Monitoring and Evaluating a Project for Upgrading Bulgarian E-Government Systems: A Case Study

Kalinka Kaloyanova
University of Sofia/Institute of Mathematics and Informatics, kkaloyanova@fmi.uni-sofia.bg

Follow this and additional works at: http://aisel.aisnet.org/mcis2016

Recommended Citation
http://aisel.aisnet.org/mcis2016/29

This material is brought to you by the Mediterranean Conference on Information Systems (MCIS) at AIS Electronic Library (AISeL). It has been accepted for inclusion in MCIS 2016 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.
MONITORING AND EVALUATING A PROJECT FOR UPGRADING BULGARIAN E-GOVERNMENT SYSTEMS: A CASE STUDY

Kaloyanova, Kalinka, Faculty of Mathematics and Informatics, University of Sofia/Institute of Mathematics and Informatics, BAS, Sofia, Bulgaria, kkaloyanova@fmi.uni-sofia.bg

Abstract

The increasing importance of service sector forces organizations to present more and more services to citizens and business. Every country aims to improve and facilitate the use of e-services in the public sector. This paper enquiries into a process of effective evaluating and controlling the development of new services and upgrading the existing ones as a part of a comprehensive project at a national level in Bulgaria. The implementations of different concepts of Information Systems, Software Engineering, and Project Management areas are discussed in the paper in the connection with the presented approach.

1 Introduction

The increasing importance of service sector forces many countries to provide new e-services and to improve the existing ones. Every modern public administration is constantly trying to find better ways for the public services provision and to support the administrative activities. Managing such kind of activities requires complex professional and organizational efforts.

In this paper we present a specific approach for the process of IT evaluation of a comprehensive project for upgrading the existing central system of e-government in Bulgaria to improve the administrative services in the country.

The paper addresses the challenge to organize the evaluation process for this complex project that includes different activities provided as separate sub-projects, many teams and organizations, variety of stakeholders, etc. We describe our experience in monitoring and evaluation of project based on strong theoretical knowledge in the Project Management (PM), Software Engineering (SE) and Information Systems (IS) areas, customizing known paradigms for our particular goals and using a specific framework for coordinating the different task.

2 Case Description

We conducted our study on a project, supported by IT department in a governmental structure in Bulgaria, responsible for providing electronic administrative services through a single access portal (MTITC, 2015).

The main goal of the project was to improve the information and communication environment to relay better administrative services to citizens and business of Bulgaria. This was accomplished by focusing on the improvement of the existing infrastructure, the upgrade of the existing government and information web portal and the creation of several new e-services.

The project consisted of several main activities, listed in the table below.

<table>
<thead>
<tr>
<th>Activities in the project</th>
<th>Goals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lot 1</td>
<td>E-validation and e-delivery of electronic documents</td>
</tr>
<tr>
<td>Lot 2</td>
<td>Access to published registers of the state administration</td>
</tr>
<tr>
<td>Lot 3</td>
<td>Completing the instrumental environment of Bulgarian e-Government</td>
</tr>
<tr>
<td>Lot 4</td>
<td>Reconstruction of the main portal for e-Services of Bulgaria</td>
</tr>
<tr>
<td>Lot 5</td>
<td>Transformation of the e-Government Control Technical Center to a Central Administration Data Center</td>
</tr>
<tr>
<td>Lot 6</td>
<td>Electronic payments to the central and local administration, through the development of a single entry point</td>
</tr>
</tbody>
</table>

Table 1. The Project Activities

Five of the activities concerned developing software products, one – establishing hardware infrastructure for these software products. Lot 1 and Lot 6 intended the development of new software systems, the other activities focused on the upgrade of existing ones. There was no root coordination activity/sub-project to coordinate all others.

A peculiar trait of the project was that some of the activities needed to develop procedures, methodologies and other documents, which suggest improvements for the regulation of e-services in Bulgaria.
Each activity was conducted as a different “sub-project”, developed by a different company or consortium of companies and managed by different project manager. More than ten Bulgarian IT companies took part in the project, the teams varied between 5 and 25-30 people. The IT direction of a governamental structure controlled the overall development.

Initially the project was planned for nine months. Due to administrative reasons (delay of the launch of several activities) the project was extended to one year.

The evaluation and the control of the project progress were considered as a part of the project and were provided by a team, different from the ones, working on the above described activities. It was clear this activity exceeded ordinary project management task and required higher achievement and involvement. So the main question that faced this team was:

*How to organize the monitoring and evaluation process of the project as an activity within the project, based on theoretical principles and practical guidelines in SE, IS and PM areas?*

In this paper the description of the chosen approach for the evaluation and control is done.

## 3 Background Concepts

To effectively support the set of activities, listed in Table 1, concepts from several areas were considered to reflect different sides of the project (Goutas, 2013).

Firstly, all recommendations for successful project management were taken into account. As it is common practice, we followed the recommendations of the Project Management Institute (PMI) institute (PMBOK 2013). Software Engineering area main principles for modern software systems realization - requirements engineering, system analysis and design, programming, testing, maintenance, etc. were considered as well (Sommerville, 2011), (Pressman, 2015). Because of the specific of the project, Information Systems (Shelley, 2010), (Cadle, 2008) and Database lifecycle (Molina, 2009), (Elmasri, 2011) were an important part of the development of software products in several activities – especially for activities 1,2 and 6. Due to the long maintenance period (three years after the project ending), some concepts of ITIL (Information Technology Infrastructure Library) like Incident Management, Problem Management, etc. also were considered (ITIL Books, 2011).

We decided to base our approach on the main theoretical principles in these topics:

- Basic recommendations for successful project management;
- Established software processes;
- Modern IS analysis and design.

We also recognized the need of a framework for the organization of the evaluating process. Lastly, the roles and responsibilities within the evaluation team were considered.

In the next section more details for the used approach are presented.

## 4 The Project Evaluation

The particular project, discussed here, is different from the classical case of project management. In fact, every activity within this project was conducted as a separate IT project and basic project management principles were followed for it. The specific in this case was to run all lots as a united project.

The evaluation of the project had to be designed as an assessment of the six lots and their relationships. We use here the term evaluation because our focus was the overall review of the project instead of monitoring and controlling process as it is defined in PMI framework.
Our main intent was to establish a well documented and relatively easy to be followed approach, relevant to the different activities (sub-projects).

4.1 Relevance to Theoretical Concepts

According the bidding procedure there were no specific recommendations for a software process and/or project management framework for the lots. Instead, there were basic recommendations for some of the lots to follow several main phases during the projects development: Inception, Elaboration, Construction, Testing and Transition. Since Inception, Elaboration, Construction and Transition are recognized as the phases of the Rational Unified Process (RUP) process (Kruchten, 2004), this process was established as the main software process.

All teams declared to follow PMI principles and concepts for project management and this framework was chosen to guide the organization of the project activities.

4.2 Documents and Other Artifacts

A set of predefined documents and artefacts (models, diagrams, etc.) were insisted upon every lot. These documents were announced as a part of the bidding procedure - Table 2. During the project, some other documents, supporting the process like iterations plans, iteration test plans and others were prepared when necessary. The documents were delivered following predefined schedules followed strongly by the teams.

<table>
<thead>
<tr>
<th>Phase</th>
<th>Documents and Artefacts</th>
<th>Theoretical area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inception</td>
<td>Project Plan, Quality Management Plan, Risk List</td>
<td>PM, SE</td>
</tr>
<tr>
<td>Elaboration</td>
<td>System Project</td>
<td>PM, IS, SE, DB</td>
</tr>
<tr>
<td>Construction</td>
<td>Code</td>
<td>PM, IS, SE, DB</td>
</tr>
<tr>
<td>Testing</td>
<td>Test Plan, Test Results, System Guide</td>
<td>PM, SE</td>
</tr>
<tr>
<td>Transition</td>
<td>Maintenance Procedure</td>
<td>ITIL, Project Management</td>
</tr>
</tbody>
</table>

Table 2. Predefined Project Documents and Artefacts

Following the main principles of project management (PMBOK, 2013), (Warburton, 2012) the Plans and the Risk registers were updated at the end of every phase for every sub-project. Considering the short time for developing only the most important documents, supporting the RUP & PMI frameworks were requested (Kaloyanova, 2015).

Functional requirements for the software products were requested as use case model and use cases descriptions (Cockburn, 2001). Non-functional requirements were presented mainly following the recommendation of the RUP - (F)URPS+ model, where Usability, Reliability, Performance and Supportability were presented in specific details, pointing the main constraints for the developing system (Larman, 2004). Different UML diagrams were used to explain the design elements (Kaloyanova, 2012). Test acceptance plans, test scenarios, maintenance procedure description, etc. were also part of the documentation.

4.3 The Monitoring Teams

For each activity a coordinator from the governmental organization was assigned to monitor the progress and to coordinate the communication with the stakeholders. As these coordinators hadn’t expertise in all IT aspects of the activities, the main evaluation tasks were done by two teams of high quality experts, determined to follow the project progress:

- Team 1: IT Expertise;
• Team 2: Evaluation and Quality Control.

The teams consisted of individuals highly adept to address the different aspects of the project: business process management, system analysis and design, database management, IT infrastructure, IT security, testing, etc. Also several junior experts were involved in the teams. All experts came from leading universities, possessing solid experience in their areas.

Because of the specific work, Evaluation and Control activity used different documents that were adequate to the evaluation assignments. Specific templates for the controlling teams were created.

During the project, Team 1 provided the preliminary check of different work artefacts, presented by the teams, working on the main 6 lots and made recommendations reflecting the process of the evaluation. Team 1 usually worked with response of inquiry of supporting experts. For every request, made by a coordinator for an opinion about documents, artifacts, etc., one or more experts from Team 1 prepared special expert reports, consisting of several main section:

- Materials under consideration;
- Positive observations;
- Spotted drawbacks, inaccuracies, omissions;
- Comments and notes;
- Recommendations;
- Request processing (if it is necessary);
- Summary.

The similar structure for the evaluating documents was used by Team 2. As the experts from this team evaluated the last version of the artifacts for every sub-project phase, the final evaluation made by Team 2 included recommendation for phase acceptance to the contracting authority.

Both teams only had an assessment role, all decisions were made by the governmental organization, but they were always based on the reports, provided by Team 1 and Team 2.

4.4 The Process of Evaluation and Control/ Technical Support

The activities, supported by the project, followed predefined schedules, based on the main phases: Inception, Elaboration, Construction, Testing, and Transition. Every activity had its own schedule.

To follow this process a specific environment was established to support publishing the results of the work - IBM Lotus Quickr (Lotus Quickr). There were defined different “places” for every activity, where all their documents were uploaded – Fig.1. Every team had access to his own place, only the controlling teams had full access to the information.

The documents were uploaded to Lotus Quickr system in two manners. Firstly, the developing teams had the opportunity to upload initial versions of their artefacts to be checked by Team 1. The corrected versions were uploaded again. At the end of the phase/iteration – all documents were obligatory uploaded and checked for time compliance.

Also, the coordinator, responsible for the specific lot, frequently requested technical expertise from Team 1 during the phase, when a work product was presented before the end of the phase.

Lastly, Team 2 presented the final evaluation of the current phase’s results as well as a recommendation for phase acceptance.
5 Discussion

The above discussed issues are actual challenges of every real project. To measure the outcomes of this project we should take into consideration its strong specificity.

The complexity here came from the peculiarity of this project as a set of several activities practically provided as separate projects – sub-projects. In addition, solid group of stakeholders from different administrative institution were responsible for the delay of the project because of their slow reaction. There were many issues requiring regulatory decisions that have not yet been made.

Two activities – lot 3 and lot 6 were launched late due to external administrative reasons, which delayed the project’s end by 3 months.

Although the six activities were closely related there wasn’t an activity (sub-project) to coordinate them. As a result the teams that developed software products used different tools, frameworks and initially presented quite different user interface decisions.

Considering all above mention obstacles, a decisive result for the successful end of the project was the use of a combination of useful practices, procedures and mechanisms based on the main theoretical principles, provided mainly by Team1 and Team 2, as well as the strong will demonstrated by both teams to establish clear, reliable process for the project organization.

The basic comments on the project execution are outlined below.
5.1 Project Execution

Initially planned for nine months the project was completed in a year. The decision for the project extension was made at the end of the 7-th month of the project execution and the schedules for all activities were recalculated. Although the main reason for this decision was the late launch of two activities – lot 3 and lot 6, several other obstacles also arose here:

- The lack of regulatory decisions for using e-services and personal identification;
- The slow reaction from governmental administrations indirectly involved in the project;
- The missing coordination element.

The late launch of main activity for environment establishing (lot 3) was compensating due to tremendous efforts of its developing team. Practically, this development team started to play the role of assembling element for the project, resolving a lot of raised coordination issues.

The lack of a coordination activity was demonstrated on different levels. First of all, there were big terminology differences. Also, for every activity different teams used different tools and frameworks, even from different IT providers – Microsoft, IBM, and Oracle. As a result they presented various UI designs of the developed systems. As every coordinating expert had authority to control specific tasks, only the evaluating teams could coordinate the design diversity.

To overcome these obstacles the evaluating teams started to coordinate more closely the projects execution and to insist on additional artefacts to be presented by the developing teams. Several important decisions were made:

- Business processes descriptions were requested for every system and used to coordinate the relationships between the systems, developed under the project;
- The UI elements of all systems were checked for consistency;
- Experts from Team 1 and Team 2 started to participate in all meetings with stakeholders to emphasize the importance of the coordination process.

5.2 Software Products Development vs Software process

During the project a strong dependency between understanding and following the RUP process and real execution of the software systems was noticed. The teams, which revealed misunderstanding and failure to comply with the software process, demonstrated worst results. The teams which strictly followed the RUP showed better results and followed the schedule without difficulty.

Several important observations take place here.

Although RUP was established as a main software process, most of the teams initially presented plans without any iterations. But the lack of iterations followed to waterfall model of development. In order to avoid this, internal work results for some phases of these activities were required to be included.

Understanding user requirements is the crucial part of every software project, especially for IS development where users play a crucial role of using system functionality. Despite of the good description of the needed artefacts and clear request for the requirements description to be based on the use case modelling, some of the teams lack of experience in the area was revealed and they presented poor quality of use cases description.

The bad description of the use cases resulted into bad programming and testing. Weak test cases were presented. Team 1 used tremendous efforts to make the teams improve their use case models. The use case descriptions and corresponding test scenarios were carefully checked, many recommendations were made, template were imposed for use.
Several templates were delivered to the developing teams and some progress was shown at the end of the project.

5.3 Project and Teams Benefits

There is no doubt, every of three basic group of participants to the project – the governmental department, the developing teams and the evaluating teams benefited from the presented work approach.

Initially, the developing teams thought that their contribution to the projects would be only to present some pieces of work with no measurable benefits. They gave documents without big appropriateness to the specific phase/iteration or task. The involvement of high qualified IT experts forced them to organize their work according to the chosen software process, to prepare better documentation, to learn and apply some theoretical principle – strictly following the software processes, business modelling, use case modelling, ITIL recommendations, etc. They finally understood that following theoretical recommendations only helps their work.

The developing teams gained solid experience via the intensive interaction with IT Expertise teams. This interaction helped them not only to understand the details of the specific software project but also fostered them to look more deeply into known theoretical concepts and to obtain useful lessons learned.

For the coordinators of the governmental structure this manner of work brought more confidence and assurance – the processes establishment, the procedure maintaining and the understanding of different theoretical models. They learn how to handle changing requirements, how to insist on compliance arrangements. The expertise reports from the IT experts helped the coordinators improve their qualification. Certainly, the need of a process for the software development, the use of templates, and the establishment of clear procedure for every task will be an integral part of their future projects.

The experts from both evaluating teams gained from the direct observation of practical application of theoretical principles and had opportunity to observe directly the software development in several Bulgarian IT companies.

6 Conclusion

In this paper we presented a specific decision for the monitoring and evaluation of a project for upgrading the existing and creating new e-Government information systems in Bulgaria. The core elements of the used approach concern the application of basic theoretical principle, strictly following the appropriate software process, applying the best practices for software development, and involving high qualified experts in the areas of Information Systems, Software Engineering and Project Management.

The paper contributes to finding a solution for organizing a process of supervision and assessment of comprehensive projects, with specific tasks, organization and stakeholders. It aims to make some guidelines for practical contribution to developing a framework of this task. For the practitioners it could be useful via the set of modern approaches and technologies applied in more systematic way. Finally, it could convince students to pay more attention to theoretical concepts during their education.

Acknowledgement

This work has been partially sponsored by the Sofia University SRF under project 68/2016.
References


Cocburn, A. (2001). Writing Effective Use cases, Addison-Wesley


