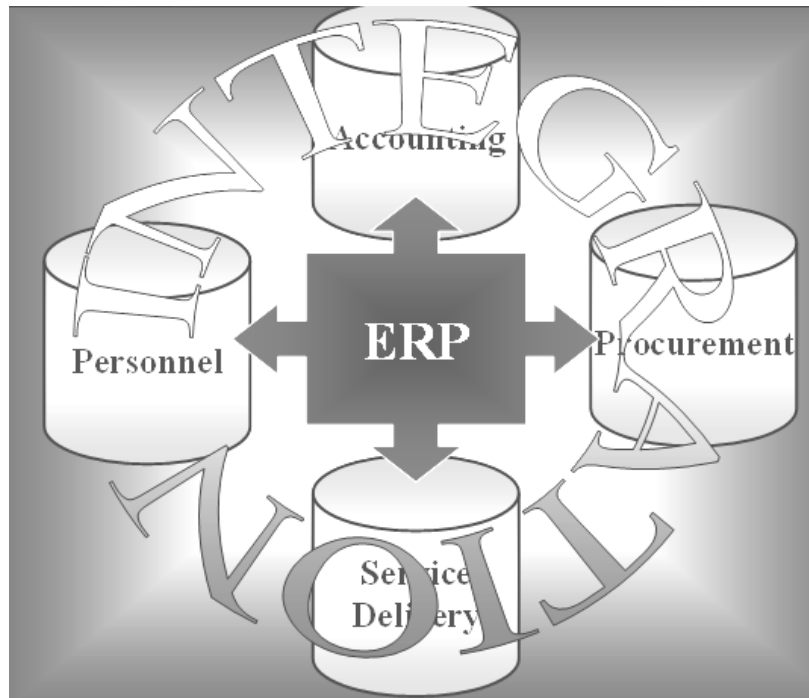


Figure 4. Integration through ERP systems

However, ERP cannot assume all the glory in the integration triumph, as it is demonstrated its ineffectiveness when it is not in concert with the processes reengineering.

Business Process Reengineering (BPR) is the analysis and design of workflows and processes within and between organizations. It seeks radical improvement of processes rather than a focus on incremental change and gradual improvement. BPR designs processes around desired outcomes rather than desired tasks. It integrates information processing work into the real work that produces the information. IT becomes the enabler of process reengineering.

BPR is a natural and inherent part of an ERP implementation. Many companies change specific operating methods to take advantage of new features and functionality provided by the new software. Though this activity may provide added value, the real improvements come from a collaborative effort to rethink and simplify the entire process rather than making subtle changes to specific tasks within it.

The National Public Academy of Public Administration¹ lists Business Process Reengineering as a key trend for public sector reform among other fairly radical changes in the way government conducts its day-to-day business [HEEK99]. Their report defines reengineering within the public sector as a “radical improvement approach that critically examines, rethinks, and redesigns mission-delivery processes and sub-processes, achieving dramatic mission performance gains from multiple customer and stakeholder perspectives.”

The reengineering of the 1990s was primarily enabled by technology [DAVE93], [MORT91]. And leading this charge of organizational transformation was the concept of integrated enterprise systems, better known as Enterprise Resource Planning (ERP). ERP has clearly had the greatest impact on business in the 1990s than any other single factor, including the Internet [DAVE98]. The value of information integration within an organization, and business process improvement based on standardization of best practices, is widely recognized. But in particular due to the large cost overruns of many ERP projects in the private sector (during the 1990s), governments continue to be skeptical of the tradeoffs between rewards, risks, challenges, and opportunity. The question that government officials are just getting their arms around is “is the road to integrated enterprise software a worthwhile one to pursue” [MIRA99].

Paradoxically, the evolution doesn't stop here and it was triggered not only by IT development, but the changes in the society and business environment.

The 4th Stage, beautifully called *Total Reinvention* covers organizations that restructure the meaning of their existence and all their internal and external relations: **why**, **what** and **how** to produce their services or goods. We will discuss the context and the issues of this stage.

A comparison of paradigms for each stage is presented in Table 1.

¹ The National Academy of Public Administration is a non-profit, independent coalition of top public management and organizational leaders who tackle the nation's most critical and complex challenges. It was established in 1967 and chartered by U.S. Congress. With a network of more than 600 distinguished Fellows and an experienced professional staff, the Academy is uniquely qualified and trusted across government to provide objective advice and practical solutions based on systematic research and expert analysis. (see <http://www.napawash.org/index.html>)

Table 1. Paradigm comparison for the four stages

Stage	IS Paradigm	IS Implementation	Organizational Paradigm	Values	Political Paradigm
1 st , 2 nd	Mainframe	Legacy, Dumb terminal	Bureaucracy, Vertical Stovepipes	Hierarchy, Tradition, Obedience	Industrial State
3 rd	Client/Server	ERP, Intra-networking, End-user computing	Mangerialism, BPR, TQM, Bechmarking	Efficiency, Quality, Responsiveness, Intra-organizational integration	
4 th	Net Computing	ERP II, Internetworking, Semantic Web, Middleware, Ontologies, Enterprise architectures	Complexity, Chaotic and dynamic behavior	Bounded instability, Inter-organizational integration, Inter-organizational alliances, Networking	Information Society

Discussion on the 4th stage occurrence

Whereas the focus in previous stages (mostly 2nd and 3rd) was primarily on the improvement of internal processes, a more global view reveals the need for improved interactions and strengthened interdependencies between internal needs and actions and the greater supply chain and demand chain. Today's business challenges inevitably call for real-time coordination across multiple locations (owned, contracted, business partners and service providers). New technology, such as a service-oriented architecture (SOA) fulfills these needs by making systems open to any user, from anywhere, on any platform.

The next generation of ERP – the new standard designed for the new manufacturing economy – harnesses the technology required to optimize performance in the globally extended enterprise. This is much more than just one more incremental improvement in a long line of evolutionary steps.

The so called ERP II is built on an underlying technology that takes advantage of recent advances in communications and networking to bring disparate facilities and entities together as never before. Closer coordination through machine-to-machine communication and interaction, and enhanced collaboration on the person-to-person side will be the hallmarks of the enabled business in the coming years.

The next generation of ERP systems, built on a service oriented platform, is designed to support current needs for collaboration and connectivity, internally and throughout the supply chain. They are designed to provide unprecedented flexibility and adaptability, and to be able to grow and adapt to new challenges, new technologies, and a constantly changing environment.

The public sector will also need to leverage the following core features of ERP solutions to enable them to achieve their mission:

- deeper functionality and more specific government requirements and processes;
- technology that leverages the Internet for both inter-enterprise connectivity and a unification of the end-user experience;

- open architectures that allow for easier integration and interoperability.

ERP implementation distinctiveness for the public administration

Like in all other sectors, in public administration ERP is an investment in more than just technology. It is an investment in the business and its people. It is not difficult to place a system within an organization and let them try to use it with training of functionalities. What is more challenging is implementing the system into a company's culture where it becomes an integral part of developing and fulfilling a vision.

From [HOSS02], [OLEA00], [MIRA99], [FOTA04], the following distinguishes the special features of the integrated enterprise system popularized in the 1990s. Note that ERP is the name often used to refer to integrated enterprise systems based on standard, packaged, best business practice:

- modular integration;
- common and relational database;
- client/server technology;
- best business practices and process reengineering;
- workflow capabilities;
- powerful development toolsets;
- drill down/audit trail capabilities;
- flexible chart-of-accounts;
- advanced reporting and analysis;
- Web enabling and internet capabilities.

The importance of accurate and timely information in state public administration was pointed out even in the 90s: "...require accurate and timely information to forecast revenues, control expenditures across functions, pay vendors, resolve payroll and personnel problems, including retirement system weaknesses, meet federal reporting requirements, prepare and review budgets, improve productivity, make policy and operational decisions, and meet the diverse needs of state-level public managers and users statewide." [STEV85, p. 98]. The same source suggested that, "Though computer technology has been available since the 1950s, the rate of adoption has not been consistent across levels of government or even across the same level of government such as the states." [STEV85, p. 94].

The key benefits of ERP implementation in the public sector can be summarized as follows:

- 1) standardize on best business processes and data integration
 - eliminate, through integration, redundant systems;
 - standardize the data;
 - eliminate and/or reduce manual processes;
 - automate interfaces other statewide systems;
 - improve processing through use of best business practices, business rules and workflow;
 - standardize business processes across different entities statewide - process standardization will result in more efficient and effective operations;
- 2) improve data access

- provide the ability to gather, access, and share information across departments and other entities of government while respecting each entity autonomy, maintaining security and confidentiality, and ensuring a high level of data integrity;
 - reduce the effort required to produce and comply with state and local tax reporting;
 - allow for 'one-stop', 'single-thread', and paperless transactions;
 - eliminate or reduce the amount of time spent on such things as multiple entry, pre-approval, auditing, reporting, tracking, manual processes, and account reconciliation;
- 3) improve real time data and business analysis
- provide the tools to support comparative analyses;
 - provide an information system for projections, modeling, and analysis;
 - reduce response time to make system changes as a result of policy changes or the introduction of new programs;
 - ensure adaptable and flexible software to support current and future needs.

In ERP system implementation, the people related problems are the hard problems. Technology problems are often well-defined problems and require a smart mind and a lot of hard work to solve. The people problems, and the organizational problems, are the problems that most often cause disasters. Nonetheless, technology, and fast changing technology, is clearly what enables and often forces organizational change. Managers must learn to appreciate the role of technology, understand the implications of technology, and learn to manage technology-enabled change effectively.

One of the greatest challenges on the ERP system implementation is getting the people to understand and to accept the impending change. This is necessary before we can expect them to accept their new roles. They need to understand that this is **a new way of doing business**. Culturally, and historically, the employees in public administration are difficult to manage as future ERP users. Resistance to change manifests in the ERP implementation. To do the integration project right, the ways the organization work will need to change and the ways people do their jobs will need to change too. And that kind of change doesn't come without pain.

An integrated system supports the process-oriented perspective in an organization. A process can be defined as a set of logically related tasks that collectively add value to a customer. Coming up against difficulties in adapting the product to the local distinct particularities of the public sector. Very often applications do not meet completely the requirements. Two things can be done in this situation.

The first is to change the processes to accommodate the software. Many times this is just what the client needs, but there are two cases here too: (1) users agree with it and (2) users don't. Deep changes are needed, even if users admit it or not. It's not easy to transform long-established habits, especially because it alters important people's roles and responsibilities. Top managers should be convinced to reengineer business processes.

The other thing to do is to adjust the software to fit the business processes. A lot of time is sometimes spent in attempting to replicate the existing functionality into the new system, instead of transforming the business. This looks more convenient to the users, but is extremely effortful and dangerous for the vendor, because it limits or heavily burdens

the future upgrade. Few vendors accept this kind of customization and they are right not to. It should be noted that organizational and cultural factors seem to be very important for successful implementation of ERP solutions.

Romanian organizations have, more or less, considered the decision of shifting to an ERP system, and some of them are still oscillating between yes and no. The main indecisiveness reason is the bad reputation for exorbitantly expensive and delayed implementations without producing the expected (and promised) benefits. Romanian businesspeople associate ERP systems with high costs and long implementation times, not with value added to their business. The final constraint is the time allowed for the selection and implementation process. Unrealistic time frames and deadlines may add unnecessary pressure and lead to project failure.

The management's actions and decisions should base on the following tenets (see [DONO99], [OLEA00], [FOTA04]):

- a. there is no magic in the software – benefits are directly related to the effective preparation and implementation and appropriate use;
- b. the best IT can't offset the problems of flawed business strategy and poorly performing business processes;
- c. define a business strategy, analyze current business processes and develop objectives. ERP software selection and implementation can then support the strategic and process objectives better;
- d. acquire flexible ERP information technology that can accommodate rapidly changing business conditions;
- e. have implementation led by senior executives who have the authority to make changes happen quickly.

Conclusions

Each decade a major business idea surfaces and dominates the business spotlight for several years. In the business software field, we witnessed a four stages evolution, in response and in accord with technological evolution and business practice experience and development.

The public information systems set up in the 90s, but their integration aspiration became visible at the end of the 20th century.

ERP public systems involve most of the business ERP but also have distinctive features as we described in the paper. The improvements triggered by integrated systems (ERP) implementation in public organizations are:

- processes become visible;
- jobs broaden;
- organizational boundaries begin to dissolve and fade away;
- authority moves to the front-line. all users can have access to all information;
- processes not only become visible, they become standardized.

The level of complexity of governments, in general, and the fast rate of social change, has brought bureaucratic administrations to the point of total breakdown. Efficient and effective technological infrastructures are necessary to enable new forms of

business. ERP might be view as the first step in the right direction. Each ERP implementation is unique and presents its own challenges, sacrifices, and accomplishments. Each implementation is a lesson to learn and the key of success is the sum of these lessons. The following issues came across our studies:

1) Never assume anything!

Miscommunication was the cause of some of the biggest errors. You can't make decisions in a casual or informal environment. Everything must be formally agreed upon and documented. Communicating by passing emails around does not work. Meeting face-to-face facilitate to get at the root of the issue in the shortest amount of time, to bring minds together and to foster the synergy required to come up with an innovative solution, and to come to grips with the fact that there would be sacrifices that had to be made.

The project will fail unless users and managers are committed to work as a team, and to take ownership and responsibility, as a team, for each problem that surfaced.

2) Ownership of project is the key.

'This is my project and I am going to be accountable for it no matter what is happening.' That is the attitude to adopt. People should be brought in early on.

3) Change management is the key to success.

Sure, the technical challenges are there, but they tend not to be as critical as driving changes to the personnel. A tremendous amount of effort has to be spent in communicating to people. They are doing their jobs one way for a long time. Trying to break them of their old habits is very difficult. They should be taken them from old school to new school, using all forms of communications: web sites, email, monthly meetings with technical people, quarterly meetings with change agents and encouraging people to call at any time.

4) Good project management is not just a Gantt chart.

An ERP system is a vastly complex system that provides functionality to cover essentially every aspect of business, and then some. Going into this engagement, the public organizations do not have deep knowledge of the ERP system, while the implementation consultants did not have deep knowledge of the State Government business practices. Complicating this is the fact that ERP vendors, and their software, never stand still. At the start of any implementation, it is essentially impossible to be all-knowing. Project team members must be open to experimentation and discovery. In the end, as best suggested by Charles Darwin, "it is not the strongest species that survive, nor the most intelligent, but the ones most responsive to change."

To ensure the ERP success requires close collaboration between the database administrators and the application developers. It was said, "it is like the old adage, the right hand knowing what the left hand is doing."

It is important to build a special trusting relationship. The project people can't bend over backwards for each other unless they trust each other and unless they agree that they are in this together and have joint ownership of the problem.

The management and collaboration of the diverse groups involved in an ERP project (i.e., State project team members, State change agents, implementation consultants, change management consultants, training and documentation consultants, application software vendor, hardware, operating system, and database vendor, and different functional and technical project team members) is the most difficult aspect of ERP implementation in the public sector.

A fundamental barrier to getting productivity from ERP implementation is government's people and organizations inherent resistance to change. ERP enables better interactions and coordination, but each opportunity requires substantial changes in current bureaucratic procedures. Success will depend on breaking down the resistance to such change. A holistic approach is needed, and each ERP project must include results oriented performance measures, policy alignment, training, communications, and organizational change milestones.

In the last few years, influenced by the publications, workshops, seminars and programs, Romanian managers and their actions changed in ERP esteem. They start to understand that the success of an ERP project does not depend on chance. To choose the most appropriate solution, to educate the personnel and to plan resources are the three essential conditions for the successful implementation and the use under conditions of maximum efficiency.

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