Business Process Reengineering of academic R&D organizations in the Republic of Moldova: opportunities and risks

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This article reviews the Business Process Reengineering (BPR) vision, focusing on the importance of information systems/information technologies (IS/IT) in BPR project. Although there is a lack of experience in implementing BPR in R&D organization, the key elements as necessary resources, the methodology containing possible scheme of IS/IT reengineering is proposed. Opportunities and risks of BPR project in R&D organization are highlighted in the paper.

Keywords: Business Process Reengineering, Information System Reengineering, R&D organization Processes Reengineering

1. Introduction

In today's ever-changing world, the only thing that doesn't change is 'change' itself [1]. The concurrence provokes the organizations to look for new methods and tools to become more effective.

Business Process Reengineering (BPR) is a relatively new mean in management that arouses huge interest and many organizations attempted to implement it. Hummer and Champy [1], promoters of BPR, define reengineering as the fundamental rethink and radical redesign of business processes to generate dramatic improvements in critical performance measures – such as cost, quality, service and speed. Re-engineering seeks breakthroughs, not by enhancing existing processes, but by discarding them and replacing them with entirely new ones [2].

BPR has been implemented in industry [1], [3], [4], [5], public sector [2], [6], [7], health care sector [8], [9], the legal and judicial field [10], education [11], [12], [13], [14]. BPR is topical for R&D organizations as well.

One of the characteristics that distinguish BPR from other types of restructuring is comprehensive implying of the organization staff in the project, where every worker aims at maximum high end result of the whole business, rather than at qualitative and timely executing of own tasks, although the direction of BPR is determined by high level managers of the organization [15]. It should be stressed that in a BPR project the synergy between coordination, interdependence and complementarity are of fundamental importance.

2. BPR resources

Allocation of resources includes formation of empowered and at the same time representative BPR team. The team should be enough empowered for clear vision of situation and decision making. On the other hand lack of representativeness can lead to limitation of knowledge regarding as-is processes. High level design had to be done by a small design team that studies the process in its entirety and considers relevant enablers and benchmarks in its design [16]. The BPR team consists of five to seven people. One or two of them have to be from IT subdivision, one or two can be from HR subdivision, one or two have to be external consultants or internal collaborators with imagination and creative thinking.

Key roles for BPR project include executive group that consists of chief executive officers, coordinators that solve all administrative problems, process owner, managers elected by BPR team, communicator, BPR team leader and BPR team itself. It is important to have the active support of chief executive officers team for reengineering processes.

3. BPR methodology

There are many methodologies used for BPR. Muthu, Whitman et al. [17] consolidated 5 varying BPR methodologies and propose following activities for BPR:

1. Prepare for Reengineering
2. Map and Analyze As-Is Process
3. Design To-Be Process
4. Implement Reengineering Process
5. Improve Process Continuously

3.1 Prepare for Reengineering

Before attempting reengineering, the question "Is BPR necessary?" should be asked.

Hammer and Champy [1] describe three types of companies implementing BPR. The first type – companies with big problems that have no choice but BPR. The second type refers to companies that foresee problems to approach. The third type of companies has no problem and flourish, but the strategy of the company is an active and advancing policy. So, in what situation are public R&D organizations from the Republic of Moldova? Do they need BPR?

In the Republic of Moldova the lion's share of R&D expenditure are Governmental. Although according to the Law on Science and Innovation [18] Government guarantees functioning and development of the field of science and innovations by means of stable ascending financing of R&D potential and stimulation of up-to-dated infrastructure establishment (it is worth mentioning that according to this Law the Academy of Sciences of Moldova distributes the Governmental financial resources), beginning with 2009 financing of R&D activities is continuously decreasing (fig. 1).

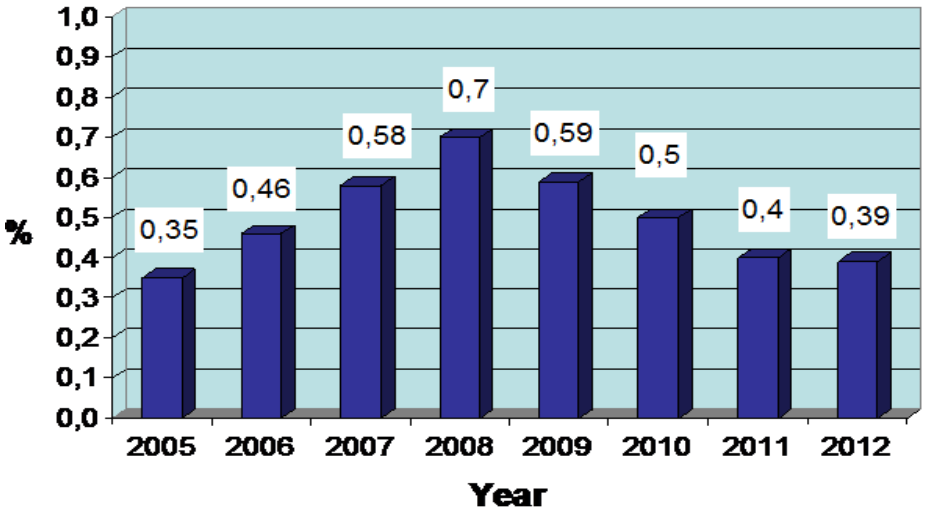

Fig. 1. Governmental R&D expenditure in the Republic of Moldova (% of GDP). Source: Annual reports of the Academy of Sciences of Moldova.

This austere situation already caused the reorganization in 2012 of academic R&D infrastructure that resulted in uniting some R&D institutions, absorption or even closing some of them. The main outcome of the reform was not the increased efficiency of the researches but reduction of the number of R&D institutions, laboratories and staff, including managers, despite the fact that R&D potential and human especially is one of the most important resources of any country.

So, the Governmental expenditures on R&D are annually decreasing and growing financial support is expected to be obtained from private sector and from abroad (international research projects); the Government is unsatisfied by the results obtained and implemented by public R&D organizations; according to the National e-Transformation strategy the services provided by public organizations should be transformed as much as possible into e-services. These factors, as well as obsolete business processes in R&D organizations of the Academy of Sciences of Moldova, are the main reasons for BPR. Thus, BPR for R&D organization is actual more than ever, more by token, the right way would be BPR when the object of reengineering is not the organization or its subdivisions, but processes, especially as Robson and Ullah [15] warn against destroying worth things within BPR project.

So, the justification of BPR need marks the beginning of the preparation activity. This activity

begins with the development of executive consensus on the importance of reengineering and the link between breakthrough business goals and reengineering project. An important factor to be considered while establishing the strategic goals for the reengineering effort is what the company believes it wants to achieve when it is done [15].

3.2 Map and Analyze As-Is Process

Before proceeding to redesign the process, the reengineering team should understand the existing processes and identify the problematic ones. Although there are two opposite opinions on this issue (in particular Hammer and Champy do not support this idea) it can be useful for R&D organization, when the redundant and too complex activities can be identified and later simplified.

According to the Law on Science and Innovations of the Republic of Moldova [18], the R&D activity is supported through projects and programmes. It is a common practice for R&D organization. The difference is in the method of project management. The successful management of a research project depends upon the researchers' ability to plan, coordinate and perform the research [19]. The ability of reporting the project results is the last but not the least important. Unfortunately, in Moldovan R&D organizations the research performing is in the focus and less the planning, coordination and reporting, although these activities consume a lot of time taking into consideration the obsolete methods used for these activities. So, after identifying the problematic process, the amount of time that each activity takes and the cost that each activity requires in terms of resources have to be calculated through simulation and activity based costing.

3.3 Design To-Be Process

This activity aims at producing one or more alternatives to the current process that would satisfy the strategic goals of the organization. After identifying the potential improvements to the existing process, the To-Be model is developed using one of the various modeling methods available [17].

Because all processes in organizations are dealing with flows of information that grow annually exponentially, nothing copes better with these flows than Information Systems/Information Technologies (IS/IT). In fact, BPR and IS/IT are closely connected, making possible the redesign of processes that represent the essence of reengineering [1]. Evolution from mainframes based legacy systems to PC based distributed network systems and the influence of the Internet has enhanced considerably the capabilities and usage of IS/IT in the context of BPR [20] and data reutilization. The methodologies for BP and IS reengineering should be the same. The use of different methodologies for process redesign and IS reengineering results in a gap between business process models and IS/IT systems [21][22]. This may contribute to the failure of BPR initiatives especially in cases where the majority of business processes in the organization are driven by IS/IT.

The following model (fig. 2) could be used for ISR in a R&D organization of the Republic of Moldova.

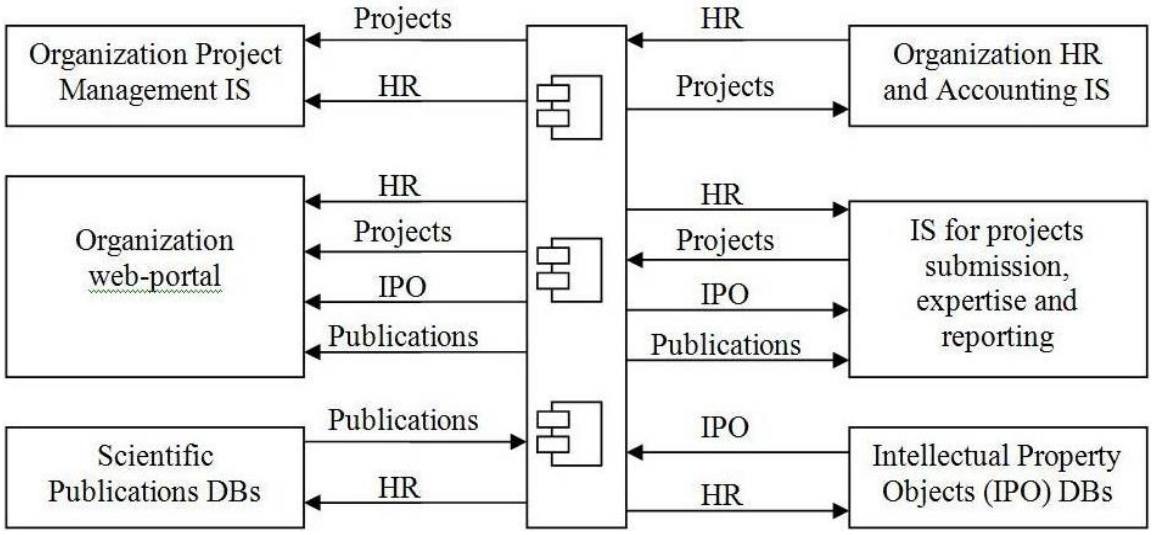

Fig. 2. Proposed model of IS/IT for BPR of R&D organization processes.

IS for projects submission, expertise and reporting - Expert on-line (www.expert.asm.md) is a system that has been initiated by the Information Society Development Institute in 2008 for submission and expertise of national research projects [23], [24]. For the moment it is used for submission and expertise of projects, while reporting part is under construction.

In 2013 within the ENPI project "Support to the Academy of Sciences of Moldova in better integration into the European Research Area" an European expert assessed the software for research programs management of the Academy of Sciences of Moldova. According to the expert's report the reengineering of Expert on-line system is suggested. Thus, Expert on-line should be reengineered synchronously with BPR.

There are a lot of **Project Management Information Systems (PMIS)** developed by different software companies used by organizations. R&D organizations from Moldova can use/ adapt some existing systems as Information Society Development Institute did [25] or develop special software as Institute of Mathematics and Informatics of the Academy of Sciences of Moldova [26] does. Unfortunately for the moment these are independent systems, not connected with other systems of the organization.

HR and accounting system is important because of the control of the main resources: money and human potential. All public R&D organizations use one of the accounting IS containing information about all expenses of the organization and data on all employees of the organization. Human resources subdivisions of some R&D organizations attempt to create own software to control HR fluxes. Thus, information about employees doubles and it provokes inevitable data mismatch. Another problem is the same as in the case of PMIS where no connection with other systems of the organization exists.

Data Bases of scientific publications are important because of two key factors: research results dissemination and reporting. There are many international DBs as Thomson Reuters, Elsevier, Springer etc., and national DB as National Bibliometric Tool (IBN – Instrumentul Bibliometric National, ro) (www.ibn.idsi.md) developed by Information Society Development Institute [27, 28]. The good news is that IBN reutilizes data on human potential from Expert on-line and users of Expert on-line can see their own publications entered in IBN. The bad news is that for the moment there is no connection between IBN and international DBs. This connection should be established within IS/BP reengineering. The connection between IBN and Expert on-line is established through web-services.

Intellectual Property Objects DBs contain information on different types of patents as well as applications for patents. On national level AGEPI (State Agency for Intellectual Property of the Republic of Moldova) is the owner of that DB. At present web-service for national IPO is implemented in Expert on-line. The problem that appeared is related to HP, in special to spelling of names (English, Romanian languages). IS/BPR should help in finding right solution of this problem.

Web-portal of an organization is its mirror. Today the bad business-processes of an organization can be observed on its web-site. Web-portal should gather all important for dissemination and promotion data from all information systems/data bases, excluding secret information of the organization and personal protected data.

The new model of BPR in a R&D organization should obligatory include continuous training of the staff. Thus, besides professional and project management courses, the organization have to provide training on information system utilization trainings.

3.4 Implement Reengineering Process

This is the most difficult activity of BPR. Usually on this stage the opposition is met. Implementing Reengineering Process has an impact not only on processes but also on organization culture. This fact bothers people that are afraid of changes. For R&D organizations, with their special institutional culture and high self-importance of titled savants this stage would be particularly complex. On the other hand, if the staff participates in previous stages, this activity will be easier to implement. Thus the implication of organization employees in BPR from the very beginning is very essential for the success of reengineering. But whatever may be the juncture in time that the culture change program may be initiated, it should be rooted in our minds that 'winning the hearts and minds of everyone involved in the BPR effort is most vital for the success of the effort' [29].

During implementing IS/BPR some changes or additional components in processes model can appear that have to be taken into consideration. Training programmes for the staff within this activity are initiated and the plan is executed in full scale [17].

3.5 Improve Process Continuously

BPR is not implemented in one day. The success of the BPR project consists in continuously improvement of reengineering processes. In order to improve something, it should be clear what have to be improved. Thus, monitoring is indispensable activity of this stage. There are two objects to monitor: the progress of action and the results. In R&D organization the progress of action can be measured by interviews of people and attitude surveys. It is important to know the staff and stakeholders opinion on the progress. Monitoring the results is made through measurement of time employees spend on solving tasks, through such indicators as finances attracted, number of economic contracts signed, number of publications, patents, adoptions of new technologies etc. Team reviewing of performance against clearly defined targets is done and feedback loop is set up wherein the process is remapped, reanalyzed and redesigned.

4. Opportunities and Risks of BPR in a R&D organization

There are a lot of case studies of implementing BPR. Some of them were successful, other – not. In order to increase the probability of a successful BPR project in R&D organization, it is worth to realize the opportunities and risks.

4.1 Opportunities

Successful BPR results in clear strategy of an organization, effective planning and efficient use of resources.

Management of R&D organizations would notice more effective research groups due to simplifying and optimization of processes, large usage of IS/IT and thus diminishing time for routine work, as well as thanks to continuous courses and trainings in case of successful BPR project.

Restructured processes would have a positive impact on effective communication between all stakeholders.

The main goal and result of BPR proceeded from above mentioned factors would be increased competitiveness of the organization.

4.2 Risks

The identification of risks and knowledge of their management is crucial for successful BPR.

Lenk [30] stresses the number of risks implying BPR in the public sector:

- A focus on top-down design at the expense of employee participation and concerns about implementation;
- Less meaningful interaction of organization members and a loss of organizational culture.
- A danger of increased organizational rigidity;
- Inadvertent deflation of the knowledge asset which is central to public sector organizations;

Archer and Bowker [31] identified the following factors for the failure of BPR:

- Lack of communication of a clear vision of the project,
- Lack of staff participation and ownership,
- Lack of involvement from staff at different levels,
- Failure to instill a re-engineering culture,
- Lack of project organization and planning.

A report by Xalles Limited, a business management innovator company, providing business strategy and systems implementation [32] identifies 5 traps of BPR that are applied to any kind of organization and that seems to summarize the risks identified by other authors.

- Subject Matter Experts.

The same team who created the current processes is used to reengineer the new ones or too many like minded people are included in a project team.

To manage this risk experts should be chosen very carefully. Experts on the current processes need to be balanced with people who can bring fresh ideas to the process.

- As-Is and To-Be Modeling Method.

The act of mapping the existing processes can limit the creativity of the effort to develop something better.

To manage this risk you can start with mapping to-be process before as-is processes have been mapped. Then take a break, map the current process and return to the to-be model for a second time. Another way is to change the composition of a mapping team for the To-Be process mapping, retaining 30-40% of the original team for continuity.

- Ignoring Constraints.

Too often teams focus on the wrong constraints. The real constraints of resources and sometimes technology limitations are ignored and ‘idyllic’ processes are designed that could never be implemented. Expecting perfect conditions versus realistic conditions to exist for new process to work is a common tendency.

The way to manage this risk would be to have a full list with all possible constraints and have it in mind when mapping new processes.

- Detailed Process Documentation.

Creating the most detailed process documentation may not lead to business results. Very detailed process documentation takes longer and the risk of conditions changing necessitating new processes increases.

Try to avoid too much detailing and focus on fundamental components.

- Solving the Wrong Problems.

Correct problem identification is a key to process reengineering.

Clear goals creates a basis for good process design and greatly increases the odds of creating business value instead of simply fixing what appears to be most broken.

In addition to identified traps it would be worth mentioning one more risk - different methodologies for BP and IS reengineering.

In order to cope with this risk BP and IS reengineering should be implemented shoulder to shoulder.

Conclusions

BPR is one of many existing tools for improving organization effectiveness and should not be considered panacea. In order to increase the chances for successful BRP decision makers should realize the complexity of the project and have in mind many factors and risks. Even if BPR project seems to fail it doesn't mean that reengineering stops. The mistakes should be identified, analyzed and corrected, because it is continuous process and there is no dead-line for BPR.

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