

# INTEGRATION VERSUS DEDICATION IN ROMANIAN MANAGEMENT SUPPORT SYSTEMS

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*The technologies supporting future business must be intuitive from a user standpoint, flexible from design standpoint and highly productive. As an answer to many requirements, analysts recommend the inclusion of SOA and ESB in the IT management strategies, since these tend to become mainstream, overcoming their abstract vision status in the last decade. In this paper, we provide a study regarding the attitude of companies from north-western Romania with respect to this transition and the SOA&ESB models. Our analysis targets attributes such as: level of understanding, knowledge and concern in adopting such technologies, the management involvement in the company IT strategy, the added value of the new technologies and risk factors for the migration towards an SOA&ESB architecture.*

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## **1. Introduction**

The role of IT has been changing significantly in the last decade. Far from being just a background element or a system acknowledged for logistics support only, the IT environment has become an engine for the business, an element with direct impact upon improving business results and indicators such as customer satisfaction and revenues. The majority of systems have developed gradually, with multiple technologies and vendors, and in time they have become too complicated and inflexible, big resource consumers and difficult to change. [site1,2006]. In the 90's many firms from Romania acquired software solutions which worked very well individually but had an application scope of high specificity. Gradually these applications generated a discontinuity in processes (information islands), it became increasingly difficult to exchange data between them, information was redundant and burdened the company resources. This could only be compensated by „manual intervention” on data (even screen scraping), which led to data isolation and inconsistency. Thus, the need for integrating legacy systems in an system of high interoperability prevailed, an integration which acts on two levels: the infrastructure integration and the applications integration. It was supposed, and in time it actually proved to be real, that the IT integration determines both the corresponding business performances and the access to the methodologies recommended by the international good practice rules for maintenance. All ensure dependence and continuity, the safety and the effectiveness of data processing and stocking in efficient conditions. The strategic planning, a feature of performant management, is extended in this way to the level of the IT department. „System integration” refers to the functional integration, which includes two aspects: the infrastructure integration and the integration at the level of the application. The infrastructure integration determines a distributed IT system, with a certain number of interconnected locations collaborating in real time, ensuring a corresponding data flow in the system

and having a security framework in place. Integration at the level of the application means that for all the data processing requirements of a firm, the number of independent applications should be minimized, both a company level and within departments and units of the organization [site1, 2006]. The integration at both levels is also known as Enterprise Application Integration. The first solution which worked relatively well with two applications was found under the name of Point-to-Point integration, well supported by Java technology. For a larger number of applications, the integration would become too complex. Moreover, there were problems in the case that one or several integrated applications were changed. Middleware-based integration is the solution that solved the integration of several applications considering that it introduces an architecture oriented towards the maintenance of the system, which allows to change certain applications more easily, without affecting the others, due to high modularity and base code refactoring [site1,2006]. SOA is based on middleware between the operation systems and the applications which ensure the integration. According to [Vasile,2005] „SOA is a model through which businesses are seen as a set of services which interact, an approach which uses open standards for making the operations of a company more efficient, more flexible and more collaborative”. In this paper we make a study with the purpose of monitoring the attitude of the companies from North-West Romania towards integration through SOA and ESB.

**2. Related works on SOA&ESB**

Why is there a need for SOA? According to [Rangu, 2006] the fundamental reason is to be able to answer the changing and unpredictable needs determined by the market demands, the clients and the increase in the number of distribution channels. The term SOA was introduced by Yefim Natis in a research paper from 1994: SOA is a software architecture which starts from an interface definition and builds a whole topology of the application as an interface topology, interface implementation and interface calls. [Petcu,2009] The SOA principles [Frasinaru,2010] are not technology-dependant, but rather define an abstract architectural vision:

Encapsulation	Abstractization	Contract
Autonomy	No state	Loose coupling
Granularity	Re-use	Composition
Communication	(Self) description	Discovery
Standardization	Integration	Interoperability

SOA uses the service as a reusable component [Petcu,2009]: the services have a higher granularity than the components; the communication between services and with the clients is made on the basis of well-defined interfaces. The SOA general design in according to [http://www.getelastic.com/wp-content/uploads/soa-large.jpg



According to [Frasinaru,2010] and [ERL, 2009], SOA is an architectural solution for exhibiting and accessing the applications under the form of services (such as web services); it involves an infrastructure for communication and service management, the ESB (Enterprise Service Bus), a specialized language for composing the simple functionalities into complex ones, which will model the economic processes (such as BPEL). Other definitions state: - “service oriented architecture (SOA) is an approach to have software resources in an enterprise available and discoverable on network as well defined services. Each service would achieve a predefined business objective and perform discrete units of work. The services are independent and do not depend on the context or state of the other services.

They work within distributed systems architecture” [Anurag, 2008]; - “earlier SOA used COM or ORB based on CORBA specifications and recent SOA stress on web services using standard description (WSDL), discovery (UDDI) and messaging (SOAP). Service oriented architecture may or may not use web services but web services provide a simple way towards service oriented architecture albeit with the age old security and reliability limitations” [Anurag, 2008]; - “enterprise service bus (ESB) is an infrastructure to facilitate SOA. Technically ESB is a messaging backbone which does protocol conversion, message format transformation, routing, accept and deliver messages from various services and application which are linked to ESB” [Anurag, 2008]; - according to Gartner Group’s definition, the new application integration middleware is: „a new architecture that exploits Web services, messaging middleware, intelligent routing and transformation. ESBs act as a lightweight, ubiquitous integration backbone through which software services and application components flow“. [site,2006]

Some advantages of SOA we can sum up are, as follows [site,2006]: it covers the integration of applications, an essential requirement under the circumstances of very rapid development of instruments such as the CRM or BPM etc; it provides efficiency through flexibility, automation and the integration of the business processes; it ensures cost reduction through re-using what was developed before and not through re-inventing for each new product or distribution channel; it decreases the time-to-market and time-to-yes by standardization and re-use of previously developed services; it simplifies the IT infrastructure and complexity in the company, the possibility to apply well-fundamented architectural principles; it supports business innovation and the competitive advantage [Rangu,2006]; it is agile - the significant improvement of the answer times to the business changes - the systems are projected as parted and autonomous services which behave independently as the “black box” type; it supports the implementation of new business processes or modified ones at a high level of independence from the particular IT systems; - it helps the business owners to have an active and direct role in designing the IT systems or at least the business processes supported by the IT systems. The modern software products which implement the SOA architecture provide the necessary functionality to a business-agile firm by implementing an ESB line. The ESB approach is to transform the robust messaging infrastructure in a platform for the development of the applications which interact through service-type interfaces. The working and management method based on the tools contained in the SOA/ESB software products transforms the IT infrastructure so that it could be used both by IT administrators, programmers and by the business people. [Lupu,2006]

In terms of technology, a project based on SOA principles is preferable to be implemented either on a Microsoft platform or on an IBM platform, these being the most popular. The Microsoft SOA platform represents a technology portfolio which offers capabilities such as:

- service exhibition (from the business point of view it means to allow the participation/re-use of services and from the technical point of view to adapt the services and to develop the end points or facades);
- connectivity between services;
- a message exchange system between services, preserves the abstraction of service implementation and a loose coupling, but also a naming, organization and mediation system for services;
- the service composition. Assembling new solutions, with minimum code: composite application or service orchestration or process composition, business ones etc.;
- the service consumption (the interaction with the users through a minimum number of interfaces);
- the service administration, service management and governance [site2,2006].

The SOA in the IBM mainframes provides a lot of advantages. We can use the old mainframes systems for getting data and integrating them in the new applications which use newer technologies, such as Java, XML and web services. Also, besides the possibility of integrating with new applications using state of the art technologies, the use of SOA permits a cost reduction as well and avoiding the implementation of more complex systems. Through a mere application and a web service, the existing data can be taken without problems and their usage will lead to an extension of their utilization mode. Thus, the SOA integration on the IBM mainframes and the use of new technologies (Java, XML, web

services) bring about new benefits: the extension of the applicability of current data in the IBM mainframes by cost reduction, as well as avoiding the development of more complex applications which would involve an infrastructure that would be more difficult to use and maintain. [site2,2006]. Thus, SOA is implemented by using a variety of technologies [Petcu,2009]: Distributed objects CORBA, J2EE, COM/DCOM; Message-oriented middleware (MOM); WebSphere MQ, Tibco Rendezvous; MonitorsCICS, IMS, Encinia, Tuxedo; Platforms B2B as well as ebXML, RosettaNet; Web services

### **3. The SOA market in the northwestern Romania**

The West development region, called shortly the West region, is one of the 8 development regions from Romania. From the point of view of neighborhood, the North-West region has a strategic geographical position, close to the European markets and it is characterized by a relatively good accessibility by air or land. The following were settled as priority supporting sectors at the region level, meant to ensure competitive advantage in the national and global competition: IT&C, higher education and research, tourism, agriculture, foods industry, consumption goods (furniture and clothes), the machine and equipment industry, banking activity. Among the factors that contributed to the introduction of the concept in the Romanian business environment we mention: - previous implementations of ERP, BPM, CRM, SCM; - the appearance of multinational companies (for example, Italian, German, Finnish even American companies); - the involvement of the software vendors who support the promotion of architecture through their products; - the statistics given to the public linked to the expansion of the SOA concept.

Concerning the ERP, this is often considered as backbone for many producers' activities, as well as a basis for performant management. The ERP systems based on SOA allow clients to model and manipulate the system in such a way as to adjust it more easily to their own needs. This thing helps them obtain maximum flexibility of their business, generate innovation and react promptly to different changes, without modifying the basic business processes. The SOA benefits include also a decrease in the demands of IT resources at the end user, for the integration and personalization of the systems, and the reduction of the maintenance requirements. Some of the statistics from the national literature which influenced, as we believe, the attempt to analyze and even to adopt the SOA &ESB concept are:

- the Forrester Research study published in August 2004 which shows that 25% of the interviewed companies gave up the EAI platforms opting for an ESB solution [site1,2006];
- according to Gartner Group, 75% of the companies' projects were supposed to be based on SOA in 2008;
- according to Gartner „SOA will be used in more than 50% of the new operational applications and the processes projected for business in 2007 and in more than 80% of such programs until 2010” [site3,2007];
- the IBM specialists predicted the use of SOA in more than 80% of the business applications and processes before 2010.

The first attempt to implement SOA in Romania was linked to the banking activity, more exactly in 2003 a collaboration between Iiruc Service and Raiffeisen Bank România. Other attempts followed. If we group on categories the potential SOA&ESB clients we can identify: banks and financial institutions; IT&C companies (Nokia); big corporations in the real estate field and in tourism, respectively industries which already run systems such as ERP, CRM, etc. The analysis we are undertaking refers to such aspects as: the understanding, knowledge and interest level in adopting these new technologies; the involvement of the management in the firm's IT strategy: the business value of the new technologies, the risk factors in the migration from a closed architecture to SOA&ESB, etc. We applied 500 questionnaires among the decision factors and the IT specialists from companies belonging to the north-west business region. We obtained 427 answers which could be processed. Through the questions from the questionnaire we tried to analyze the following aspects: the understanding, knowledge and interest level in adopting these new technologies; the involvement of the management in the IT strategy of the firm; the business value of the new technologies, the risk factors in the migration

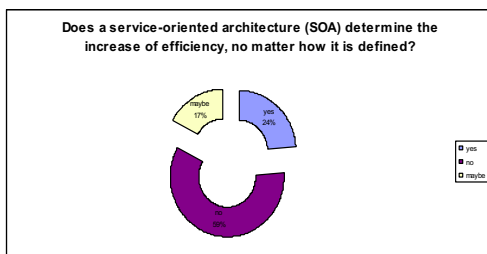
from a closed architecture to SOA&ESB. The questions were grouped in 3 big classes: A. questions referring to the respondent's profile and to the firm he/she is coming from: age, sex, college graduated, other studies, professional activity, research activity, company type, (SMBs, or corporations), the company profile (IT&C, higher education and research, tourism, agriculture, foods and consumption goods industry (furniture, clothes), machine and equipments industry, banking activity), number of employees, the county they are coming from; B. questions about competence in IT&C; C. questions which define understanding and the will to progress. It provided the following definition: SOA is the composition of services, an architectural approach which allows IT to be agile and to answer the changing needs of business. In the following paragraph we are going to detail some conclusions linked to class C, the will to know and the interest in promoting new technologies.

To the question: „Is there a business model respectively an IT model in the company you work for?“, 35% answered YES, 42% answered NO and the others said they were not interested. Out of those who answered YES a number of 67% were in leading positions and the others were ordinary employees.

To the question „Which ERP system is there in the firm you are currently working for?“ 56% were able to name the ERP, 23% do not know that the integrated application is called ERP and 21% were not interested by the fact that it was an integrated application, they knew that it was an application they can work in.

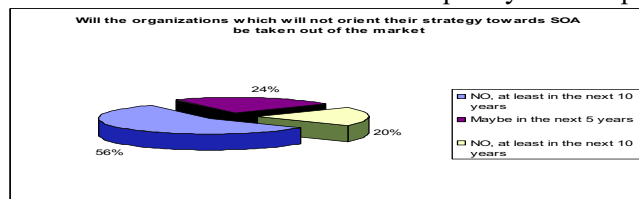
To the question „Does the modernization of the company's business environment depend on the IT&C modernization?“ 58 % answered YES while 25% said maybe and 17% said NO, the business environment in Romania being determined mostly by politics and current regulations.

To the question: „Does a service-oriented architecture (SOA) determine the increase of efficiency, no matter how it is defined?“ 24% answered YES, 59% answered NO, and 17% think that the term efficiency must be modulated.



To the question "Will the organizations which will not orient their strategy towards SOA be taken out of the market?" 56% answered NO, at least in the next 10 years, 24% answered maybe in the next 5 years and the rest said NO because they consider this is a slogan with no real basis, based on a buzzword.

Our observations show that the frequency of companies



that have already implemented or try to implement the new models is low, less than 10% of the business environment in north-western Romania, but there are perspectives for a potential growth.

#### 4. Conclusions

Regarding the questionnaire we applied there were certain difficulties in gathering data, as the concept of SOA is not really familiar to managers and is considered to be a technical issue rather than a strategic management approach. We realized that it is hard to define in universally accepted indicators the benefits of SOA. [ERL, 2005]. One of the problems the organizations under our scrutiny are facing is that the majority of IT departments would rather use legacy hardware and software than being the promoter of an IT approach strategically linked to improving business results. This can be noticed even though the IT managers admit the importance of aligning the IT efforts to the business objectives. On the other hand, the IT departments have the tendency to manage their resources and tasks like islands, each with their own agenda and priorities, consuming redundant efforts and wasted time. Another remark is that at the moment of the study there was a segmentation of the integrated software solution market and there are players with experience in this area, with a correct and acknowledged positioning, but at the same time we can still find a serious growth potential, due to the maturity and development process many companies from Romania are going through. SOA, composite applications, EAI and

related-products do not define a mature market in the north-west region of Romania. Above all we have to understand the benefits of using composite applications both on an operational and on a strategic level, and its implications on the general informational system of a company. SOA is not a product to buy and install. Besides adopting new technologies, it imposes changes in the people's behavior. All these involve costs which cannot be justified only based on technical specifications. In the absence of specific business requirements that SOA would respond to directly it is difficult to "sell" (and be convinced to buy) SOA. We conclude that the area submitted to the analysis from the point of view of IT&C technologies is characterized by three aspects: quite a big and very dynamic market, talented human resource with good technical skills and clearly belonging to the European priorities. As a final conclusion, the integration of management applications continues to represent a challenge for Romanian specialists and a necessity for companies, providing benefits from various points of view: management, system design, maintenance cost.

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