THE IMPACT OF SAP INTERNATIONAL DEVELOPMENT TEAM ACROSS THE STAGES OF ERP IMPLEMENTATION.
A CASE STUDY.

BANTA VIOREL COSTIN
THE BUCHAREST UNIVERSITY OF ECONOMIC STUDIES
e-mail: viorel.banta@cig.ase.ro

Abstract
        The development phase done in the large SAP (Systems Applications and Products in Data Processing) implementation projects has begun to use in the last years development resources from other countries, not those from the country where the solution is implemented. This was done due to the increasing pressure on the implementation costs. More and more companies are located in the area where a reduced price of the development part, which is essential in the implementation of an SAP Project, entails the implementation of the project. Some companies decide to delay the implementation of SAP precisely because of the high price offered by the companies that implement such an integrated system of type ERP (Enterprise Resource Planning). It has been shown, the studies of the last period show, that the involvement in the development area ABAP (Advanced Business Application Programming) and not only, of the programmers in an area where the price per day is much lower, has aroused a series of pro and cons discussions on how who have contributed to the project in good conditions. In this case study, the author wishes to bring into discussion, based on the information gathered during the SAP implementation project, a series of risks, difficulties and problems - issues, that have appeared. It will also be desired to discuss and bring to the table of the researchers, how the problems were solved, the times of resolution, the approach to the problems, often the language barriers as well as the understanding of the problems, exceeding the limits of the normal understanding. of how to approach a problem. Unfortunately, the discussions regarding money had priority over the quality of development, at the expense of a correct, coherent, very well written, explained and documented programming mode, which is absolutely necessary for a project which is created for an ERP implementation..

1. Introduction

        Several companies started, in Romania, after 1990 to implement ERP-type IT solutions, which is one of the IT innovations that made the existing end-to-end processes able to be modeled using these types of systems. ERP solutions have been increasingly sought in the area of adopting an integrated solution, for business environments, these integrating all departments within a company, the information used is not redundant, the reports as well, so that help in influencing decision making the adoption of such a system [3], [4], [10].

        The major SAP IT projects in Romania had as a starting point the functional involvement of consultants from outside our country, so that the transfer of knowledge was somewhat random. The adoption of internationally renowned software, such as Oracle Application or SAP, has inevitably led to a more cumbersome way of learning and further implementation [17]. However, this software has also appeared in the background of changing the economy of our country, many companies being acquired by large international concerns, amid increasing privatization, extended in the business environment of our country. Some companies became local branches, so they had to adapt their IT solutions, either by adopting new ones or being part of some existing ones in the parent company [15], [16], [20].

        A recent analysis shows that most large companies, in the area of energy, utilities or cars, have adopted state-of-the-art IT solutions, which makes the optimization of existing processes easier, the efficiency of business processes increasing from one year to year [17], [18], [19]. It is understandable that without an ERP type IT solution, the success of the business is very difficult

nowadays. The author of this article wants to discuss the risks and difficulties encountered during many implemented projects, risks arising when part of the programming was done with teams that worked remotely without being present on-site, at the client. This implementation project was an atypical one. Development resources were used from outside the country.

Thus, in Romania, on the project, there were realized Functional Specification, based on the business models found here. Technical Specification were made where the developers were based. It was also a mismatch of time versus resources. It is good to specify the fact that this phase, within the project, started too early.

Here there was a minus of programming activities, the minus coming from Project Manager PM. The details regarding this minus planning, it is good to be considered by the future researchers / implementers. The mismatch between planning and execution most often leads to endless frustrations and discussions, due to the inability to accomplish certain things, due to the lack of information (cutomization vs. development) [5].

2. The research model and hypotheses (abbreviated)

The methods used for this article were of several types, from the access to different scientific articles, to the actual approach of everything that meant collecting data from the field, creating assessment questionnaires, questionnaires that were offered to the participants in the project, as follows:

-RS_1: for SAP consultants from the project (functional consultants): to see how the problems of the project are understood, their solution, by the programmers;

-RS_2: for project manager (here the author wanted to see the reaction of the developer (s) involvement in the context provided by the project, times, separation of the resolution modes)

-RS_3: for end-users, key-users, service managers (here we wanted to find out their opinion regarding the use of the programming result, functionality, adaptation, frendly, visualization mode).

On the other side, the author took into account and the theory of diffusion of innovation (DOI) model [1], the resource-base view theory (RBV) [2] and RDT (Resource dependency theory) [2]. These theories, are found in a lot of research and are broken down into different areas of action, in our case, dealing with information, people involved, decisions, one after the other, all in one way or another, has to do with the theories explained.

Figure 1 Main directions of ERP Implementation – Development phase
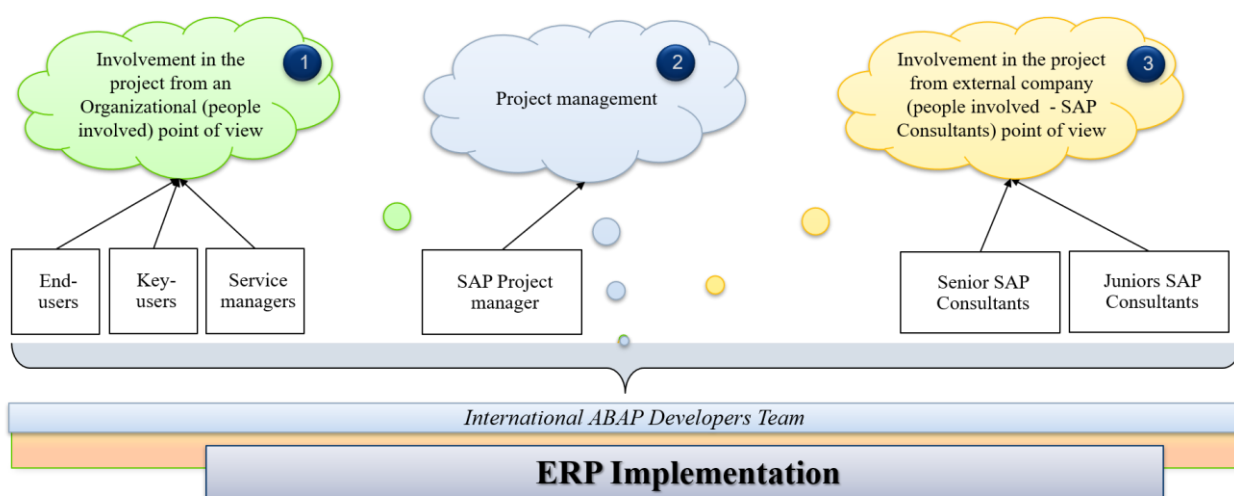
## 3. The ERP implementation project – the development phase

This implementation project was thought from the outset that it will be carried out, in the programming part, with external resources. Thus, the entire setup of the project was done in such a way that the collaboration with external programmers was done via skype, the project sessions being very frequent [6], [7], [8]. The working methods chosen had to be frequently adapted, so that everything as a requirement, left Romania (via SAP Functional consultants that were present daily on-site), reached someone from SAP QA belonging to the mother company, if everything was OK, then the requirement must reach the developer [9], [19].

The company had a Solution Manager (SAP application) that manages all the requests coming from the client, were created by SAP Functional consultants, approved by the company, then taken over by the programmers. The development phase (ABAP - in the SAP case) is a very important one. Here all the developments must be well coordinated, to solve a series of difficulties, with which, the great information systems face, when they are adapted in our country [16], [17].

There are several types of developments, which each system considers, we mention here: localization regarding reports, forms, data addition, restrictions, data exports, forms found only in our country, links with other systems (interfaces). Many of these developments require a detailed analysis, which can only be done by a highly experienced functional consultant, in the area in which it operates. The author has had discussions with many consultants over the years, concluding that, for a successful implementation, you need consultants who know the business environment in Romania, with at least 2-3 projects implemented. A discussion that must be taken into account when discussing green fiels or rollout implementations is that of how programmers are involved, their number, and the type of skills required. You know the fact (in this project this was the case), that for a zero implementation, you need programmers with great experience. At a rollout this is not the case, as most of the developments are copied and adapted later [11], [12].

In the following figure (Fig. 2) is detailed the development phase of the rollout project that refers to Development and Construction step:

Figure 2 Development phase - main points described
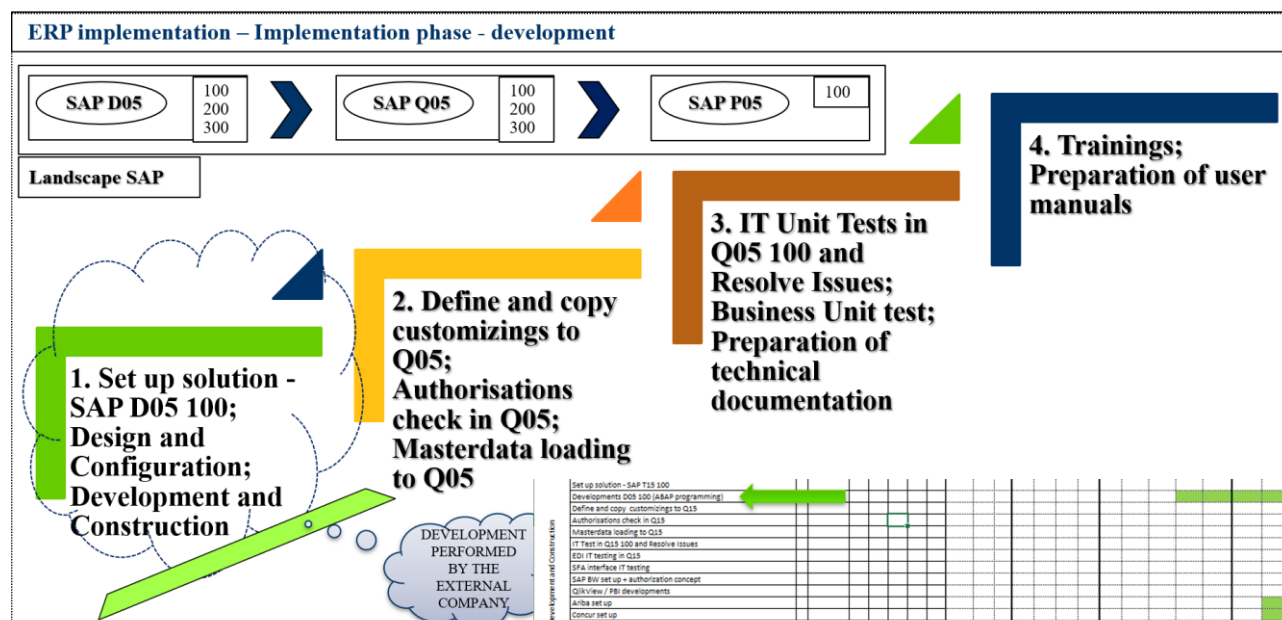
The company that provided the programming services for this implementation project was made up of several programmers, their grades varying from 3 - senior, to 1 - junior. This team was

led by a team lead, who throughout the project context was awarded with 0.5 MD. At the beginning of the project, 5 developers + Team lead were allocated, towards the end, the last 3 months, remaining 05 Dev + 0.5 TL.

The pyramid made regarding the allocation of resources related to this project has been updated four times, the difficulties encountered, offering the possibility to rotate the resources in the project. Another thing to consider was that the working day for the programmers was 9 hours, an unknown thing from the beginning, and that the Project Manager from the mother company would have to run when the budget (which had been made considering mandays) had been consumed. A change request had to be made in order to complete the project [13], [14].

4. The rollout project – the difficulties encountered

In the current context of globalization, in which remote work (from a distance) is no longer an impediment, this project would offer the author of this paper a diversity of information, which were collected, were the basis of this article. Throughout the project were encountered a number of difficulties, which the author, with the help of this article, wants to bring into discussion. For the author, who was a member of the implementation team, this stage of the project, which lasted from the beginning of the project to go-live, was an extremely difficult one. Among the difficulties encountered on the project we mention:

- DEV_R_1: communication difficulties (language was extremely difficult to handle) – this is the major risk encountered;
- DEV_R_2: cultural difficulties have their mark, the way of thinking is very different from how the Romanian functional consultants think;
- DEV_R_3: the quality of the final product always left room for comments and adjustments (reports, forms, applications, etc.);
- DEV_R_4: the QA performed for each SAP object highlighted ABAP code very often without any logic behind it;
- DEV_R_5: the answer from the real time point, it would have to be one of the many problems that appeared (the realization of a report and not only it had a very high execution time).

Figure 3 Development phase – risks / issues / teams

The main direction of implementation of an ERP solution – Development phase
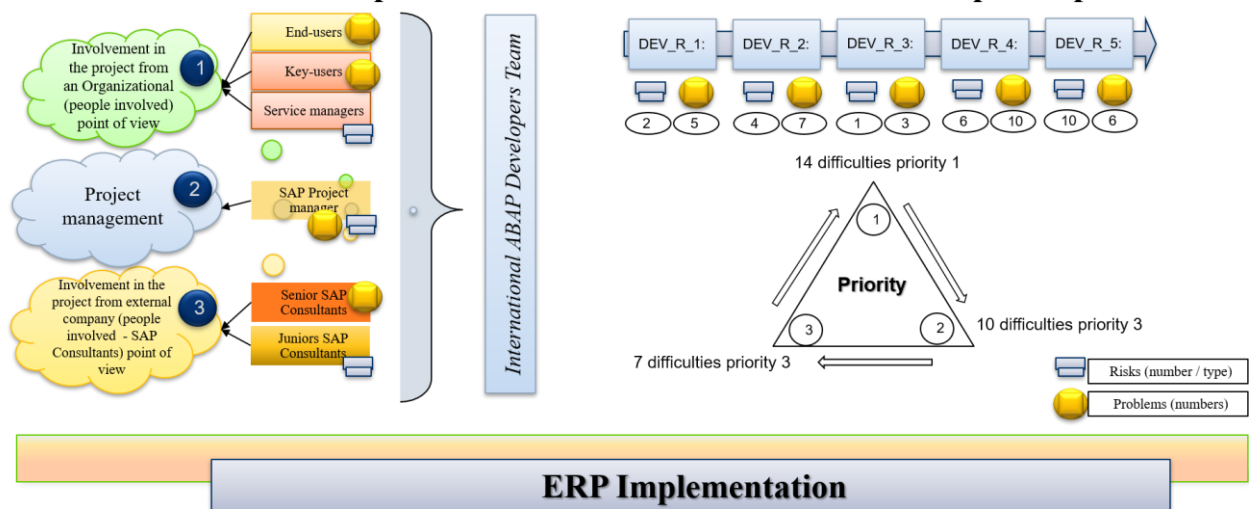
During the implementation period, as well as in the post-go-live period, a number of 31 difficulties were registered, the average being 14 difficulties priority 1, 10 priority 2, and the rest of 7 difficulties had category 3.

This rollout project has proven to be an implementation from scratch. The author wants to specify this, because most developments have turned out to be new implementations. The specifics of the Romanian company highlighted, for the mother company - the one who bought the branch in our country, that there were a number of specifics of the business environment here. There were two reports (white spirit and packaging report) that required a great involvement from the three SAP consultants on the project (SD, MM / WMS and PP).

They were able, after a work of about two weeks, to solve this legislative requirement. This was one of the over 47 new requirements, met on this project and which showed that involvement of the team of external developers was a very active one. As a minus I could notice the response times, which were sometimes very large, up to a week.

5. Conclusions

As a conclusion, the author can mention that there are two discussions regarding this type of collaboration: one is about the budget, another is about quality. We can mention, analyzing all the difficulties encountered, that the budget category was successful. Quality was not one of the strengths of the international company that made this implementation, creating confusion and frustration among those who received this project. It was very difficult to manage the way of collaboration, the cultural and linguistic factors being very often mentioned in the discussions between the members of the implementation project.

The final conclusion was that the organization of the project was a good one, the involvement of the programmers not meeting the expectations set initially, however the project plan was respected. The involvement of the team of developers located somewhere in a center of competence, was a very active one, the degree of understanding being one, many times, very difficult to adapt to the way of thinking, action and possibility of resolution, found in the SAP functional consultants , from the project, they have a thinking and a time of resolution / response, very fast. This project also had minuses and pluses, as minus, we can mention limited response time, very difficult understanding of the problems, many existing sessions (lost time for both consultants - technical and functional); as pluses: very low cost of development, possibility to work on multiple reports, interfaces, forms - in parallel, very detailed technical specifications. At the same time, the involvement of the offshore team proved to be a success, all the documents needed for the project were delivered on time, there were no delays. The duration was sufficient - 6 months, at least a third more than, if, the same developments were made by developers from our country. The big gain, regarding the involvement of the development team offshore, was that of the final costs, these being very small, compared to the involvement of a team from our country. Quality is a point, which, in the future, will be discussed a lot, the programming mode being not even of a high quality.

6. Bibliography

[1] **Rogers E.M.** "Diffusion of Innovations: Modifications of a Model for Telecommunications", In: Stoetzer MW., Mahler A. (eds) Die Diffusion von Innovationen in der Telekommunikation. Schriftenreihe des Wissenschaftlichen Instituts für Kommunikationsdienste, vol 17. Springer, Berlin, Heidelberg, 1995.
[2] **Nemati, A. R., Bhatti, A.M., Maksal, M., Mansoor, I., and Naveed F.,** "Impact of Resource Based View and Resource Dependence Theory on Strategic Decision Making", International Journal of Business and Management, Vol. 5, No. 12, December 2010

[3] **Ha Y. M., Ahn H. J.,** "Factors affecting the performance of Enterprise Resource Planning (ERP) systems in the post-implementation stage," Behaviour & Information Technology, vol. 33, pp. 1065-1081, 2014.

[4] **Haddara M., Hetlevik T.,** "Investigating the Effectiveness of Traditional Support Structures & Self-organizing Entities within the ERP Shakedown Phase," Procedia Computer Science, vol. 100, pp. 507-516, 2016.

[5] **Grossman T., Walsh J.,** "Avoiding the pitfalls of ERP system implementation", Information Systems Management, vol. 21, no. 2: 38–42, 2004.

[6] **Huang Z., Palvia P.,** "ERP implementation issues in advanced and developing countries", Business Process Management Journal, vol. 7, no. 3: 276–284, 2001.

[7] **Soja P.,** "Difficulties in enterprise system implementation in emerging economies: insights from an exploratory study in Poland", Information Technology for Development, vol. 14, no. 1: 31–51, 2008.

[8] **Roztocki N., Weistroffer H.R.,** "Information Technology Investments: Does Activity Based Consting Matter?", Journal of Computer Information Systems, vol. 50, no. 2: 31-41, 2009

[9] **Cooper R., Zmud R.,** "Information Technology Implementation Research: A Technological Diffusion Approach", *Management Science*, vol. 36, no. 2: 123–139, 1990.

[10] **Dumitru V.F., Albu N., Albu C.N., Dumitru M.,** "A Contingency-Based Approach to ERP Implementation and Organizational Implications - what is Different in Emerging Economies?", Proceedings of the 7th International Conference Accounting and Management Information Systems, June 13–14, Bucharest, 2012.

[11] **Esteves J.M., Pastor J.A.,** "An ERP life-cycle-based research agenda, published in First International workshop in Enterprise Management and Resource Planning: Methods, Tools and Architectures", EMPRS'99, Venice, Italy, available on-line at http://jesteves.com/EMRPS99.pdf, 1999.

[12] **Kumar V., Maheshwari B., Kumar U.,** "An investigation of critical management issues in ERP implementation: Empirical evidence from Canadian organizations", Technovation, vol. 23, no. 10: 793–807, 2003.

[13] **Markus M. L., Axline S., Petrie D., Tanis, C.,** "Learning from adopters' experiences with ERP: Problems encountered, and success achieved", Journal of Information Technology, vol. 15, no. 4: 245–266, 2000.

[14] **Roztocki N., Weistroffer H.R.,** "Information Technology in Transition Economies", Journal of Global Information Technology Management, vol. 11, no. 4: 1–9, 2008a.

[15] **Roztocki N., Weistroffer H.R.,** "Information Technology Investments: Does Activity Based Consting Matter?", Journal of Computer Information Systems, vol. 50, no. 2: 31–41, 2009.

[16] **Soh C., Markus M. L.,** "How IT creates business value" in Proceedings of the Sixteenth International Conference on Information Systems, Amsterdam, The Netherlands: ACM, 1995.

[17] **Soja P.,** "Understanding determinants of enterprise system adoption success: Lessons learned from full-scope projects in manufacturing companies", Production Planning & Control, vol. 21, no. 8: 736–750, 2010b.

[18] **Soja P., Paliwoda-Pekosz G.,** "What are Real Problems in Enterprise System Adoption?", Industrial Management & Data Systems, vol. 109, no. 5: 610–627, 2009.

[19] **Soja P.,** "ICT in Poland: lessons learned from enterprise system adopters", presentation delivered at the Swedish Institute Annual Contact Seminar: Innovative ICT – Networking in the Baltic Sea Region, Stockholm, Sweden, October 28th, 2010, available on-line at https://www.researchgate.net/publication / 228380426_ICT_in_Poland_Lessons_Learned _from_ Enterprise_System_Adopters, 2010a.

[20] **Somers T.M., Nelson K.G.,** "A taxonomy of players and activities across the ERP project life cycle", Information & Management, vol. 41: 257–278, 2004.