Complexities of I.T. Project Management

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Abstract

As the global business landscape grows increasingly intricate, the necessity for interdisciplinary teams has become essential, transforming the work environment significantly. These transformations have escalated the demand for sophisticated IT projects, necessitating advanced and comprehensive project management approaches. IT project management involves the utilization of specific knowledge, skills, tools, and techniques to meet the defined objectives, goals, and requirements of an IT project, particularly concerning time, costs, quality, and performance parameters. These elements—time, cost, quality, and performance—act as constraints within IT project management. To gain as many competitive edges as possible and to produce suitable competitive responses, an organization must be proficient in modern IT project management techniques. The research study primarily seeks to analyze the key challenges that may arise in IT projects and, secondly, to identify the causes of these issues.

Key words: IT projects, organization, planning, control, management
J.E.L. classification: M11

1. Introduction

As technology continues to advance, increasingly more companies across various sectors are integrating computers and software tools into the management and development of diverse pro-jects. An IT project represents a time-bound investment aimed at achieving specific objectives. It is defined by its unique, one-time nature with a distinct start and finish, designed to meet specific goals while adhering to established parameters regarding costs, deadlines, and quality. Typically, IT projects involve new products or adapted existing procedures. Executing an IT project is a complex, enduring endeavor that demands substantial material, human, and time resources. This process is akin to achieving an investment goal, drawing clear parallels between the two. Like investment goals, which require a detailed implementation and monitoring plan focusing on cost, schedule, and quality, IT projects demand a similar approach. An IT project encompasses a series of interrelated activities (how?), aims for a successful con-clusion (what?), addresses a recognized need (why?), involves various participants (who?), and is managed by a project manager with the goal to balance cost, timeline, and product quality (how much?, when?).

The main objective of project planning is to achieve these projects within predefined deadlines and budgets, which is challenging and prone to obstacles. Some of these challenges are foresee-able and can be mitigated with experience from past projects, while others are unexpected and require the project manager's skill to navigate and resolve. In this scenario, a project manager must possess the ability to identify the best strategies to avoid and overcome hurdles and im-plement corrective measures to address any deficiencies. Experience has shown that without detailed planning, complex projects are not feasible because accurately estimating the costs and timelines for the involved activities requires thorough prep-aration from the outset. Without this initial planning, one might wonder how it would be possi-ble to predict final deadlines, assess whether the project met its timelines, or determine if it stayed within budget. How would one estimate the required workforce, both in number and skill level?

The answer to these challenges lies in developing a comprehensive plan from the start. While problems may arise at various stages of a project, they typically stem from insufficient plan-ning. During the execution and deployment of IT projects, continuous collaboration between the project manager and the client's decision-makers is essential. This partnership should estab-lish the project's conditions and development plan. Prior to detailing the timeline of team activities, the IT project manager must ascertain critical information, such as (Snedaker and McCrie, 2019):

- ✓ the overall budget for the IT project.
- ✓ the desired timeline for the project's completion and implementation.
- ✓ the projected implementation date.
- ✓ the available staff.
- ✓ the hardware and software currently at the client's site and its compatibility with the project requirements.
- ✓ who will handle system maintenance post-launch?
- ✓ who will oversee the project's implementation on behalf of the client?
- ✓ the key individuals from the client side involved in the project.

Having clear answers to these questions is crucial for effective IT project planning. Ignoring these details or lacking satisfactory responses can jeopardize the development and foundation of the project plan. Additionally, establishing a methodology for planning, monitoring, and reporting is considered a prerequisite. Commonly, only the initial phases of an IT project are detailed, with later stages such as design, programming, and testing merely outlined. Hence, software project develop-ment not only requires meeting the above criteria but also involves selecting the project team and manager based on their professional competencies. A project is organized and exists throughout the product or service development cycle until its completion, marked by the start of a warranty period for external clients. Once planning pre-requisites are identified, the project manager undertakes detailed planning, which involves un-derstanding the activities, determining their logical sequence within each stage, and setting timelines. Below is an example of how project activities might be grouped and sequenced in stages.

In conclusion, the process of realizing a project starts by defining requirements and concludes with the delivery of an operational program. This encompasses the software development cycle, which consists of overlapping phases and defined activities within those phases, producing spe-cific outputs and establishing dependencies among phases. The primary aim of this research is to pinpoint the challenges that arise throughout the lifespan of IT projects and to identify their underlying causes.

2. Literature review

As the landscape of technology, information management, and communication continues to transform, IT projects are becoming more integral to the foundational operations of various organizational structures. This shift is prevalent not only in private companies but also within public institutions and non-governmental organizations, marking a significant evolution in operational strategies across multiple sectors (Avornicului and Avornicului, 2006). The influence of IT project management is vast, with estimates suggesting that up to half of all operations in large corporations are now influenced or directly governed by principles derived from IT project management (Airinei, 2007). This pivotal role is a testament to the critical importance of technology in optimizing organizational efficiency, ensuring compliance, enhancing decision-making capabilities, and driving strategic initiatives. The wide applicability of IT projects across these sectors indicates not only the versatility of IT project management as a practice but also underscores its importance as a critical component of modern organizational infrastructure (Rusu, 2001). As organizations continue to evolve and technology becomes even more embedded in daily operations, the role of IT project management is expected to expand, pushing the boundaries of what can be achieved through the innovative use of technology. This progression suggests a future where IT project management could become the linchpin in the operational strategies of not just large corporations but organizations of all sizes across the globe (Buchmann, 2014).

IT projects are typically defined as tasks with distinct characteristics. They are precisely planned, coordinated, and managed to meet specific deadlines, utilize designated resources, and manage associated costs. From an organizational theory perspective, IT projects can be seen as temporary

structures established to execute specific, time-bound business processes. They are characterized by unique objectives, constructions, and processes tailored to the needs of the project. The novelty of the objectives and tasks in IT projects often correlates with higher risks. A common issue across organizations is the inadequate implementation of established IT project management methodologies, leading to various project dysfunctions such as delays, unsuitable technical solutions, unmet objectives, or underutilization of implemented systems. These dys-functions significantly impact organizational efficiency and performance (Oprean and Abdel, 2019). IT project management is a relatively modern practice within organizational frameworks, gain-ing prominence over recent decades. This management style equips organizations with robust tools to enhance their planning, execution, and oversight capabilities, optimizing the use of human and other resources to achieve strategic objectives.

The challenges of IT project management vary depending on the sector in which they are implemented (Snedaker, 2016):

- ✓ in the corporate sector, particularly in industries like infrastructure, telecommunications, construction, and entertainment, IT projects play a crucial role.
- ✓ in non-profit organizations, IT projects are essential in fields such as education, health, and environmental protection.

The increasing complexity of project-related issues and the rapid growth in the number of organizations that are project-oriented have led to greater professionalization in this field. IT projects can be classified into two main types: external and internal. *External IT pro-jects* often begin with a request for quotation from a client, which may be formalized through a detailed specification or may sometimes be a verbal request. *Internal IT projects*, on the other hand, usually start with an internal decision made by the marketing department and ap-proved by management, often leading to the development of a new program or an updated ver-sion of an existing one (Lehmann, 2018).

Once the project specifications are set, the technical director, or a delegated offer developer, organizes the project into a series of fundamental tasks. These tasks are detailed as thoroughly as possible and categorized into phases, stages, or batches to outline a specific development process tailored to the project (Andone, 2006). The offer developer also reviews the project requirements and specifications provided by the client or from related documentation, and identifies the process-es involved in the project. The effort required for each task, as well as for overall project management, is estimated using a project estimation guide. This estimation process includes breaking down the effort into dif-ferent processes and stages. Typically, the tasks associated with the project are organized into a Gantt chart and a PERT chart to help manage and visualize the project's timeline and depend-encies (Wheeler, 2011).

In cases where the workload to achieve a significant organizational goal is too vast to be managed within a single IT project, the organization might undertake a program comprising several interconnected IT projects. This program is designed as a series of activities that collectively aim to achieve broader organizational missions and objectives, utilizing an integrated ap-proach.

3. Research methodology

The study aimed to uncover issues that arise during the lifecycle of IT projects and to identify the causes behind these problems. The research involved 250 managers from Romania, repre-senting four different sectors: medical, research, production, and industries. The study was conducted between December 2023 and March 2024, utilizing a questionnaire distributed via email. The simplicity of the sample size was intentional to facilitate analysis.

The questionnaire was designed to evaluate how well the components of IT project manage-ment methodology are applied in practice, rather than to assess the respondents' theoretical knowledge. The components covered in the questionnaire included:

1. Organizing IT projects;
2. Planning of IT projects;
3. Control of IT projects;
4. Management of quality;
5. Management of changes;
6. Management of configuration.

The research utilized the maximum global utility method to address complex socio-economic decision-making challenges. This method is particularly beneficial for multi-criteria decision processes, where various factors must be weighed to arrive at a decision that best meets the objectives of a project or policy. The essence of the maximum global utility method lies in its ability to systematically utilize an extensive information base and apply it to simulate rational decision-making. By integrating quantitative data and qualitative assessments, this method enhances the decision-making process, making it both rigorous and replicable. It enables decision-makers to consider a broad spectrum of variables and criteria, integrating them into a unified framework that emphasizes objective, data-driven outcomes. This approach is grounded in the principle of maximizing utility, which, in the context of the study, refers to achieving the highest possible value or benefit from the choices available. To do this, the method calculates the total utility for each decision option by considering the weighted sum of all relevant criteria. Each criterion is assigned a weight based on its importance, and these weights help prioritize the factors that are most critical to the decision-making process. Although the specific steps of the global utility method were not detailed in the provided text, the method typically involves several key stages:

1.*Identification of criteria*: determining the set of criteria that will influence the decision. These criteria could include cost, efficiency, effectiveness, impact, and sustainability, among others.

2.*Weight assignment*: assigning weights to each criterion based on their relative importance to the overall objective. This step often involves stakeholder input to ensure that the weights reflect the priorities and values of those impacted by the decision.

3.*Utility scoring*: scoring each option against the identified criteria. This can involve both quantitative measures and qualitative assessments, converted into a uniform scale (usually 0 to 1 or 0 to 100).

4.*Calculation of global utility*: multiplying the scores by the weights for each criterion and summing these to get an overall utility score for each option.

5.*Decision making*: comparing the total utility scores of all options and selecting the one with the highest score as the optimal decision.

By using this method, the study not only promotes a structured and transparent decision-making process but also facilitates the simulation of various scenarios to foresee and evaluate the outcomes of different choices. This capability to model decision impacts makes the maximum global utility method a powerful tool in strategic planning and policy formulation, providing a robust foundation for making informed and rational decisions in complex socio-economic environments.

4. Findings

The research study focuses on examining the primary challenges encountered during the implementation of IT projects. The analysis categorizes these challenges into five distinct problem areas that IT project managers frequently face:

P1 - Problems in the organization of projects:

P2 - Problems in project planning:

P3 - Problems in project control:

P4 - Problems in quality management:

P5 - Problems in change and configuration management:

Table no. 1 in the study provides an informational foundation, detailing the significance attributed to managing each of these problem areas.

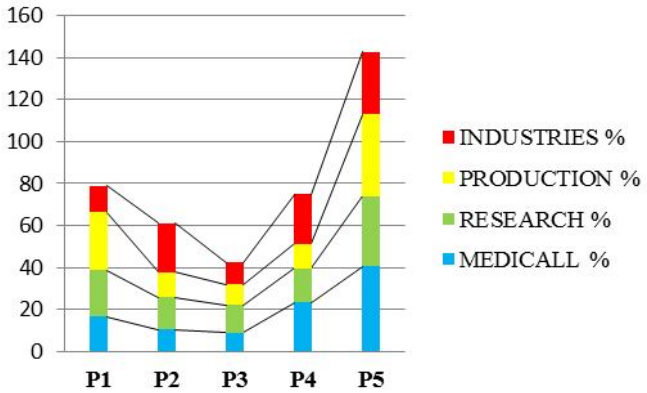
Table no 1. Share of issues that may influence IT projects

CATEGORIES OF PROBLEMS	FIELD OF ACTIVITY			
	MEDICAL % (v1)	RESEARCH % (v2)	PRODUCTION % (v3)	INDUSTRIES % (v4)
P1 (c1)	16.45	22.35	27.5	12.5
P2 (c2)	10.55	15.15	11.9	23.61
P3 (c3)	8.9	13.25	9.8	10.54
P4 (c4)	23.45	16	11.82	23.55
P5 (c5)	40.65	33.25	38.98	29.8

Source: developed by the author

The findings of the study reveal that IT project management prioritizes addressing P5 - Problems identified in the management of changes and configurations as the most critical area. Conversely, P3 - Problems identified in project control is considered the least critical area, as indicated in Figure no. 1 of the study.

Figure no. 1. The importance of the problems in each field of activity



Source: developed by the author

The execution of the calculation algorithm implied:
Step 1 – building the unit matrix with the elements xij figure no. 2.

Figure no. 1. Unit matrix

$$\begin{bmatrix} 0.26 & 0.66 & 1.00 & 0.00 \\ 1.00 & 0.65 & 0.90 & 0.00 \\ 0.00 & 1.00 & 0.21 & 0.38 \\ 0.99 & 0.36 & 0.00 & 1.00 \\ 0.00 & 0.68 & 0.15 & 1.00 \end{bmatrix}$$

Source: developed by the author

Step 2 – Calculating the global utilities for each organization (Table no. 2):

Table no 2. Results of the global utilities calculation

GLOBAL UTILITY	RESULT
INDUSTRY	2.25
RESEARCH	3.34
PRODUCTION	2.26
MEDICAL	2.38

Source: developed by the author

Step 3 of the analysis involved utilizing Table no. 2 to calculate the global utilities for various organizations across different fields. The results showed that the organization in the research field achieved the highest global utility. This indicates that the research organization most ef-fectively recognized and prioritized the importance of issues that could negatively impact IT project implementation. Consequently, this approach helps in mitigating the risks that lead to project failures, whether in not meeting the intended objectives or not adhering to set con-straints.

The types of problems identified across different aspects of IT project management are detailed as follows:

P1 - Problems in the organization of projects:

- ✓ Unclear reporting lines for the project manager during the project.
- ✓ Inadequate training of the project coordinator from the beneficiary side to monitor and evalu-ate project management.
- ✓ Limited capacity of the organization or project manager to handle complex project implemen-tations.
- ✓ Non-utilization of the products by the end users.
- ✓ Resistance or non-acceptance of the products by the users.
- ✓ Lack of interest or availability from the beneficiary's side towards project development.

P2 - Problems in project planning:

- ✓ Incomplete or incorrect identification of project dependencies.
- ✓ Unrealistic time estimates for stage activities.
- ✓ Inadequate resource allocation.
- ✓ Delays due to unavailable resources when needed.

P3 - Problems in project control:

- ✓ Issues during project development not identified or resolved timely or effectively.
- ✓ The beneficiary is often unaware of the actual project status or existing problems.
- ✓ Lack of effective institutional control by the project coordinator from the beneficiary side.
- ✓ Ambiguities in the defined services or documents and their specifications in contracts.
- ✓ Vague responsibilities and interdependencies between parties.
- ✓ Lack of clarity in acceptance procedures for deliverables.
- ✓ Undefined or poorly documented testing and acceptance procedures.
- ✓ Unclear responsibilities for monitoring and reporting progress.
- ✓ Conflicts in contract documents prioritization.
- ✓ Disagreements arising from differing interpretations of deliverable requirements or delivery methods by the supplier.

P4 - Problems in quality management:

- ✓ Non-compliance of deliverables with the established quality standards.
- ✓ Testing processes failing to detect all non-conformities.
- ✓ Deliverables being unusable due to major dysfunctions immediately after operation com-mencement.
- ✓ The supplier's inability to ensure and control quality throughout the project.

P5 - Problems in change and configuration management:

- ✓ Changes in the beneficiary's requirements during the project, with the supplier unable to re-spond effectively.
- ✓ Failure to integrate some subsystems or components into the final system due to changes.
- ✓ Delays and unapproved costs resulting from changes to the deliverable specifications.
- ✓ Delivery of non-functional or unusable products.

These issues across different problem categories each define specific areas of concern that directly influence the success or failure of IT projects. Identifying and addressing these prob-lems early in the project lifecycle is crucial for achieving project objectives and maintaining project constraints.

5. Conclusions

IT projects frequently encounter delays and budget overruns, often due to shifting requirements from clients. A recent research study has identified multiple causes leading to the failure of IT projects, categorized under several key areas:

C1 - Causes in project organization:

1. Lack of a project steering committee established before the project starts.
2. Project coordinators often selected from the IT department without consideration of their project management skills and experience.
3. No formal nomination of the project team members with clearly defined roles and responsi-bilities.
4. Benefiting departments not always actively involved in project development or represented in the project management committee.
5. Inefficient tools for presenting and addressing project issues, hindering timely decision-making.
6. Suppliers not required to outline their project management methodology in their technical proposals.

C2 - Causes in project planning:

1. Planning processes often overlook crucial elements.
2. Lack of specific methods or tools in planning.
3. Inadequate detailed planning at the beginning stages when necessary information is availa-ble.

C3 - Causes in project control:

1. Contracts lacking sufficient detail for effective project control.
2. Suppliers' offers missing critical details about responsibilities, dependencies, testing, and acceptance methods.
3. Party responsibilities for monitoring and reporting progress are not well-defined in specifi-cations.
4. Absence of contractual clauses specifying the interpretation order of contract documents.
5. Ineffective use of control modalities and tools by the project coordinator.

C4 - Causes in quality management:

1. Misunderstanding of quality standards in IT projects by both beneficiaries and suppliers.
2. Quality criteria for deliverables not consistently specified.
3. Lack of clear or known quality criteria applicable to various types of deliverables.
4. Specifications do not require suppliers to demonstrate how they will ensure deliverable qual-ity.
5. Suppliers often do not detail how they will control the quality of project deliverables in their technical offers, frequently only citing ISO certification.
6. Neglect or non-application of criteria for testing and accepting deliverables within IT pro-jects.

C5 - Causes in change and configuration management:

1. While most acknowledge the need for a documented change control procedure, it's often un-known or unused.
2. Lack of awareness about which components of the IT project are subject to change manage-ment.
3. Undefined authority for approving changes within the project.
4. Insufficient knowledge of the benefits and risks associated with different change implemen-tation approaches.

The study concludes that many IT project failures stem from insufficient planning, which can-not be effectively performed without a clear and consistent definition of phases, tasks, and ac-tivities, along with a method for evaluating tasks and deadlines. Cost estimations are crucial and should be conducted at least once before the project starts and periodically throughout its progression. The accuracy of these estimations improves over time and depends significantly on the project management methodologies employed, the practices and competencies of the teams, and the leadership and monitoring style of the project management. A precise evalua-tion, aligned with activity planning and using a robust methodology, is essential for ensuring project success and is typically more accurate for immediate upcoming stages, with only a global estimate for later stages.

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