

# **Towards in Agility in Research and Technology Organizations Case study**

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# Abstract

This thesis explores the implementation of project management tools and methodologies within Research and Technology Organisations (RTO's), specifically focusing on their application at RTO X. The research is driven by the need for RTO's to adopt flexible and dynamic project management approaches that cater to the volatile, uncertain, complex, and ambiguous (VUCA) nature of scientific and technological research environments.

The study evaluates the current project management frameworks used at RTO X, identifies their limitations, and proposes a tailored approach that enhances agility and responsiveness. Through an in-depth literature review and analysis of existing methodologies, the thesis establishes a foundation for understanding how traditional project management techniques can be adapted to suit the unique needs of RTO's.

To practically assess the effectiveness of the proposed methodologies, the thesis includes a hypothetical case study of a municipal waste management app development. This case study serves to demonstrate the integration of advanced project management tools like Microsoft Teams and Jira, highlighting how they can streamline communication, improve task management, and ensure efficient project tracking and reporting.

The findings from this research suggest that implementing specialized agile project management strategies at RTO X can lead to more successful project outcomes, providing clear project goals, enhanced team coordination, and better alignment with organizational strategic objectives. Moreover, the research contributes to the academic discussion on project management by providing insights into the adaptation of agile methodologies within the unique context of RTO's.

This work also underscores the potential for these methodologies to facilitate sustainable practices and align with the United Nations' Sustainable Development Goals (SDG's), making a case for their broader application across similar institutions globally.

**Key Words:** Project Management, Research and Technology Organizations, Research and technology organization, Management Methodology, Management Tools, Case Study, Operational Efficiency, Innovation



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Cristina Lopes



*“Rio por tudo e por nada  
E uma gargalhada fica sempre bem  
Pra ser feliz o meu destino  
Basta um pouquinho do que a vida tem  
É porque a vida dura muito pouco  
Dura muito pouco, dura muito pouco  
É porque a vida dura muito pouco  
Vamos lá cantar, tu não sejas louco”*

José Pinhal





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# List of abbreviations

|       |                                                |
|-------|------------------------------------------------|
| IT    | Information Technology                         |
| KPI   | Key Performance Indicator                      |
| PMBOK | Project Management Body of Knowledge           |
| PM    | Project Management                             |
| PMO   | Project Management Office                      |
| R&D   | Research and Development                       |
| RTO   | Research and Technology Organization           |
| SCRUM | Scrum (Agile framework)                        |
| SDG   | Sustainable Development Goals                  |
| URC   | University Research Centres                    |
| VUCA  | Volatility, Uncertainty, Complexity, Ambiguity |



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# Chapter 1

## Introduction

In the rapidly evolving landscape of technological advancement and global complexity, agility has become a cornerstone for the survival and success of Research and Technology Organizations (RTO's). This thesis delves into the intricate world of agility within these organizations, particularly under the lens of the volatile, uncertain, complex, and ambiguous (VUCA) environment of our era. It specifically focuses on how RTO's, which are at the forefront of innovation and discovery, can navigate and excel in an ecosystem filled with unpredictability and incessant change.

The project at the heart of this thesis addresses a critical problem: the heightened uncertainty and complexity inherent in research, development, and innovation projects, which traditional project management methodologies often fail to adequately manage. This research aims to explore and integrate agile practices in project management within RTO's, offering a more adaptive and fluid approach to managing projects that are subject to continuous evolution and change.

Central to this thesis is the objective to thoroughly identify and articulate the state of the art and best practices in project management as they apply to the typical activities of an RTO. It goes beyond mere identification, aiming to design a nuanced project management approach tailored specifically for such activities. This approach includes a detailed definition of the role of the Project Management Office (PMO) within this new paradigm, recognizing the PMO's critical role in driving and sustaining agility in project management.

Furthermore, this thesis seeks to pinpoint the essential requirements of information systems and tools that are pivotal in supporting the management of projects within RTO's. This encompasses not only the identification of such tools but also an understanding of how they can be effectively integrated into the agile framework to enhance project management practices.

This report unfolds systematically, beginning with a comprehensive literature review that lays the groundwork by exploring existing literature on agile practices in project management, with a particular focus on their application within RTO's. It then progresses to a detailed case study conducted at RTO X, a renowned Portuguese RTO. This includes an in-depth analysis of current project management practices at RTO X, the formulation and application of an innovative agile project management approach, and an evaluation of its efficacy. Concluding with a discussion of the findings, the report contemplates the broader implications for future practices and offers

recommendations for ongoing research in this vital and dynamic field.

Through this structured exploration, the thesis aims to make a significant contribution to the existing knowledge of agility in RTO's and provide practical, actionable insights for organizations striving to adapt and excel in the fast-paced world of research and technology.

For confidentiality reasons, the organization under study will be referred to as RTO X throughout this document.

## 1.1 Context

In today's fast-paced world marked by continual technological progress and shifting market needs, the concept of agility has emerged as a crucial element in the realm of project management. This is especially true in sectors deeply entwined with research, development, and innovation. The focus of this thesis is to examine the application of agility in Research and Technology Organizations (RTO's), with particular attention on RTO X, a leader in scientific research and transfer of technology. This research is premised on the idea that conventional project management approaches might not be adequately equipped to tackle the distinct and intricate challenges typical of R&D activities in the field of technological advancements.

## 1.2 Objectives and Research Questions

This dissertation confronts a fundamental issue: the absence of flexible and dynamic methodologies in conventional project management, especially in sectors characterized by research, development, and innovation. The inherent uncertainty and swift evolution in these areas necessitate project management methods that are not just resilient but also adaptable enough to manage the inherent unpredictability of these projects. This challenge is especially evident at RTO X, an institution engaged in advanced research and technological innovation, which requires a project management strategy that is both agile and responsive.

For this study, it's important to define some questions. These questions will help in understanding how project management works in Research and Technology Organizations (RTOs), especially how they stay agile and adaptable. The focus will be on examining the strengths and weaknesses of current methods, testing a new method, and envisioning the best method for RTOs like RTO X.

### **RQ#1 How do existing project management frameworks in RTO's address agility, and what are their limitations in this context?**

This question explores the effectiveness of current project management approaches in RTOs, focusing on their ability to incorporate agility and adaptability, and highlighting areas for improvement.

### **RQ#2 How effective is the newly proposed project management methodology when applied in the context of RTO X?**

Answering this question will demonstrate if the newly introduced project management approach effectively improves agility and outcomes in RTO X. It seeks to provide insights into the practical advantages and any limitations of this method compared to traditional practices.

**RQ#3 What would an ideal project management methodology look like for RTO's, particularly for institutions like RTO X, that embodies agility and adaptiveness?**

For an RTO like RTO X, determining the potential of an ideal project management methodology that embodies agility and adaptiveness is crucial. This question will explore how such a framework could be structured to better support dynamic research environments, thereby enhancing the effectiveness and adaptability of project outcomes.

### 1.3 Methodology

The choice to employ a mixed-methods approach is grounded in several key considerations. First, the array of data types at RTO X, which spans from qualitative insights regarding employee experiences and the organizational culture to quantitative performance indicators, necessitates a methodology capable of effectively managing this diversity. Second, the dynamic and complex nature of the R&D environment at RTO X requires a methodological framework that is sufficiently adaptable to meet varied research needs and objectives. Finally, the specific aims of this thesis, which involve both a comprehensive understanding and an empirical assessment of agility implementation in RTO's, call for a methodology that synergies the in-depth analysis of qualitative data with the objectivity of quantitative evaluation.

This segment paves the way for an in-depth examination of how the mixed-methods approach is specifically adapted to align with the distinct requirements and characteristics of RTO X. Such an approach ensures that the research findings are not only comprehensive and pertinent but also accurately reflect the complex interplay of factors within such a multifaceted organization.

The methodology employed in this thesis was carefully chosen to align with the constraints of the study, which includes the inability to directly validate with RTO X teams due to the theoretical nature of the case study presented. With this in mind, the approach was designed to maximize the relevance and applicability of the results within the possibilities of indirect analysis.

#### Literature Review

- **Purpose:** To establish a solid theoretical foundation on project management methodologies and their application in research and development contexts, focusing on research and technology organizations.
- **Approach:** Detailed analysis of academic literature, books, and case studies discussing agile management practices and their application in environments similar to that of RTO X.

## Data Collection

- **Qualitative Techniques:** Development of scenarios based on typical experiences and challenges that might emerge at RTO X, allowing for a theoretical exploration of perceptions about project management practices.
- **Quantitative Techniques:** Formulation of hypotheses based on secondary data and published information about similar practices in comparable organizations.

## Data Analysis

- **Qualitative:** Use of thematic analysis to identify theoretical patterns and infer possible outcomes from the implementation of agile management practices.
- **Quantitative:** Evaluation of the hypothetical impact of agile management practices based on case studies and relevant literature, using statistical methods to simulate potential improvements and challenges.

## Implementation of Models and Frameworks

- **Methodologies:** Adapting agile frameworks like Scrum, Kanban, and Lean, envisioned for a future experimental study at RTO X, respecting the unique operational needs of the organization.

## Agile Principles in Research Methodology

- **Iterative Research Design:** Proposing a research approach that allows for continuous adjustments and refinements based on theoretical feedback and preliminary analysis.
- **Stakeholder Collaboration:** Planning for future direct collaboration with RTO X members to validate and adjust the implementation of the suggested tools and practices.

This methodology was designed to provide contextual and theoretical insights into the implementation and impact of agile practices at RTO X, with the expectation that future studies may validate and expand upon the findings explored here. This approach not only contributes to the academic base on agile management in RTOs but also sets the stage for practical and collaborative interventions that can effectively transform project management in the organization.

## 1.4 Dissertation structure

This dissertation is organized to present the research objectives, methodology, and findings in a clear and coherent manner. It aims to provide a comprehensive understanding of the project management challenges and solutions at RTO X.

The introduction of the dissertation provides a summary of the study's history, problem statement, research questions, and goals. This section lays up the background information for the study, outlining its goals and significance.

The introduction is followed by a comprehensive summary of the body of research on project management in research and technology organizations (RTO's) in the literature review chapter. It establishes the theoretical foundation that supports the investigation and points out gaps in the present knowledge. This review is crucial for understanding how the current research builds on and contributes to existing studies.

The project description chapter offers a detailed look at RTO X's organizational structure and its current project management practices. It highlights RTO X's particular goals and areas of focus and talks about the main difficulties in project management. In order to understand the setting in which the suggested solutions will be put into practice, this chapter provides the essential background.

Next, the dissertation discusses the proposal and management tools chapter. This section covers various digital tools and methodologies for improving project management at RTO X. It evaluates tools like Microsoft Teams, Jira, Asana, Trello, ClickUp, and MeisterTask, highlighting their features, benefits, and potential uses. This helps in choosing the right management tools.

To show how these tools work in practice, the dissertation includes a hypothetical case study of developing a municipal waste management app. This chapter explains how Microsoft Teams and Jira can be used to manage the project efficiently, covering phases such as requirement analysis, system design, implementation, testing, and deployment. The case study serves as an example of how these tools can improve project management in real situations.

The discussion chapter answers the research questions from the beginning of the dissertation. It summarizes the work done, evaluates the benefits of the proposed solutions, and validates the findings. This chapter also discusses the broader implications for RTO X, highlighting the importance of standardized project management tools and methodologies in improving project outcomes and efficiency.

The conclusions chapter summarizes the key findings and their implications for RTO X. It emphasizes the importance of optimizing project management practices and the role of digital tools in achieving this goal.

The limitations and recommendations section acknowledges the challenges encountered during the research and offers suggestions for overcoming them. It provides practical recommendations for refining the proposed solutions to better meet the diverse needs of RTO X's projects.

Finally, the dissertation outlines potential directions for future research. It suggests areas for further study to build on the findings, exploring additional ways to enhance project management practices and tool integration at RTO X.



## Chapter 2

# Literature Review

### 2.1 Concept of agility, Agile Principles and Frameworks

In the dynamic landscape of contemporary research and technology organizations (RTO's), the concept of agility has emerged as a pivotal determinant of success. The unprecedented pace of technological evolution and rapidly changing market demands necessitate a fundamental shift in organizational paradigms. (Harraf and Wanasika, 2015) emphasize the increasing need to understand the factors that render an organization agile in the face of global competition. They identify speed and responsiveness as critical components of agility, essential for competing in today's environment.

Agility, primarily recognized in IT projects, offers an iterative approach to effectively meet clients' needs throughout a project's lifecycle, as outlined by (Tomanek and Juricek, 2015).

This agility is manifested in a variety of methodologies such as Scrum, Kanban, and others, detailed by (Rasnacis and Berzisa, 2016). (Igor et al., 2018) draw a parallel between the development of resilience thinking and the evolution of agile frameworks, noting a shared emphasis on adaptability and response to change.

(Fernandes et al., 2021) discuss the crucial role of project management in University Research Centres (URCs), focusing on scientific research and technological development organized as projects. (Aubry et al., 2007) highlight project management as a complex set of skills and competencies, essential for meeting project goals and managing risks.

The development of Project Management Offices (PMO's) in universities and URC's, as noted by (Hobbs et al., 2008), is increasingly aimed at enhancing these project management skills and fostering organizational learning.

Based on (Aubry et al., 2007) three theoretical fields have been mobilized to contribute to the understanding of the PMO: social innovation system, network theory and organisational performance, as showed in the figure 2.1.

The PMO is seen here as a constructed entity that is part of a social innovation system. Taking this approach will give a completely new vision of the PMO.

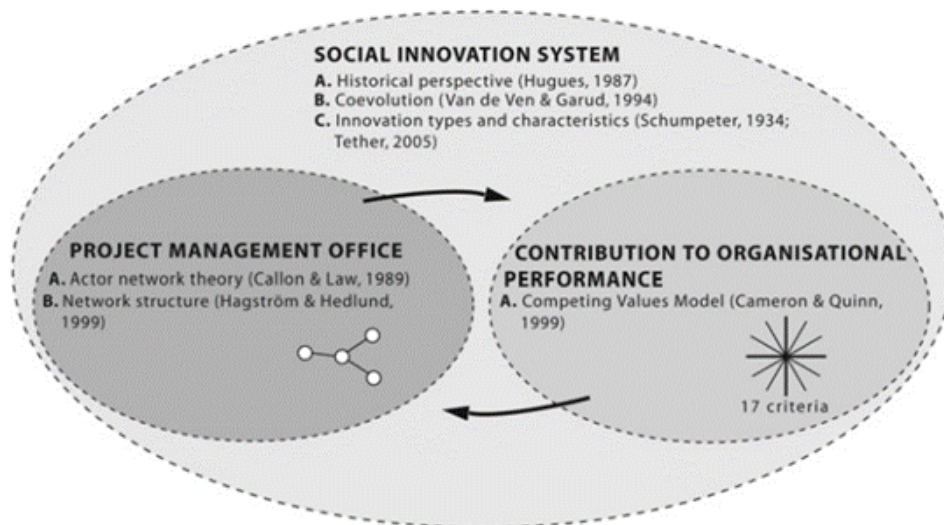


Figure 2.1: Organisational project: a conceptual framework by (Aubry et al., 2007)

(Rahi et al., 2021) further define agility as a quality or skill, primarily observed in the adaptability of project teams and plans in response to stakeholders' needs or market and technology demands. This agility is not just about coping with disruptive events but transforming in response to them. (Rasnacis and Berzisa, 2016) highlight the widespread implementation of over 20 different agile methodologies globally, showcasing their popularity and diverse application.

(Project Management Institute, 2021) observes that emerging technology, new approaches, and rapid market changes have disrupted traditional ways of working, driving the project management profession to evolve. Each industry, organization, and project face unique challenges, necessitating adaptive approaches for successful project management and delivery.

(Fernandes et al., 2021) discuss the emergence of specialized Project Management Offices (PMO's) in University Research Centres (URC's), which coordinate activities from proposal development to project execution. These PMO's are crucial for ensuring that research results are effectively disseminated. A key challenge for URC's is defining what roles, functions, and competencies such a PMO should have to effectively support large, funded research projects and create breakthrough research results.

Lastly, (Giannopoulou et al., 2019) highlight the significant role of RTO's and universities in countries' innovation systems, indicating their importance in advancing research and technological development. These institutions are key drivers in national innovation efforts, underscoring the interconnectedness of research, technology, and organizational agility.

This revised narrative weaves together your references to provide a comprehensive overview of agility in research and technology organizations, emphasizing the evolving nature of project management and the critical role of PMO's in driving innovation and success in these settings.



## 2.2 Characteristics of RTO's and Project Management in RTO's

Research and technology organizations (RTO's) are characterized as complex adaptive systems, each facing unique challenges due to their interconnected nature and the continuous need for innovative solutions. As (Igor et al., 2018) point out, this complexity necessitates a dynamic approach to managing these organizations. Within this context, Project Management Offices (PMOs) play a crucial role.

(Aubry et al., 2009) emphasize that PMO's in such complex organizations are in a constant state of adaptation, responding to both external and internal environmental changes. Further highlighting the intricate role of PMO's, (Aubry et al., 2007) describes them as integral components of the organizational fabric, linking strategy, projects, and structures.

This positioning makes PMO's pivotal in understanding and implementing effective organizational project management within RTO's. This narrative underscores the criticality of agility and adaptability in the management and operational frameworks of RTO's.

(Rahi et al., 2021) highlights the challenges posed by continuous dynamic changes in project conditions, particularly the difficulty in identifying all threats with current risk management practices.

This underscores the need for more flexible approaches as advocated by (Tomanek and Juricek, 2015), who suggest practices that can adapt to the characteristics of disruptive events and limit their impact.

The success of methodology implementation, according to (Rasnacis and Berzisa, 2016) is significantly influenced by employee characteristics, relationships, and motivation. (Villazón et al., 2020) further emphasize the importance of project management KPI's as crucial variables for project success in project-based organizations.

(Igor et al., 2018) contrast agile project management in RTO's with traditional models, noting the emphasis on adaptability and responsiveness to uncertainty.

In this approach, the PMO in one period is seen as a temporary state resulting from previous conditions and generating new consequences. This sequence constitutes the PMO structuring process, which is illustrated in Figure 2.2. (Aubry et al., 2009)

Project management at the strategic level (including programme and project portfolio) is considered a means to implement corporate strategy. (Aubry et al., 2007)

## 2.3 Agile RTO's and Innovations in Agile RTO's

The study of PMOs serves as a starting point for developing a theory of organizational project management. (Aubry et al., 2009)

The development of scientific activity management in higher education institutions, as discussed by (Piterska et al., 2019), demonstrates the effectiveness of using portfolio management methods for research projects.

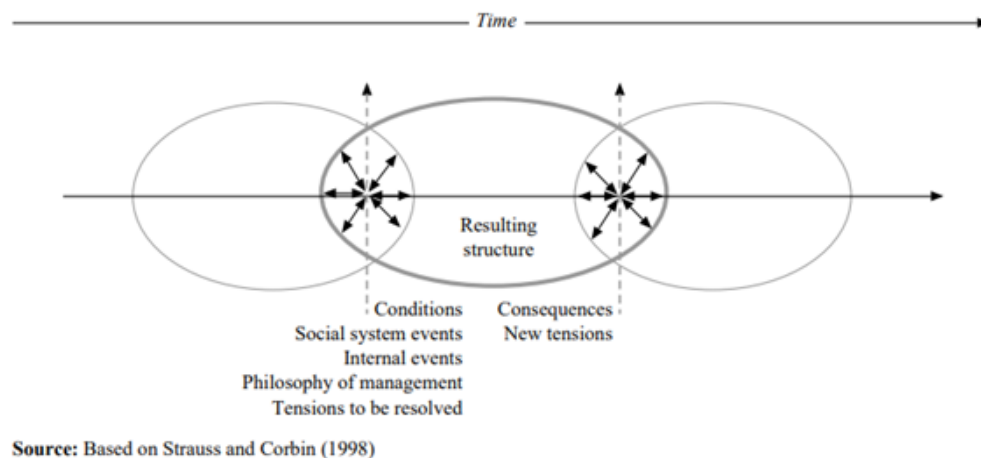


Figure 2.2: PMO structure process

This approach has been instrumental in enhancing the productivity of scientific activities within universities. Complementing this perspective, (Igor et al., 2018) emphasize that resilience offers a global viewpoint in managing complexity, particularly in RTO's across diverse geographical and cultural contexts.

Further, the research by (Fernandes et al., 2021) on the role of PMOs in university research centres reveals a developmental trajectory of PMOs, categorized into three maturity stages: 'basic', 'intermediate', and 'advanced'. This conceptualization suggests an evolutionary progression in the role of PMOs over time (figure 2.3).

Agility and resilience represent two distinct approaches in project management. (Rahi et al., 2021) point out that agility tends to overlook the organizational context within which projects operate, whereas resilience emphasizes the continuous interaction between a project and its environment.

This ongoing interaction plays a crucial role in enhancing a project's resilience. Moreover, agility primarily focuses on reactive actions, particularly altering the project plan at the project level, which is executed by the project team members. In contrast, resilience encompasses both proactive and reactive capacities.

In the realm of project management, vulnerability management is a proactive concept that differs from traditional risk management. Instead of solely focusing on risks, vulnerability management, as highlighted by (Rahi et al., 2021), concentrates on identifying, analyzing, and mitigating weaknesses within a project.

The adaptability of project methodologies based on project and team requirements is essential for achieving superior results in methodology implementation, as suggested by (S, 2020).

In the context of Research and Technology Organizations (RTO's), innovation is increasingly defined by their ability to agilely adapt and respond to changing conditions and emerging challenges, as observed by (Igor et al., 2018).

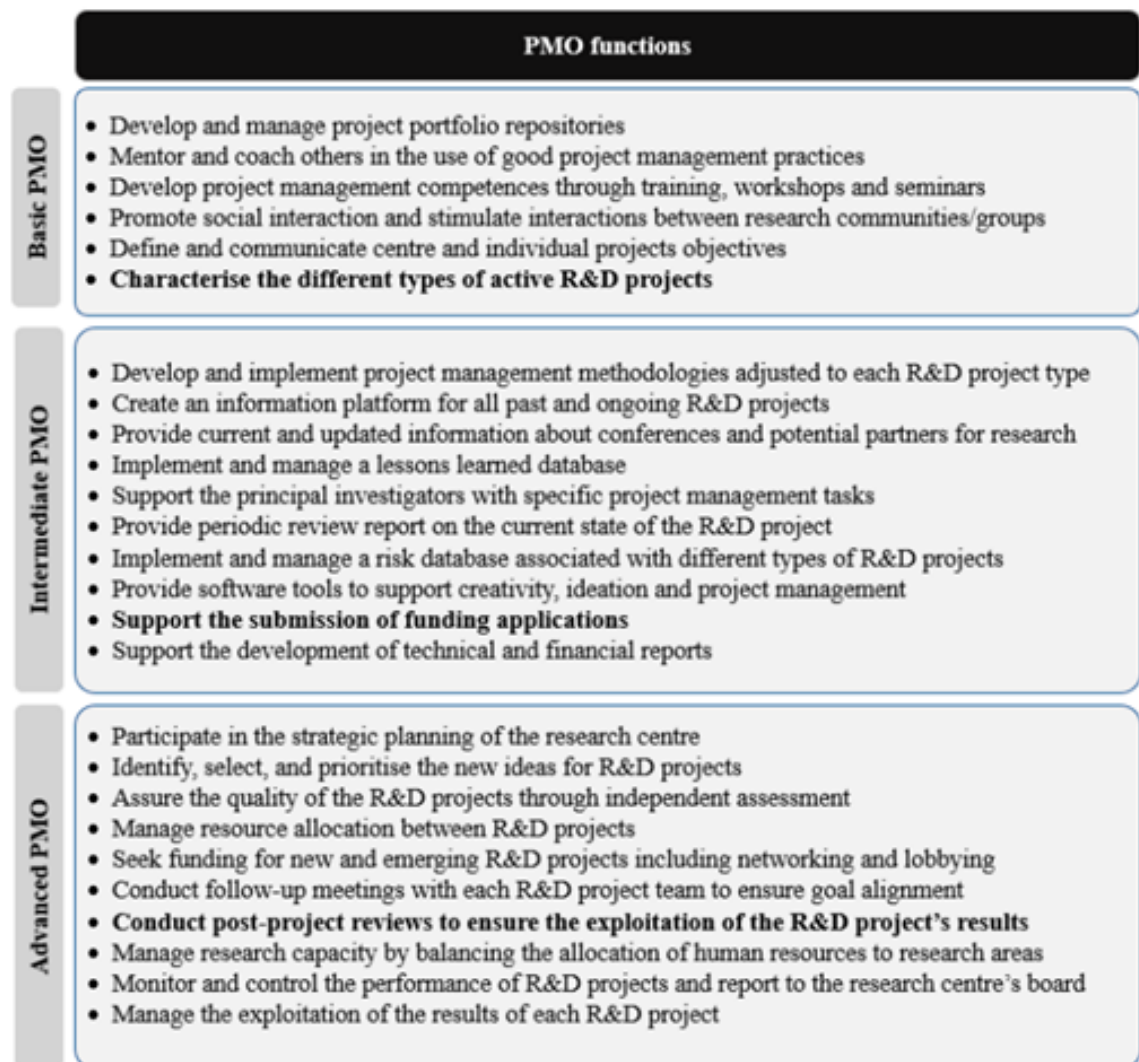


Figure 2.3: Organisational project: a conceptual framework by (Fernandes et al., 2021)

(Aubry et al., 2009) note that the Project Management Office (PMO) represents an organizational innovation. However, this innovation is characterized by its instability and ongoing evolution, both within individual organizations and across the broader population of organizations.

## 2.4 Role of a PMO in Agile RTO's

Case studies, as demonstrated by (Igor et al., 2018), showcase the pivotal role of Project Management Offices (PMO's) in integrating resilience thinking and agile practices within Research and Technology Organizations (RTO's). This integration is essential to navigate the complexities of dynamic environments.

(Aubry et al., 2009) shed light on the primary drivers behind the implementation and reconfiguration of PMO's, highlighting organizational tensions and the significant influence of organizational politics. These tensions underscore the importance of effectively managing the intricacies within organizations.

Building on this perspective, (Aubry et al., 2007) propose a paradigm shift in how we perceive the PMO. They argue that the PMO should no longer be considered an isolated entity within an organization. Instead, it should be viewed as an integral part of a network of complex relations that connect strategy, projects, and organizational structures. This perspective positions the PMO as a strategic entry point for studying the foundations of organizational project management.

## 2.5 Tools and Information Systems

From a project management perspective, it is essential not only to possess the appropriate tools for addressing risks at the event level, vulnerabilities at the system level, and changes in customer or stakeholder needs and requirements, as highlighted by (Rahi et al., 2021). Equally important is the ability to manage project behavior and efficiently handle the consequences of disruptive events, as emphasized by (Klein et al., 2015).

Transitioning to an agile project management methodology involves a preparation phase that helps enterprises or project teams adapt to this new approach. This transition encompasses changes in physical processes and a shift in the thinking of team members, as articulated by (Vaishnavi and Kuechler, 2013).

In the context of project management, controlling and monitoring progress are critical aspects. (Villazón et al., 2020) recommend the use of a web application, such as a customized dashboard, to access the necessary standards and project management tools for effective progress tracking.

Furthermore, (Igor et al., 2018) emphasize the significance of emerging technology trends and user-centric designs in the development of tools and systems that support resilience and agility within Research and Technology Organizations (RTO's).

(Aubry et al., 2009) highlight that assessing the Project Management Office's (PMO) contribution to organizational performance requires the use of a wide variety of performance criteria. This holistic approach is vital for evaluating the overall impact of PMOs on organizational success.

## 2.6 Conclusion

In the context of project management, the concept of project resilience does not negate the importance of risk management, vulnerability management, or project agility. Rather, these perspectives complement project resilience, among other contributing factors (Rahi et al., 2021).

When implementing agile Project Management (PM) methodologies, significant improvements can be observed in the development process. These improvements encompass aspects such as reduced errors, accelerated delivery times, enhanced communication, improved quality, more effective risk analysis, and decreased cost overruns. However, it is crucial to acknowledge that successful implementation of agile PM methodologies is not solely reliant on these advantages. Research by (Rasnacis and Berzisa, 2016) highlights that several challenges within project teams can impact the application of agile methodologies and the overall success of a project. Team preparation becomes a crucial prelude to the implementation of new agile PM methodologies. The proposed approach allows for an analysis of team structure and motivation, enabling the adaptation of agile roles, artifacts, processes, and practices that align with the project team's specific needs. This tailored approach aims to enhance team self-organization, motivation, and overall effectiveness.



## Chapter 3

# Project Description

### 3.1 Description of case study organizational structure

RTO X reflects a unique position as a research unit that is part a technological interface center for companies. Management at RTO X balances, in a hybrid model, the academic culture of scientific freedom, continuous reflection, and innovative spirit with the efficiency of a culture of dialogue and responsibility in management.

In addition to a set of bodies that assume the highest levels of decision-making and strategy, with varying degrees of independence, the bulk of the activity is carried out in the R&D centers, that cover eight scientific domains. Thus, R&D centers have a large level of autonomy to define their own direction and conduct their activities, while still reserving a considerable amount of individual freedom for each researcher.

This autonomy is always accompanied by a concern to preserve the continuity of the knowledge value chain, from basic research to appropriation by society, ensuring a joint and coherent vision of the institution's evolution that is not reduced to a simple aggregation of individual policies. On the other hand, it aims to foster a culture of responsibility in management, supported by professional services that simultaneously inform, support, and ensure control, organization, and accountability.

Currently, RTO X does not have a department specifically dedicated to project management (figure 3.1).

However, a Project Management Office (PMO) is currently being implemented.

The objectives for establishing the PMO are as follows:

- **Establishment of Project Management Standards at RTO X (Manual):** Allow for different standards tailored to each type of project, ranging from FCT projects to service provision. This includes the development of templates and other tools to support project management.



Figure 3.1: Organization and Governance Model



- **Support for Project Managers in Standard Implementation:**
  - Ensure proper planning across all projects.
  - Ensure the availability of essential project documents such as project sheets, word documents, etc.
- **Ensuring Access to Necessary Project Information:** Guarantee the availability of all essential project information within RTO X information systems.
- **Monitoring of Ongoing Project Execution:** Focus particularly on adherence to defined standards.
- **Training for Project Managers (When necessary):** Aimed at enhancing their capability in managing projects according to the new standards.
- **Gradual Improvement of Project Management Maturity at RTO X:** Enhance the overall maturity of project management processes over time.
- **Reporting Capabilities:**
  - Enable generation of reports detailing projects that are behind schedule.
  - Reports on the outcomes of recent projects in specific areas.
  - Identifying projects that have exceeded their budget or that are under spending
- **Client Satisfaction Assessment:** Evaluate the satisfaction levels of clients involved in the projects.
- **Ensuring Projects Follow the Prescribed Phases:** Ensure that all projects adhere to the stages outlined in the manual, including project closure (figure 3.2).

## 3.2 Current objectives/fields of focus

RTO X is a private, nonprofit association with public utility status, focused on activities in scientific research and technological development, technology transfer, advanced consulting, training, and the pre-incubation of new technology-based companies.

RTO X aims to create a sustainable and impactful future through groundbreaking science, technology, and innovation. With a vision to be a leading force in empowering and transforming communities through digitally-enabled systems, RTO X tackles society's biggest challenges.

Its mission underscores a commitment to bold scientific endeavors and technological advancements. By fostering collaborative ecosystems and supporting public policies, RTO X strives to significantly enhance both the economy and society, championing a diverse community that drives innovation.

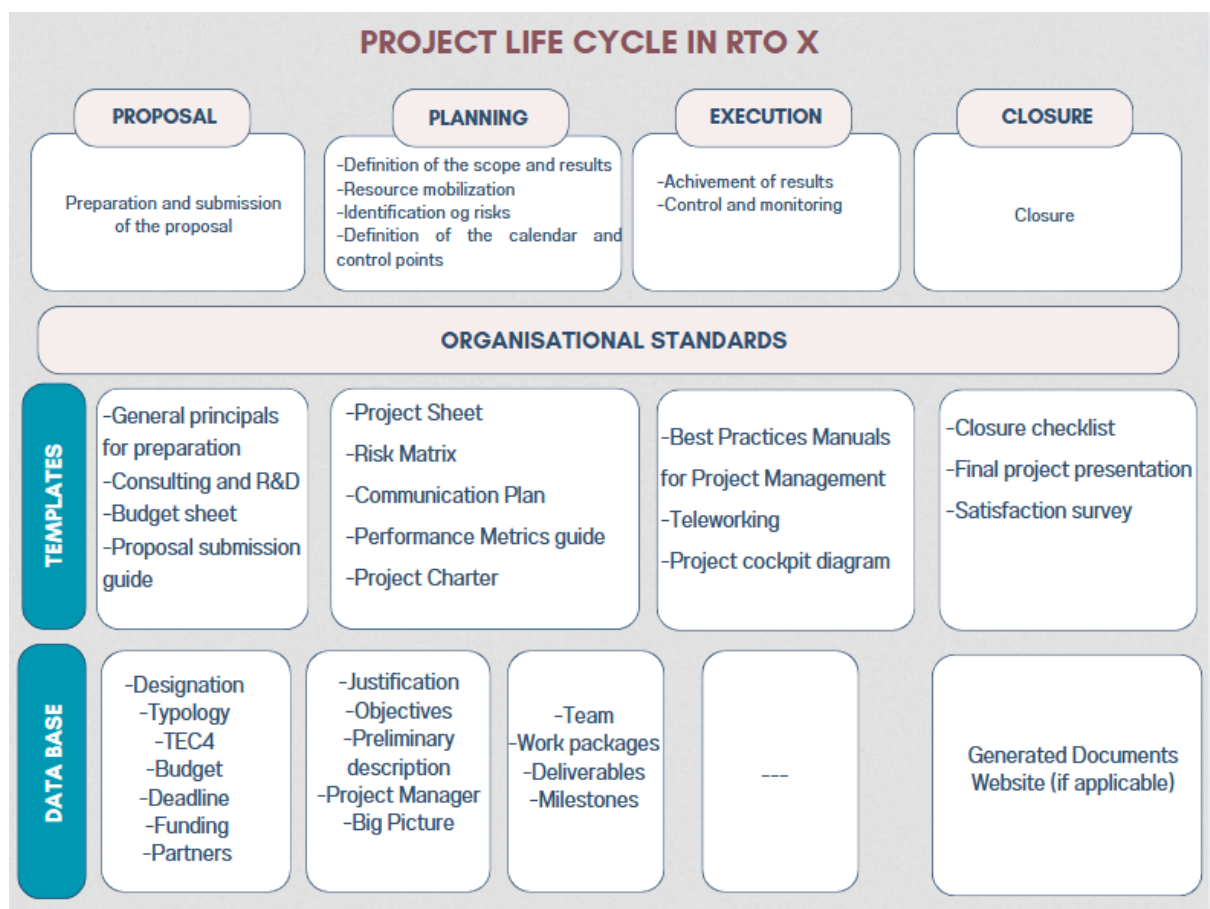


Figure 3.2: Project Life cycle at RTO X

RTO X's strategy emphasizes enhancing impact and fostering growth through key strategic commitments. Each commitment leverages the organization's strengths to advance the frontiers of academia, technology, and societal engagement.

- **Fostering Innovation and Excellence:** RTO X is committed to excelling in academia and innovation, with a focus on contributing to education and societal benefits. It strives to maintain international standards and create an inclusive environment that supports the growth of its diverse community.
- **Driving Transformative Action:** The organization takes on complex societal challenges with cutting-edge science and technology. It aims to make significant contributions that influence both current and future policies, blending creativity with scientific rigor.
- **Enhancing Interdisciplinary Integration:** RTO X increases its relevance by seamlessly integrating across various scientific disciplines and innovation ecosystems. This approach ensures comprehensive and sustainable solutions that cater to broad stakeholder needs.
- **Cultivating a Talented Community:** Attracting and retaining top talent is crucial for RTO X. It nurtures an environment that supports the personal and professional growth of its researchers and staff, underscored by a commitment to ethical practices and open communication.
- **Ensuring Sustainable and Effective Operations:** RTO X is dedicated to a sustainable and resilient operational model. This foundation allows the organization to provide optimal conditions for research and innovation, promoting a culture of creativity, risk-taking, and continuous improvement.

The management and operational model of RTO X implements the concept of the knowledge chain to create value. Research begins with the creation of knowledge and continues through to its valorization via a combination of technology transfer processes. The transformation of science into economic value ranges from pure technology transfer, through collaborative development and advanced consulting and training, to the potential creation of spin-offs.

### 3.3 Challenges in project management

The main issue in project management at RTO X is improving how projects meet their goals. Addressing these challenges is crucial for several reasons:

- **Project Quality:** Projects need to consistently meet their specified requirements and deadlines. Better quality ensures timely and effective deliverables.

- **Customer Satisfaction:** It's important to achieve better outcomes at a lower cost, staying within the budget, and ideally finishing ahead of schedule. This increases productivity and reduces costs.
- **Communication of Results:** Effective communication of results inside and outside RTO X can increase the visibility and impact of research.
- **Impact of Activities:** Enhancing project management practices can significantly increase the overall impact of RTO X's activities, establishing it as a leader in science and technology.
- **Valorization and Reuse of Results:** Better management can help maximize the use and value of project outcomes, leading to more sustainable and innovative future projects.

### 3.4 Projects typology

Projects at RTO X fall into two main groups: proposals submitted for funding and proposals to provide R&D, consulting and training services. Proposals for funding include various programs such as the FCT (Foundation for Science and Technology), European and national funding programs.

Table 3.1: Overview of Project Types and Programs

| Typologies | Financed projects  | Non financed Projects |
|------------|--------------------|-----------------------|
|            | National projects  | R&D                   |
|            | European Projects  | Advanced consulting   |
|            | Strategic projects | Training services     |

Each project at RTO X possesses unique characteristics depending on its scope, complexity, and objectives. Aspects such as project duration, budgeting strategies, impact assessments, dominant activity types, and team compositions are examined.

Table 3.2: Project Management Aspects at RTO X

| Aspects                 | Question                                                                                                                                    | Description                                                                                                                                                                                                                                                                                                                                                                                |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Duration                | What are the common durations of projects, and how does time management vary between short-term and long-term projects?                     | The duration of the project varies depending on the specific project.                                                                                                                                                                                                                                                                                                                      |
| Budget                  | What strategies are employed to define and manage the budgets of various projects?                                                          | The budget of the project varies depending on the specific project. Financial management is supported by the Management Control Service.                                                                                                                                                                                                                                                   |
| Impact                  | How is the expected or actual impact of the projects evaluated, both internally at RTO X and within the scientific community or the market? | Currently, the Licensing Support Service (SAL) is involved in identifying project outcomes and studying their valuation and protection. It is intended that the PMO will add to and complement this effort.                                                                                                                                                                                |
| Degree of Certainty     | What is the dominant activity type at RTO X?                                                                                                | Each project is assigned a 'dominant activity type' (Basic Research, Applied Research and Development, Consulting, etc.). Projects of 'Basic Research' may carry the greatest uncertainty.                                                                                                                                                                                                 |
| Number of Collaborators | On average, how many collaborators does each project have?                                                                                  | This varies significantly depending on the project's size and complexity, ranging from 1 to 10 (or more). In cases of large teams, projects typically involve several R&D Centers. The number of collaborators a project can have directly depends on its diversification. The more different areas it involves, the more it integrates various domains and, consequently, multiple teams. |

At RTO X, R&D centers enjoy the autonomy to define their own paths and manage activities, while project managers are afforded significant independence. To bring consistency to these processes, a Project Management Office (PMO) has been introduced to standardize procedures and establish a "project lifecycle." This initiative includes the standardization of templates and the recording of essential data to accurately depict projects. The information used to describe RTO X and its projects was gathered through interviews with project management officials at INESC TEC. A set of questions was developed to understand operational dynamics. Due to confidentiality agreements, specific questions and answers cannot be disclosed. However, this information has been crucial in shaping a coherent case study by providing a detailed portrayal of the organization and its projects.

### 3.5 Tools and Systems

Each project/team leader at RTO X has the freedom to choose their own tools and manage their activities. At the central level, financial management is supported by the Management Information System, where different budget items (expenses and income) are recorded and managed over the duration of the project based on the type of project.

At the central level, the project manager is required to record data that characterizes the project in a Project Information System. Currently, as part of the PMO implementation process and with its assistance, this system is undergoing improvements to enable the recording of project data, such as work packages, deliverables, and milestones.

The Management Information System supports the financial management of projects at the central level. There are plans to improve this tool to make it more useful for project managers, enabling proper reporting functionality (metrics) and content management (outcomes).

The following figure (figure 3.3) is a prototype of the metrics actually recorded. Due to data confidentiality, this figure represents a demo structure, with some of the metrics currently used.

| Tipology                       | European Program |      |        |      |        |      |
|--------------------------------|------------------|------|--------|------|--------|------|
| Year                           | 2021             |      | 2022   |      | 2023   |      |
|                                | Budget           | Cost | Budget | Cost | Budget | Cost |
| <b>Rubrics</b>                 |                  |      |        |      |        |      |
| <b>Equipments and software</b> |                  |      |        |      |        |      |
| <b>Subcontracting</b>          |                  |      |        |      |        |      |
| <b>Travel</b>                  |                  |      |        |      |        |      |
| <b>Other direct cost</b>       |                  |      |        |      |        |      |
| <b>Personal costs</b>          |                  |      |        |      |        |      |
| <b>Indirect costs</b>          |                  |      |        |      |        |      |

Figure 3.3: Financial control of projects

## **Chapter 4**

# **Proposal and Managing Tools**

This chapter discusses the solutions associated with the main improvement events that solve some of the problems identified in the organization, according to the characterization of the current situation. Each of these solutions designed is directly or indirectly associated with one of the pillars of the RTO X Project Management model, which has also been discussed in detail.

### **4.1 Framework of the proposal and Management Tools**

This section describes a set of support tools that can be used to improve RTO X's project management system. Through the use of innovative tools and information technologies, the suggested framework aims to improve project management practices and performances.

The process entails an extensive investigation and application of particular project management methods and technologies. This strategy is intended to improve current project execution issues, boost productivity, and guarantee that project results are in line with institutional objectives.

To guarantee that projects are finished on schedule, within budget, and to the satisfaction of stakeholders, effective project management is crucial. Six tools— Microsoft Teams, Jira, Asana, Trello, ClickUp and MeisterTask — were chosen as viable options for managing projects at RTO X following a thorough assessment.

These tools all have special features and functions that cater to various project management needs. This chapter offers a thorough examination of each instrument, stressing its benefits and drawbacks, usability, and related expenses. The goal of this review is to provide a thorough understanding of how these tools might be included into RTO X's project management procedures to enhance communication, task management, teamwork, and project outcomes in general.

With this information, RTO X will have a clear idea of which tools are best for their project management requirements, which will help make better decisions and execute their projects more effectively.

## 4.2 Microsoft Teams

Microsoft Teams is a powerful collaboration tool that integrates various functionalities to support effective project management.(Support, 2024)

Microsoft Teams seamlessly integrates with Office 365 applications, making it easy to share files, communicate via chat, and hold video conferences. This integration ensures that all team members can collaborate in real-time, regardless of their location, which is crucial for maintaining project momentum and cohesion.(Support, 2024)

At RTO X, the Project and Roadmap apps can be particularly useful for managing the complex and multidisciplinary research projects the organization undertakes. By using the Project app, project managers can easily set up a new project within Teams, define tasks, assign them to team members, and set deadlines. The visual timeline and Kanban board views help in tracking the project's progress and identifying any potential bottlenecks early on.

For instance, in a collaborative project at RTO X, the Roadmap app provides a high-level view of all ongoing projects. This helps in aligning the goals and timelines of different teams, ensuring that all efforts are coordinated and contributing towards the overarching objectives of the organization.(Tech Community Microsoft, 2024)

The Tasks app in Microsoft Teams integrates tasks from Microsoft To Do and Planner, offering a comprehensive view of both individual and team tasks. This integration helps project managers prioritize work, track progress, and ensure that all team members are aligned with project goals. The app supports creating task lists, assigning tasks, setting due dates, and tracking completion, which enhances overall project efficiency.(Support, 2024)

The Files tab in Microsoft Teams allows for centralized document storage and management. Project-related documents can be easily accessed, edited, and shared, ensuring that everyone has the latest information. This centralized approach reduces the risk of miscommunication and helps maintain consistency across the project.(Tech Community Microsoft, 2024).(Support, 2024)

### Overview of Microsoft Teams Features and Costs

(Tech Community Microsoft, 2024)

- **Integration and ease of Use:** Seamlessly integrates with Office 365 applications, enhancing collaboration and productivity by enabling real-time file sharing, communication, and meetings. It is user-friendly for those familiar with Microsoft products, although extensive features may present a learning curve for new users.
- **Project and Roadmap Apps:** Allows users to create, manage, and track projects within the platform, supporting various project management methodologies like Agile and Waterfall.
- **Task Management:** Integrates tasks from Microsoft To Do and Planner, providing a comprehensive view of individual and team tasks, supporting task lists, assignments, and tracking.



- **Document Management:** Centralized document storage and management, allowing easy access, editing, and sharing of project-related documents to ensure everyone has the latest information.
- **Reporting and Analytics:** Integrates with tools like Power BI to create dashboards and reports for project performance insights, aiding informed decision-making.
- **Cost and Premium Features:**
  - Microsoft 365 Business Basic: \$5/user/month.
  - Microsoft 365 Business Standard: \$12.50/user/month.
  - Microsoft 365 Business Premium: \$20/user/month.
  - Additional features such as Microsoft Teams Phone, Teams Rooms, and AI-powered functionalities available with Teams Premium, costing an additional \$7/user/month.

## 4.3 JIRA

Jira, developed by Atlassian, is a comprehensive project management tool designed to help teams plan, track, and release software effectively. It integrates seamlessly with various third-party applications like Slack, GitHub, and Microsoft Teams, enhancing collaboration and ensuring all project-related activities are centralized within Jira. This tool supports multiple project management methodologies, offering high-level views of timelines, dependencies, and detailed task management capabilities, which include customizable fields for descriptions, attachments, comments, and priority levels. Additionally, Jira provides robust reporting and analytics features, including out-of-the-box reports and customizable dashboards, facilitating data-driven decision-making.(Atlassian, 2024)

Adapting Jira to RTO X presents several advantages and disadvantages. One significant advantage is its comprehensive integration with numerous tools, enhancing overall project management and collaboration. This centralization of activities and communications helps reduce misalignment, making it easier for teams to stay aligned and productive (Atlassian, 2024).

Jira also offers robust reporting and analytics, providing detailed reports for data-driven decision-making, which aids in tracking project milestones and ensuring efficiency(Community, 2024).

Additionally, Jira's highly customizable workflows and boards can be tailored to fit various project management styles, allowing RTO X to meet the specific needs of different research projects.

However, there are disadvantages to consider. The extensive features of Jira can be overwhelming for new users, requiring substantial training and adjustment time for staff. Furthermore, the premium features and extensive integration capabilities come at a higher cost, which may be significant for larger teams with advanced needs. The complexity of setting up customized workflows and integrations also means that project managers and team members will need to invest considerable time in training to utilize the tool effectively.(Community, 2024)(Atlassian, 2024)

## Overview of Jira Features and Costs

(Atlassian, 2024)

- **Integration and Ease of Use:** Jira integrates seamlessly with a wide range of third-party applications and tools, such as Slack, GitHub, and Microsoft Teams. This extensive integration capability enhances collaboration and ensures that all project-related activities and communications are centralized within Jira, making it easier for teams to stay aligned and productive.
- **Project and Roadmap Apps:** Provides tools for planning and tracking projects with high-level views of timelines and dependencies, supporting various project management methodologies.
- **Task Management:** Allows detailed task creation, assignment, and tracking with customizable fields for descriptions, attachments, comments, and priority levels.
- **Document Management:** Integrates with Confluence and Google Drive for centralized document storage and management, ensuring easy access, editing, and sharing of documents.
- **Reporting and Analytics:** Offers robust reporting and analytics features, including out-of-the-box reports and customizable dashboards for data-driven decision-making.
- **Cost and Premium Features:**
  - Free plan for up to 10 users.
  - Standard plan at \$7.50/user/month.
  - Premium plan at \$14.50/user/month.
  - Enterprise plan with custom pricing.
  - Includes advanced features like roadmaps and enhanced security.

## 4.4 ASANA

Asana is a comprehensive project management tool designed to help teams organize, track, and manage their work efficiently. It offers a variety of features, including task management, project views, automation, and real-time reporting capabilities. Asana integrates with over 270 applications such as Slack, Google Drive, and Microsoft Teams, which enhances collaboration and centralizes project activities, making it a versatile tool for different types of projects.(Asana, 2024)

Adapting Asana to RTO X presents several advantages and disadvantages. One key advantage is its comprehensive integration with numerous tools, enhancing project management and collaboration by centralizing activities. Asana also offers robust reporting and customizable dashboards

that provide real-time insights into project performance, aiding in tracking milestones and making data-driven decisions. Moreover, its highly customizable workflows can be tailored to meet specific research needs, benefiting various teams and projects.(Asana, 2024)

Also, the extensive features can be overwhelming for new users, requiring significant training. The premium features come at a higher cost, which might impact budget-conscious teams. Additionally, setting up customized workflows and integrations demands considerable time and training, potentially slowing initial implementation.(Asana, 2024)

### Overview of Asana Features and Costs

(Asana, 2024)

- **Integration and Ease of Use:** Integrates with numerous tools such as Slack, Google Drive, and Zoom, enhancing collaboration and productivity. While user-friendly, it may require some training to fully leverage its capabilities.
- **Project and Roadmap Apps:** Provides tools for planning and tracking projects with high-level views of timelines and dependencies, supporting various project management methodologies.
- **Task Management:** Allows detailed task creation, assignment, and tracking with customizable fields for descriptions, attachments, comments, and priority levels.
- **Document Management:** Integrates with tools like Google Drive and Dropbox for centralized document storage and management, ensuring easy access, editing, and sharing of documents.
- **Reporting and Analytics:** Offers robust reporting and analytics features, including dashboards and customizable charts for data-driven decision-making.
- **Cost and Premium Features:**
  - Basic plan is free.
  - Premium plan at \$10.99/user/month.
  - Business plan at \$24.99/user/month.
  - Enterprise plan with custom pricing.
  - Includes advanced features like workflows and enhanced security.

## 4.5 Trello

Trello can be used by RTO X's multidisciplinary research projects to efficiently manage its many phases. The project manager can create a Trello board with lists for the phases of the study

that may include, for instance the literature review, experimentation, data analysis, and reporting. Cards are used to indicate individual tasks under each category, like "Analyze Data," "Conduct Experiment," "Review Related Work," and "Prepare Report." Members of the team can mark deadlines, provide comments on cards, attach pertinent documents, and monitor how their tasks are coming along. Project execution is ensured by integration with Slack, which allows all team members to discuss concerns in real-time and get updates.(Trello, 2024)

### Overview of Trello Features and Costs

(Trello, 2024)

- **Integration and Ease of Use:** Trello integrates seamlessly with numerous tools such as Slack, Google Drive, and Microsoft Teams, enhancing collaboration and productivity. It is user-friendly but may require some training to fully exploit its capabilities.
- **Project and Roadmap Apps:** Provides tools for planning and tracking projects, offering high-level views of timelines and dependencies, and supports various project management methodologies.
- **Task Management:** Allows detailed task creation, assignment, and tracking with customizable fields for descriptions, attachments, comments, and priority levels.
- **Document Management:** Integrates with tools like Google Drive and Dropbox for centralized document storage and management, ensuring easy access, editing, and sharing of documents.
- **Reporting and Analytics:** Offers robust reporting and analytics features, including views such as Timeline, Calendar, Dashboard, and Table, which support data-driven decision-making.
- **Cost and Premium Features:**
  - Free plan available.
  - Standard plan at \$5/user/month.
  - Premium plan at \$10/user/month.
  - Enterprise plan with custom pricing.
  - Includes advanced features like automation and enhanced security.

## 4.6 Click Up

ClickUp can be used by an RTO X research project to efficiently handle its many phases. For the planning, experimentation, data analysis, and reporting phases of the research, the project manager can make a ClickUp space with lists. Specific actions like Review Literature, Conduct

Experiments, Analyze Data and Draft Report might be represented by tasks under each list. Team members have the ability to track the status of their assignments, establish deadlines, attach pertinent documents, and provide comments on them. Project execution is ensured by integration with Slack, which allows all team members to discuss concerns in real-time and get updates.

Implementing ClickUp at RTO X can lead to more efficient project management, improved collaboration among teams, and ultimately, more successful project outcomes.

### Overview of ClickUp Features and Costs

(Up, 2024)

- **Integration and Ease of Use:** ClickUp integrates with numerous tools such as Slack, Google Drive, and Microsoft Teams, enhancing collaboration and productivity. While user-friendly, it may require some training for full proficiency.
- **Project and Roadmap Apps:** Provides tools for planning and tracking projects, offering high-level views of timelines and dependencies, and supports various project management methodologies.
- **Task Management:** Allows detailed task creation, assignment, and tracking with customizable fields for descriptions, attachments, comments, and priority levels.
- **Document Management:** Integrates with tools like Google Drive and Dropbox for centralized document storage and management, ensuring easy access, editing, and sharing of documents.
- **Reporting and Analytics:** Offers robust reporting and analytics features, including views such as Gantt, Timeline, Dashboard, and Table, which support data-driven decision-making.
- **Cost and Premium Features:**
  - Free plan available.
  - Unlimited plan at \$5/user/month.
  - Business plan at \$12/user/month.
  - Enterprise plan with custom pricing.
  - Includes advanced features like automation and enhanced security.

## 4.7 Meister Task

MeisterTask is an intuitive project management tool that enhances team collaboration and task management through a visually appealing and streamlined interface. Its robust feature set makes it suitable for managing a wide range of projects, including those at RTO X.

## Overview of Meister Task Features and Costs

(Task, 2024)

- **Integration and Ease of Use:** Meister Task integrates with numerous tools such as Slack, Google Drive, and Microsoft Teams, enhancing collaboration and productivity. The platform is noted for its user-friendly and intuitive interface.
- **Project and Roadmap Apps:** Provides tools for planning and tracking projects, offering high-level views of timelines and dependencies, and supports various project management methodologies.
- **Task Management:** Allows detailed task creation, assignment, and tracking with customizable fields for descriptions, attachments, comments, and priority levels.
- **Document Management:** Integrates with tools like Google Drive and Dropbox for centralized document storage and management, ensuring easy access, editing, and sharing of documents.
- **Reporting and Analytics:** Offers robust reporting and analytics features, including views such as Kanban, Timeline, and Dashboard, which support data-driven decision-making.
- **Cost and Premium Features:**
  - Free plan available.
  - Pro plan at \$8.25/user/month.
  - Business plan at \$20.75/user/month.
  - Enterprise plan with custom pricing.
  - Includes advanced features like automations and enhanced security.

Taking into account the tools presented, which could improve RTO X's management, the next chapter will present the modeling of a project and its application in 2 selected management tools. These tools were chosen on the basis of cost and the ease of getting employees to use these management tools.

In this way, a Demo project was created so that we could visualize in the tools how this project could be integrated into the management tools and how it facilitates and allows the visualization of the project both internally and externally.

## Chapter 5

# Application of Project Management Tools in a Demo Case Study

This chapter provides a thorough hypothetical case study of the creation of a municipal waste management app to show how project management techniques may be used in a practical setting. This example shows how Microsoft Teams and Jira can be used in real-world project management scenarios.

### 5.1 Project overview

The goal of the Municipal Waste Management App is to improve Porto citizens' access to efficient and effective waste collection services through a comprehensive mobile application. The main objective is to use contemporary technology to optimize waste management processes in order to promote a more sustainable and clean urban environment. The application seeks to enhance communication between the municipality and its constituents, optimize service efficacy, and encourage recycling initiatives.

### 5.2 Key Features and functionalities

- **Scheduling and Notifications**
  - **Scheduling Pickups:** Schedule pickups for different waste types to ensure timely collection.
  - **Real-Time Notifications:** Notifications about collection schedules, changes, and special events.
- **Issue Reporting**
  - **Report Issues:** Report missed pickups, overflowing bins, illegal dumping, or damaged containers.

- **Tracking and Updates:** Status updates and resolutions for reported issues.
- **Recycling Tips and Information**
  - **Educational Content:** Information on recycling practices, including what can be recycled and how to sort recyclables.
  - **Interactive Guides:** Tutorials and guides for waste segregation and recycling.
- **Data Analytics and Optimization**
  - **Data Collection:** Collect data on waste collection patterns to understand trends and improve services.
  - **Route Optimization:** Optimize collection routes to reduce fuel consumption and travel time, enhancing efficiency.

To provide efficient communication, document management, and job tracking for the Municipal Waste Management App project, RTO X is proposing to use both Microsoft Teams and Jira. The practical applications of these technologies to improve project management procedures are outlined in the list below.

- **Communication:** The main platform for all project communications will be Microsoft Teams. To make sure that all team members and stakeholders are in agreement and informed, regular team meetings, client meetings, and instant messaging will be carried out via Teams.

In this case, the Teams tool was proposed, and a team was created containing the client (Porto City Council), the manager (RTO X) and the development company.

Channels were made to arrange the work and only place the components that related to each distinct work area in order to differentiate the work areas (figure 5.1).

- **Document Management:** To provide for simple access and version control, all project-related documents will be arranged in Teams into designated channels and subfolders. This configuration guarantees that all users have access to the most recent information and aids in keeping a centralized repository for all significant papers.
- **Task Management:** Jira will be used on the platform for task creation, assignment, and tracking. Task management will be made easier with this integration, and everyone in the team will be aware of their duties and due dates. Each project phase's specific tasks, together with their corresponding deadlines and priorities, will be entered into Jira to facilitate thorough progress monitoring and prompt issue resolution.



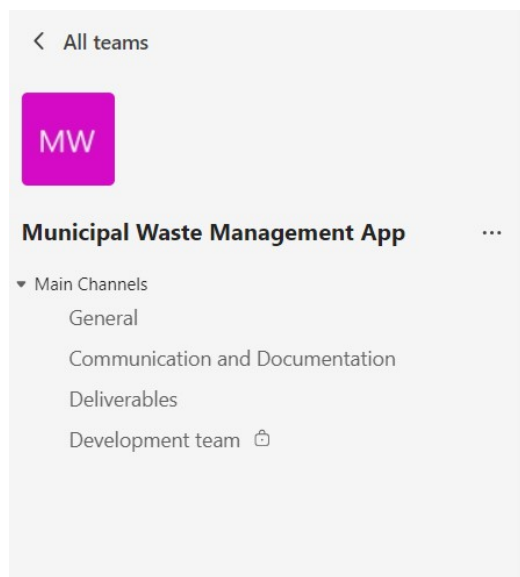


Figure 5.1: Channels created to manage team

## Requirement Analysis Phase

1. **Task Assignment:** Specific tasks such as conducting surveys, meeting with municipal officials, and gathering requirements are created and assigned in Jira. This ensures that all preliminary activities are clearly defined and assigned to responsible individuals.
2. **Client Communication:** Microsoft Teams is used to schedule and conduct meetings with the client to finalize requirements. Detailed notes and action items from these meetings are documented and shared in Teams, ensuring all stakeholders are informed and aligned. (Figure 5.2)

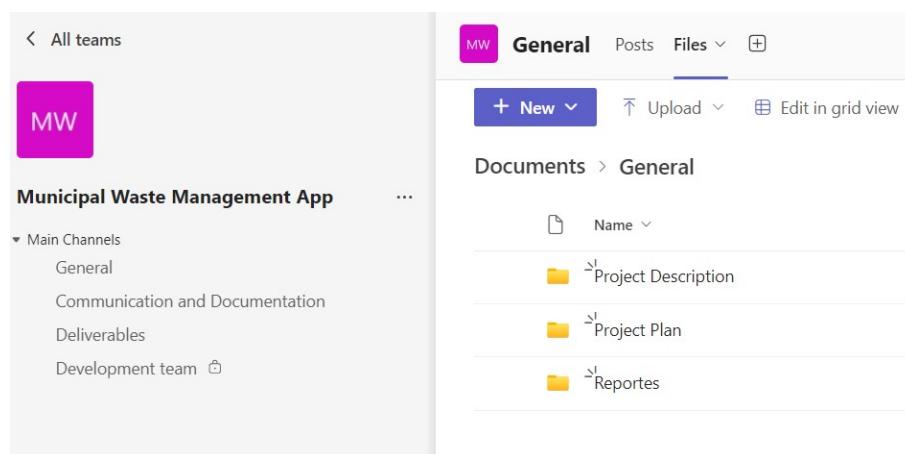


Figure 5.2: Shared folders

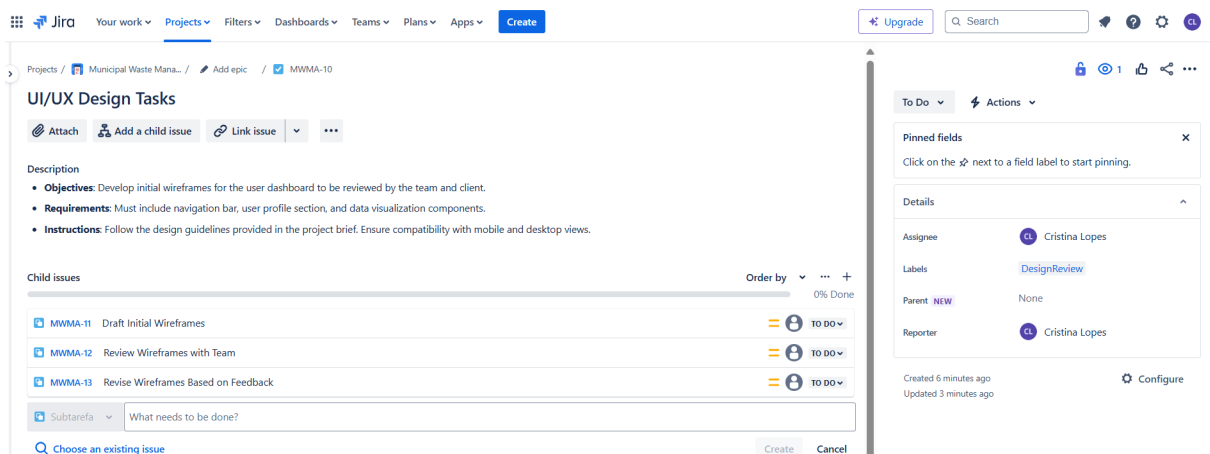


Figure 5.3: Task Description

## System Design Phase

1. **Task Management:** Design-related tasks, including UI/UX design and backend architecture planning, are assigned in Jira. Each task includes detailed descriptions, deadlines, and assigned team members, facilitating clear accountability and progress tracking. (Figure 5.3)
2. **Design Reviews:** Design documents and prototypes are shared through Teams for collaborative review sessions. Regular design review meetings with the client ensure that the designs meet their expectations and incorporate their feedback.

## Implementation Phase

1. **Development Tracking:** All development tasks are logged in Jira. Agile methodologies may be employed, with sprints tracked using Jira's Kanban or Scrum boards. This phase includes assigning and prioritizing tasks, tracking progress, and resolving any development issues that arise. (Figure 5.4)
2. **Progress Updates:** Regular progress updates are provided to the client through Teams meetings. These updates include demos of the developed features, ensuring the client is kept informed and can provide feedback promptly.

## Testing Phase

1. **Testing Tasks:** Testing tasks, including user testing, functionality testing, and performance testing, are created and managed in Jira. Bugs and issues identified during testing are logged, prioritized, and tracked until resolution. (Figure 5.5)

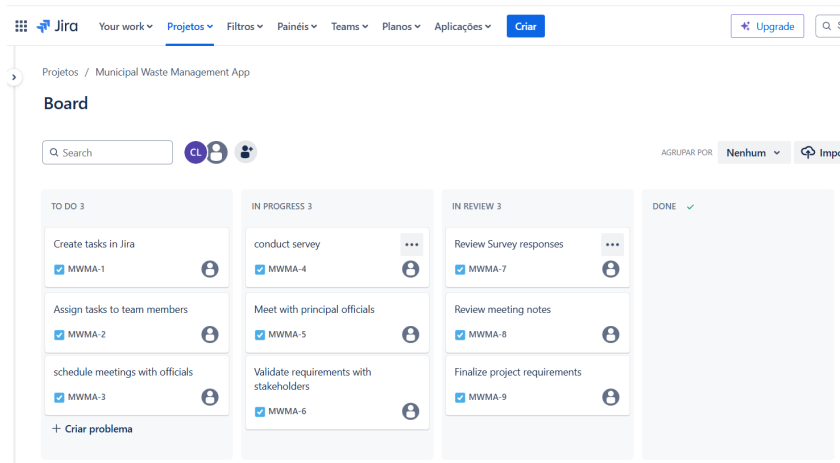


Figure 5.4: Kanban Board description

2. **Feedback Sessions:** Feedback from user testing is gathered and discussed in review sessions conducted via Teams. This feedback is crucial for identifying and addressing any issues before the final deployment

| Type | Key     | Summary                              | Assignee       | Reporter       | Priority | Status   | Resolution | Created      | Updated      | Due date     |
|------|---------|--------------------------------------|----------------|----------------|----------|----------|------------|--------------|--------------|--------------|
| Task | MWMA-11 | Draft Initial Wireframes             | Unassigned     | Cristina Lopes | Medium   | DONE     | Done       | Jun 19, 2024 | Jun 21, 2024 |              |
| Task | GTMS-15 | Conduct user interviews for feedback | Cristina Lopes | Cristina Lopes | High     | LAUNCHED | Done       | Jun 19, 2024 | Jun 21, 2024 | None         |
| Task | GTMS-14 | New feature naming                   | Unassigned     | Cristina Lopes | Highest  | LAUNCHED | Done       | Jun 19, 2024 | Jun 19, 2024 | None         |
| Task | GTMS-13 | Create product guides                | Unassigned     | Cristina Lopes | Highest  | TO DO    | Unresolved | Jun 19, 2024 | Jun 21, 2024 | Jun 22, 2024 |

Figure 5.5: List of issues and priorities

Deployment Phase

1. **Deployment Tasks:** Deployment-related tasks are managed in Jira, including final checks, deployment activities, and post-deployment monitoring. This ensures a smooth transition from development to live deployment.
2. **Training and Support:** Training sessions for municipal staff are scheduled and conducted using Teams. Documentation, including user manuals and support guides, is shared through Teams, ensuring that staff are well-prepared to manage and support the app post-deployment.



## Chapter 6

# Discussion

This chapter offers a comprehensive examination of the conclusions and results obtained by RTO X's integration of project management technologies. This thesis' main goal was to discuss challenges that come with overseeing R&D and innovation projects, especially in the setting of RTO X. A versatile and adaptable project management style that makes use of programs like Microsoft Teams, Jira, Asana, Trello, ClickUp, and MeisterTask should be considered in order to accomplish this.

During the thesis, the utility of these technologies was shown through the use of a mock project as a case study. The goal of this strategy was to demonstrate in a visual way how simple and important it is to use project management tools when managing complex projects. The case study demonstrated how these technologies can improve task management, collaboration, and overall project efficiency by offering a concrete example.

### 6.1 Benefits of the solution

The main objectives of this thesis must be accomplished through the use of project management software such Microsoft Teams, Jira, Asana, Trello, ClickUp, and MeisterTask within RTO X. These instruments play a vital role in mitigating the complexities associated with monitoring research, development, and innovation initiatives, particularly when dealing with an RTO such as RTO X.

Through the provision of platforms that facilitate smooth communication between team members and stakeholders, these technologies guarantee that all parties remain informed and in agreement, which is crucial for keeping the pace and coherence of the project. Work management features in Jira and Asana allow for thorough tracking and accountability, which facilitates improved workflow efficiency and job completion rates. For managing the complexity and dynamic nature of R&D initiatives, an organized strategy is essential.

These tools integration capabilities facilitate the centralization of project activities and the development of a cooperative work atmosphere. This integration improves coordination and lowers the possibility of misunderstandings, which is important for an RTO where interdisciplinary

collaboration is frequently needed. Solid analytics and reporting capabilities in platforms like ClickUp and Jira offer insightful information about project performance, facilitating data-driven decision-making and guaranteeing that projects stay on schedule. This is especially crucial for an RTO, as the accomplishment of research projects depends on prompt and well-informed decision-making.

Additionally, quick access and consistency in documentation is ensured by the centralized document storage available through Microsoft Teams and other solutions. This is essential for keeping thorough records of project progress, promoting knowledge exchange, and guaranteeing that everyone in the team is working with the most recent data. The adoption of these technologies offers RTO X, which defined procedures for managing a variety of projects, an organized but adaptable approach to project management.

The adoption of project management tools at RTO X offers a strategic solution to its prevailing challenges, showed at chapter (3.3). By facilitating better adherence to deadlines and enhancing overall project quality, these tools are pivotal in improving customer satisfaction and operational productivity. Moreover, they enhance the communication and management of results, significantly elevating the visibility and impact of RTO X's research endeavors.

In conclusion, the utilisation of project management tools such as Microsoft Teams, Jira, Asana, Trello, ClickUp, and MeisterTask is consistent with the main goals of this thesis since it improves task management, collaboration, and communication. In the end, these technologies contribute to RTO X's success and innovation by supporting the flexible and agile project management approaches required when managing R&D projects within an RTO.

## 6.2 Answer to the Research Questions

The formulation of research questions aimed to tackle the difficulties that come with managing R/D and innovation projects. These initiatives often involve high levels of uncertainty, rapid technological advancements, and a need for interdisciplinary collaboration. In these situations, traditional project management techniques frequently fall short because they lack the requisite flexibility and agility. In order to assess if contemporary project management technologies can close this gap and give RTO's like RTO X a more functional framework, the proposed research questions are crucial.

### **Research Question 1: How do existing project management frameworks in RTOs address agility, and what are their limitations in this context?**

The initial research question looks into whether it is possible to optimize the project management processes at RTO X. The findings clearly show that optimization is achievable. By thoroughly understanding and analyzing RTO X's specific needs, substantial improvements were implemented. These enhancements included more effective project organization, improved processes for creating and documenting knowledge, and regular updates on project status. The optimizations have

been specified and validated, but have not yet been implemented - the implementation process is beginning

**Research Question 2: How effective is the newly proposed project management methodology when applied in the context of RTO X?**

Customizing a platform to meet the unique project management needs of RTO X involves identifying and addressing specific requirements. Key elements such as customized templates and tools within Microsoft Teams and Jira were developed. This ensured effective visualization and documentation of essential information for all stakeholders. Such customization proved vital in aligning the tools with RTO X's specific needs, demonstrating that tailored solutions are crucial for effective project management.

**Research Question 3: What would an ideal project management methodology look like for RTOs, particularly for institutions like RTO X, that embodies agility and adaptiveness?**

The final question looks at how customizing the platform affects researchers' adherence. While a definitive answer is still pending due to the ongoing implementation, several steps have been taken to increase acceptance and engagement. These steps included frequent interactions with end users during development, incorporating their feedback, using familiar platforms, creating easy-to-understand manuals, and ensuring no major additional costs to the organisation. Although we don't have complete evidence yet, these actions suggest a high likelihood of positive acceptance among researchers. Continued observation will ultimately show the full extent of adherence, but current signs are promising, indicating a favorable outlook for researcher engagement and adoption.

## **6.3 Validation**

This project is the first time a comprehensive project management framework has been developed and applied specifically for RTO X. Traditionally, project leads and team members at RTO X have chosen their own methods and tools, which often leads to inconsistent practices and a lack of standardized project management. In many cases, there are no formal methodologies in place, resulting in ad-hoc management of projects.

Usually, documents are shared only at the start of a project. After this initial phase, there is usually a lack of transparency about ongoing tasks and the project's overall status at different levels of the organisation. This lack of visibility makes it difficult for stakeholders to monitor progress and identify any potential issues early on.

The proposed tools aim to fill these gaps. They will serve as organized repositories for all project-related documents, ensuring that all essential information is stored and easily accessible. They will also provide a detailed record of each project's stages and the work completed at each

stage. This documentation is crucial for understanding the project's details thoroughly. Most importantly, these tools will offer better visibility into the project's progress, allowing stakeholders and management to effectively monitor and control the project's development.

To validate the developed mockup and the proposed project management solution, the evaluation will be carried out by a key person responsible for implementing a standardized PMO at RTO X. Because of the diverse nature of projects at RTO X, involving all team leads for validation within the timeframe of this thesis was not feasible. Therefore, it was agreed that the validation would be conducted solely by the PMO lead.

This validation is important because it provides initial feedback on the feasibility and effectiveness of the proposed solution. Although it would be ideal to involve multiple team leads for a broader perspective, the insights from the PMO lead offered valuable preliminary validation. This step will help refine the tools and methodologies before they are widely adopted across RTO X.

By using these project management tools, RTO X will be able to move from a fragmented strategy to a more standardized and effective method. This change will make ongoing projects easier to see and manage, promote greater teamwork, and develop a culture of informed project management. Consequently, it is anticipated that project outcomes will be much enhanced.



## **Chapter 7**

# **Conclusions**

### **7.1 Conclusions**

To sum up this thesis, the study was done with an emphasis on project management process optimization within RTO X, a setting focused on technological development and research. The research addressed the significance of project management methodologies and the function of digital tools in enhancing project implementation and supervision. This research seeks to optimize results and enhance operations by establishing effective project management processes, standardizing practices, and creating a tailored management platform, with a special emphasis on encouraging researcher adherence to the solution.

The study done for this thesis aimed to demonstrate how research organizations can profit considerably from the implementation of effective project management methods, standardizing procedures, and creating a tailored management platform. A clear perspective of projects, set processes, and structured data are all features of the customized platform proposed for RTO X. There may be a rise in researcher acceptability and adherence if the platform is used in a new project and end users provide positive feedback.

This research also highlights how crucial it is to provide team leaders the tools they need to use efficient project management techniques. Team leaders may more effectively monitor and record every stage of the project with the correct tools, making sure that every action is precisely defined and monitored. This methodical approach improves teamwork and communication in addition to facilitating improved project management. This work basically shows that by implementing digital tools and procedures, research institutions like RTO X may optimize their project management processes. Better project outcomes, more effective operations, and a collaborative environment that fosters the successful completion of research projects are the results of such advancements.

### **7.2 Limitation and Recommendations**

Although significant progress was made in developing and implementing the solution, it is important to acknowledge certain limitations were encountered during this dissertation. The following

outlines these limitations (L) along with corresponding recommendations (R):

L: In order to collect feedback from an experimental standpoint, the solution could not be fully deployed on an active project.

R: Use the solution in upcoming projects to get input and learn from practical experience.

L: Due to time limitations and the author's unfamiliarity with this type of project, there may have been challenges in comprehending the tasks involved in the projects and their implications.

R: Enhance understanding of the tasks involved in these projects by engaging in further research and collaboration with relevant stakeholders to promote further optimizations of the solution.

L: Different projects and team leaders choosing different platforms for project management could result in increased costs and inconsistency across RTO X. While Microsoft Teams is already in use and offers several advantages, relying on various tools for different projects could complicate standardization and increase overall expenses.

R: Consider standardizing a set of core project management tools to be used across all projects at RTO X. This would streamline processes, reduce costs, and ensure consistency. Additionally, ensure that the chosen tools are compatible with various operating systems and address any reliability concerns to provide a seamless experience for all users.

### 7.3 Future Work

Even though this thesis has significantly improved RTO X's project management procedures and tailored a management platform to the unique requirements of the research unit, there are still a number of topics that might be further investigated in subsequent studies.

Firstly, insightful information would be obtained from a thorough assessment of the adopted solution's efficacy and influence on project outcomes and efficiency. To better understand the platform's sustainability and scalability, a longitudinal study evaluating researchers' long-term adherence and acceptance of it would be beneficial. Furthermore, soliciting end-user input and implementing their recommendations for additional changes and improvements would guarantee ongoing platform development and adaptability to suit changing needs.

Another important aspect is the transition process from the current project management system to the new platform. It is essential to plan and execute a smooth transition, ensuring minimal disruption to projects and providing comprehensive training and support to researchers during the migration.

Scalability is another important factor in the solution. Doing a feasibility analysis and formulating a plan for expanding the platform to further RTO X divisions and subsequently other research centers would ensure its extensive acceptance and uniform implementation throughout

the organization. This would require changes to the platform to meet the distinct needs and procedures of other departments while maintaining the essential features that worked well during the initial implementation.

The next phase should focus on giving researchers adequate training and support in addition to continuously evaluating and enhancing the applied solution. By focusing on these areas, RTO X can strengthen its project management processes even more and make the most of the customized management platform to encourage collaboration among its researchers and produce successful outcomes.

## **7.4 Sustainable Development Goals**

This thesis significantly contributes to sustainable practices by adhering to specific United Nations Sustainable Development Goals (SDGs), particularly focusing on SDG 9 and SDG 12. SDG 9 promotes industry, innovation, and infrastructure by encouraging sustainable industrialization and fostering innovation. The project management methodologies introduced in this thesis aim to enhance efficiency and innovation within Research and Technology Organizations (RTOs), aligning with the objectives of SDG 9 (Nations, 2021).

Additionally, by optimizing project management processes to minimize waste and improve resource efficiency, this thesis supports SDG 12, which targets responsible consumption and production. These enhancements help RTO's manage their resources more effectively, contributing to sustainable production patterns and reducing the environmental impact of their operations (Nations, 2021).

In essence, the research presented in this thesis integrates sustainability into the core operational strategies of project management, showcasing a commitment to achieving the global sustainability targets established by the United Nations.



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