

Efficient Flow – Project Management System

Abhiraj Bondre, Sujit sherkar, Umar Shaikh, Sahil Hanwate, Tanyush pandey, Piyush Sawsakade

Information technology
All India Shree Shivaji Memorial Society (“Ioit”)

Abstract- The Efficient Flow - Project Management System is a collection of actions that facilitate the effective execution of a project. A project is characterized by a set of interconnected activities that are organized and carried out in a particular order to produce a distinct output (good or service) in a predetermined amount of time. The most important distinction between research and development projects is the former's (lack of) explicit requirements and the latter's (inability) to plan an output from the outset. Evaluation criteria for research projects must consider these kinds of "particularities" when it comes to outputs; for instance, demonstrating that something is impossible to accomplish could be a research project's success.

Index Terms- Project Management System, Research Project Management, Industry Academia Collaboration, Position Based Services, Mobile Agent System. Project Planning and Execution.

I. INTRODUCTION

The way that research projects are planned, carried out, and managed is generally different from that of development projects and "purely academic" research projects; this is especially true of research projects involving industry and academia. The purpose of this paper is to present our experiences managing these kinds of projects over the last five years and to analyze them from the perspective of standard project management procedures. Each of those initiatives fell under the broad category of information and communication technology.

Position-based services, mobile agent and multi-agent based systems for remote software maintenance, and middleware architectures are all examples of information and communication technology (ICT). (with Web services);4) Bluetooth-based applications (emarine, electronic daily aids); and5) quality of service for networked simulated environments in next-generation networks. Our effective research partnership paradigm between industry and academia is described in [1].

Even while this study is by no means unusual, the outcomes—competence, prototypes, demos, papers, presentations, and the like—speak for themselves. Our belief is that both sides need to appreciate and acknowledge each other's uniqueness in order to establish a synergy like this, as well as build project management techniques that are best suited for and develop project management strategies that are most appropriate for their shared objective of offering creative answers to challenging issues in the challenging but complex field of information and communication technology.

A project management system's "efficient flow" is a collection of procedures that make it possible for a project to be carried out successfully. When a development project is said to have had a "successful implementation," it typically means that the project has produced the intended and necessary outcome within the predetermined time and financial constraints. The "overall planning and coordination of a project from inception to completion aimed at meeting the client's requirements and ensuring completion on time, within budget, and to required quality standards" [2] is the formal definition of project management.

As this paper will show later, the primary difference between research and development projects is that the former have (lack of) explicit requirements, while the latter are unable to plan an output from the beginning. Two other important considerations are making use of resources and maintaining a business mindset.

Research projects usually start with a discussion about the requirements framework, as opposed to development projects, which start with a discussion of actual customer requirements and expectations for outputs.

It may be challenging to accept a "positive negative" outcome from a research project, and this is in stark contrast to development projects, where a project's goal is to produce a product that will benefit the client.

This brings up the topic of business orientation. It is assumed that research project outcomes should be used as an input for development projects in applied research projects conducted by business-oriented organizations. Instead of focusing on basic research subjects, development projects' objectives are more closely tied to existing and upcoming goods and

technology. Planning, controlling, and scheduling tasks are thus carried out more rigorously because the outcome of this particular research project may have a direct bearing on future projects. This might be problematic, particularly for the academic partner.

with development projects where a project must result with positive output or product for the customer.

In contrast to development initiatives, which strive to produce a product that will benefit the client, it might be challenging to accept a "positive negative" result from a research study.

This brings up the topic of corporate direction. It is believed that in applied research projects conducted by businesses with a business emphasis, research findings should be integrated into development activities. Development projects' objectives are less closely tied to basic research subjects and more directly to new and developing goods and technology. Planning, controlling, and scheduling tasks are thus carried out with more precision because the findings of this specific research project may have a direct impact on other projects in the future.

This study aims to examine the project management procedures required for the establishment and effective implementation of research projects, with a particular focus on real-world outcomes attained in a commercial setting that maintains close ties with academic institutions. There are five sections in this study. The specifics of research projects, such as cooperation and project managers, are covered in Section II. The Research Department of the Research & Development Center of the Ericsson Nikola Tesla company in Zagreb, Croatia, on the "industry" side, and the Faculty of Electrical Engineering and Computing of the University of Zagreb and the Faculty of Electrical, Mechanical, and Naval Engineering of the University of Split, Croatia, on the "academic" side, collaborate on collaborative projects that are the subject of Section III's example of a successful research management process.

II. RESEARCH PROJECT PARTICULARITIES

The procedure leading to the end can occasionally be pretty disorganized, research projects are rather complicated, and it can be challenging to prepare for the precise outcome. Furthermore, variables beyond of the PM's control frequently affect research programs. E. Erno Kjolhede said [3]:

Setting extremely strict deadlines for when a certain outcome needs to be attained is not a good way to organize research. Then it ceases to be research. You can never make too many advance promises. or, in a popular quote by Albert Einstein:

Would it really be termed research if we knew what we were doing?

In research, there are almost as many "go wrong" as "go right" situations. Therefore, ongoing organizational learning and modification are required for research projects, and the planning and scheduling tools of PM theory struggle to take this into account. The field of operations research might be seen as an attempt to quantify reality in this way, only to discover that reality never, if ever, meets predicted benchmarks. Some strategies for handling unpredictable uncertainty have been put up more recently in [4].

1. Phases in a Research Project

The five process groups, or stages, that make up the PM-related processes are: 1) initiation, 2) planning, 3) execution, 4) controlling, and 5) closure. Like any other project, a research project needs to go through those five stages.

Traditionally, the objective of the conceptual goal-setting phase known as "initiation" has been to come to a consensus on a clear, practical primary goal for the project. A participant in a research project has significant influence on the project aim, unlike in a development project when objectives are established outside.

The planning phase of the project, which is the second stage, emphasizes the necessity to create a realistic timetable and plan of what can be accomplished with the time and resources available. Given the great degree of uncertainty surrounding the project work, the idea of a "realistic time schedule and plan" is meaningless or completely impractical in a research project. However, if "realistic" plans are insisted upon, underachievement may result. Thus, planning ought to use more symbols and communication than computation [5].

Naturally, so-called "unrealistic" planning is the antithesis to such cautious, methodical, realistic preparation. Unrealistic planning can serve as a motivating (and even self-fulfilling) prophecy, enabling project members to achieve higher targets than they previously believed attainable. To put it another way, who is to say whether or not a plan is viable, considering the high level of contextual ambiguity around projects? However, planning in an intentionally excessively optimistic way might backfire. While aiming high may, on the one hand, result in better performance than setting more modest objectives, on the other hand, project participants may become less motivated if they believe a goal is unachievable or unattainable.

Research indicates that people who are given challenging but attainable goals are more driven to work toward them than people who are given goals that they feel are either too easy or too difficult (the latter of which may result in the goal being rejected completely). Therefore, it may be advised to describe

planning as "highly ambitious," "challenging," or "reasonably optimistic" as opposed to endorsing unrealistic planning. Since optimistic people are known to accomplish more, it is important to promote an optimistic approach to work in general.

In terms of the third phase, execution, the popular thinking in PM literature seems to be that the work of PM might, in an ideal scenario, be limited to ensuring that deliverables are made on schedule and within budget with the help of effective planning tools serving as a project blueprint. As previously said, since research project preparation is done differently, execution ought to be more adaptable as well. This is not to indicate that there aren't any methods for keeping an eye on execution, but rather that other criteria should be used to assess the outcomes. (Later in this paper, we provide some ideas.) The fourth step, controlling, is no different.

The project's results are evaluated during the fifth phase, closing. While this may not be a reasonable way to evaluate a research project, given that the requirements and conditions for the project may have changed significantly during the project period, the authors of [6] suggest that an evaluation should place more emphasis on the degree to which project results are good and useful for future use by the organization/client for whom the project was made than on how well the project met its original goals. Put another way, an evaluation should focus on determining the future strategic importance and relevance of the project outcome rather than comparing a result to the original project goal, which may no longer be the most interesting or useful goal the project could get by the time it is completed.

2. Research Project Manager's Role

In small, subject-focused units, the research project manager is crucial in fostering innovative thinking. Additionally, it is his or her duty to guarantee that this way of thinking produces practical consequences, such as new skills or information that are documented in publications, technical reports, and the like, or tangible technology or processes related to technology. Subsequently, the project's production must fall inside the allocated budget and timeline.

These diverse research project results and the methodology that leads to them have at least one thing in common: a high level of knowledge intensity. Managing a research project in mixed teams with members from academia and industry involves managing knowledge workers as well as managing the new information being produced. It also entails disseminating and exchanging current information within the specific context of a collaborative endeavor.

The management of research material has to be a direct responsibility of the project manager. As a result, he or she faces a challenging challenge in managing the unpredictability that comes with producing research project outcomes

generally, as well as the complexity resulting from the various cultures of researchers and the working environment.

This means that managing research projects requires striking a balance between a number of issues, including: the need for strict project control (adherence to budget and time limits) and the researchers' desire for a high degree of autonomy in their work and democracy in decision-making; the fact that researchers collaborate and compete with one another on the project (competition for credit in publications, competition for positions, grants, etc., which may lead to conflict between the goals of cooperation on one side, and individual goals of researchers on the other;

The need to balance the hazy predictability of research outcomes and new research opportunities that arise during the project with the need for predictability of project output (with certain qualities "on time" and "within budget"); for instance, the quality of output may improve if deviations from plan are allowed or if it turns out that a very different output than the one originally expected would be more useful for the project's intended purpose;

The need to act as though the end product or process is certain and make management decisions continuously, versus the lack of and/or difficulty in interpreting management information and uncertainty of the end product and process (exactly what are we looking for, and which is the best way to get there);

The need to take risks in order to be innovative versus the need to reduce risks in order to ensure the delivery of the desired result on time and within budget; • the knowledge asymmetry between the project manager and the individual researcher, the latter of whom is frequently more specialized in the field of study and thus in a better position to make decisions regarding research issues.

Keeping the aforementioned concerns in mind, it is crucial to adhere to the organizational procedure used for research in order to facilitate and mandate the completion of projects with tangible outcomes.

3. If the administration of research projects is not seen as and is not performed by a single person, it may be possible to increase efficiency. This is a task that functions best when everyone participating in the project works together.

4. Collaboration on Initiatives

The notion that scholars who work together on research projects are nearly always in competition with one another is an interesting one. The competition becomes troublesome when it comes to obtaining patents and/or individual acknowledgment for the project's results (e.g., being designated an author of an article or contribution to a conference). Individual credit is necessary for a scientific

career, especially for researchers employed by the government or academic institutions.

These researchers merely need to publish and receive due credit in order to keep their existing employment at the research institution and, among other things, to be considered for advancement. As a result, there could be tension in research initiatives between the researchers' demand for personal recognition and their desire to provide the greatest possible final product for the project.

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Conflicts about, for instance, what sort and/or degree of involvement is necessary for someone to be classified as a coauthor, who should be the corresponding author, or the sequence in which authors should be listed are not eliminated by these preventive measures. In addition to making sure that agreements are signed and recorded on time, the research project manager faces the difficulty of identifying possible disputes early on, resolving them amicably, and averting more major conflicts altogether.

Ultimately, it should be mentioned that competition itself is not the only thing that causes conflict in research collaborations. Since researchers are generally very self-motivated individuals, healthy rivalry within the team may also result in greater motivation and hard effort to reach one's absolute best performance.

Additionally, as teamwork increases efficiency and an individual's capacity for learning, cooperating in a team may also be a strategy for an individual to defeat rivals outside the team. In conclusion, research project competition has both a good and a bad potential, such as the potential to cause disputes over credit, authorship, and patenting. good potential: as a motivating element. Once more, the project manager's job is to make sure that the competition is fully realized (in a good way!) and that the negative aspects are kept to a minimum.

III. RESEARCH PROJECT MANAGEMENT EXAMPLES

Research management process (RMP) is utilized to support project management in research projects carried out by the Research Department of Research & Development Center of the Ericsson Nikola Tesla firm. The best practices from earlier projects and Ericsson's research approach served as the

foundation for this procedure. As seen in Figure 1, the RMP delineates three stages of a research project:

The phases of project planning, project implementation, and project completion.

The process was chosen and modified with our needs in mind, keeping in mind that most research projects carried out by the Ericsson Nikola Tesla company are managed as collaborative efforts with academia, i.e., electrical engineering and computer science units under Universities of Zagreb and Split.

The project is being developed during the project planning stage. The purpose, methodology, and anticipated results of the research are outlined in the research proposal paper that is generated. Research proposals provide problem statements and open research questions to be addressed during the project's lifetime because, at that point, one can only outline the scope of the research project and cannot define all stages that lead to a good project completion. Stated differently, it provides a framework for future project stages and orientations and makes judgments about research steering possible.

The creation of the project specification document is the next stage. The following is stated in this document, according to the RMP: • Project information (start and finish dates, orderer, owner, manager, etc.)

Objectives • Goals

- Project control and organization (project steering group, reporting guidelines)
- Project calculation (estimated expenses) • Resource plan • Time plan with deliverables and milestones
- Rights to intellectual property

The project manager is in charge of creating the project specification. The project owner, the project steering committee, the project participants, and the associated line managers are the target group for the project specification. If there is a significant change to the project's scope, the project specification has to be amended. Members of the project steering group, which includes representatives from universities and corporate management, are named in the project specification.

The resource plan considers all available resources for a project of this kind, including university resources that have equal rights. To prevent any disagreements during project execution, it is necessary to specify the ownership and distribution of the outcomes in the field of intellectual property rights.

The project implementation phase is the second stage of the undertaking. During this stage, the project manager follows the project requirements to the letter.

The quarterly Progress reports are used to report progress to the Project steering committee. Every report offers an overview of the state of the resources and research material. The project's potential dangers, warning signs, and corrective actions are all detailed in the Progress report.

The project completion phase is the last stage of a project. A final technical report is written at this phase. This a list of all noteworthy project achievements, such as publications, technical papers, and prototypes, is included in the report. The information gained throughout the project is described in a different document called the Project Experience Report in order to enable potential knowledge transfer to subsequent initiatives.

Project tracking makes it possible to continuously check the outcomes attained and adjust the project's next stages to (potentially) more accurately estimate the output results. In order to facilitate ongoing monitoring and oversight of research projects, a weekly project progress summary is created, comprising two primary components: 1) accomplished outcomes, and 2) a plan outlining the next stages.

1. Setting up the Study Project in its Surroundings

As per RMP, the project's inputs comprise of strategies, ideas, prior project experiences, and other impacts. Conversely, research project outputs, also known as project outcomes, include newly developed skills, articles, patents, standards, technical reports, demonstrations, prototypes, algorithms, and demos.

Organizational tactics have two effects on research initiatives. The choice on long-term goals (where the firm wants to go in the next planning period – notably in terms of technology) and the overall organizational strategy inform one strategic direction.

By creating a delicate balance between the research-oriented view of the problem and the real organizational (business) demands, collaboration with academia offers another strategic approach. Furthermore, academic perspectives are crucial in providing a second opinion when choosing project inputs. From a different angle, this allows academics to assess the application of research concepts to actual commercial needs.

The established project aim or goals has a significant impact on the research project's results. It may be one of several stated objectives in some circumstances, or it may be all of for only one project.

A research project's output and the caliber of the research management process are highly correlated. As previously said, there are a number of potential outcomes. However, we feel

that competence, whether freshly developed or enhanced, is a prerequisite for

Design

- We have made a website using HTML, CSS and JavaScript PHP



Figure 1: enter the description of the task



Figure 2: generate the level of the task



Figure 3: add the member to the task



Figure 4: track the task



Figure 5: task completion report

IV. CONCLUSION

This paper highlights the critical aspects of research project management in the context of the collaboration between industry and academia, this ensures the integration of the academic and practical business needs, and the solution in the field of information and communication technology, promoting effective project management practices that address the complexities and uncertainties inherent in research paper.

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