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Canvas for monitoring and control of fundraising projects in a Federal Higher Education Institution: a proposal based on the Life Cycle Canvas

Painéis para monitoramento e controle de projetos de captação de recursos em uma Instituição Federal de Ensino Superior: uma proposta a partir do Life Cycle Canvas

Paneles para monitorear y controlar proyectos de recaudación de fondos en una Institución Federal de Educación Superior: una propuesta basada en el Life Cycle Canvas

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KEYWORDS

Project monitoring and control. Visual Project Management. Life Cycle Canvas.

Abstract: This work proposes the use of Life Cycle Canvas (LCC) in the practices of monitoring and controlling certain projects carried out within the scope of a Federal Institution of Higher Education (FIHE). It was intended to fill a gap identified in the management of these projects concerning activities to monitor their implementation. The study's theoretical bias was guided by the following research: how a project management technique can contribute to the monitoring and control of project management in a FIHE. The mixed-method research involved data collection through semi-structured interviews and questionnaires, with analysis guided by the coding of materials. The results pointed to the existence of procedural inefficiencies that can be corrected with the application of specific project management techniques. From this, an intervention model was proposed based on the artifacts of project management belonging to the LCC technique to solve such disturbances. This paper contributes to the field of study by expanding knowledge on how visual project management techniques can be adopted beyond the moment of their elaboration, and to practice by proposing a model to address existing managerial bottlenecks in the monitoring and control of public projects.



PALAVRAS-CHAVE

Monitoramento e controle de projetos. Gestão visual de projetos. Life Cycle Canvas.

Resumo: Este trabalho propõe a utilização da técnica Life Cycle Canvas (LCC) nas práticas de monitoramento e controle dos projetos de captação de recursos para infraestrutura de pesquisa executados no âmbito de uma Instituição Federal de Ensino Superior. O intuito foi atingir uma lacuna identificada no gerenciamento destes projetos quanto às atividades de acompanhamento de sua execução. O viés teórico do estudo foi orientado pela seguinte questão: como uma técnica de gestão visual de projetos pode contribuir com o monitoramento e controle na gestão dos projetos em uma IFES. A investigação de natureza mista, teve a coleta de dados realizada por meio de entrevistas semiestruturadas e aplicação de questionários e a análise norteadas pela codificação dos materiais. Os resultados apontaram para a existência de ineficiência processual passível de correção por meio da aplicação de técnicas específicas de gerenciamento de projetos. Pautado nisso, propôs-se um modelo de intervenção baseado nos artefatos de gestão de projetos pertencentes à técnica LCC a fim de solucionar tais distúrbios. O trabalho contribui com o campo de estudo ao estender o conhecimento sobre como técnicas de gestão visual de projetos podem ser adotadas para além do momento da elaboração deles e com a prática ao propor um modelo para resolução dos gargalos gerenciais existentes no monitoramento e controle de projetos públicos.

PALABRAS CLAVE

Seguimiento y control de proyectos. Gestión visual de proyectos. Life Cycle Canvas.

Resumen: Este trabajo propone el uso de la técnica Life Cycle Canvas (LCC) en las prácticas de seguimiento y control de proyectos de captación de fondos para infraestructura de investigación realizados en el ámbito de una Institución Federal de Educación Superior (IFES). El objetivo fue lograr una brecha identificada en la gestión de estos proyectos con respecto a las actividades para monitorear su ejecución. El sesgo teórico del estudio estuvo guiado por la siguiente pregunta: cómo una técnica de gestión de proyectos puede contribuir al seguimiento y control de la gestión de proyectos en un IFES. La investigación de naturaleza mixta incluyó la recolección de datos a través de entrevistas semiestruturadas y cuestionarios, y el análisis guiado por la codificación de los materiales. Los resultados apuntan a la existencia de ineficiencias procedimentales que pueden corregirse mediante la aplicación de técnicas específicas de gestión de proyectos. En base a esto, se propuso un modelo de intervención basado en los artefactos de gestión de proyectos pertenecientes a la técnica LCC para solucionar dichas perturbaciones. Este trabajo contribuye al campo de estudio al ampliar el conocimiento sobre cómo las técnicas de gestión visual de proyectos pueden adoptarse más allá del momento de su elaboración, y a la práctica al proponer un modelo para abordar los obstáculos gerenciales existentes en el monitoreo y control de proyectos públicos.

Introduction

Considering the evolving challenges stemming from management reforms and the current Brazilian landscape, public management must adopt practices that facilitate the discovery of new solutions for efficiency and procedural quality. Thus, there's a compelling interest in observing and disseminating experiences that have yielded significant results in this context.

Various factors must be taken into account when examining the practices and initiatives undertaken by public organizations to address these challenges. Among the strategies employed, project management stands out as a promising avenue for enhancing project efficiency (Leal, Ceolin & Correia, 2023), because it offers distinct advantages over other management approaches, proving effective in meeting predefined deadlines and budgets set by organizations (Vargas, 2018b).

Numerous methodologies are emerging to enhance the utilization of project management techniques, with visual tools such as canvases gaining prominence. Among them, are visual tools based on a single schematic screen or frame, which are known as canvas. These models propose a general presentation logic for the project, bringing essential elements of organizational management in a dynamic, agile, and easy-to-view format (Veras & Medeiros, 2016).

Based on this, Veras (2016) developed a novel visual management technique known as the Life Cycle Canvas (LCC), which integrates canvas-type tools with the practices recommended by PMBOK, considered the global gold standard in project management. Moreover, the LCC framework is aligned with the PRINCE2 method (Costa, Rezende, Medeiros & Veras, 2019), which provides a systematic approach to project management activities.

The life cycle of a project, according to LCC, comprises five phases: initiation, planning,

execution, monitoring and control, and closure (Veras, 2016). Notably, the "monitoring and control" phase assumes particular significance as it entails overseeing project progress, ensuring adherence to plans, and generating key indicators to facilitate decision-making. This phase's emphasis underscores its pivotal role in effective project management, enabling managers to track task progress and address deviations promptly a critical factor given that many project management challenges stem from inadequate management during this stage (Lima, Ciqueira, Pinto & Souza, 2017).

Recognizing these questions, this study delves into an analysis of a successful initiative within a Federal Higher Education Institution (IFES). The Federal University of Rio Grande do Norte (UFRN) has undertaken efforts to enhance its research and development activities, including fundraising for investment in research infrastructure. Notably, the establishment of the Research Infrastructure Coordination (CIP) within the Office of Research (PROPESQ) exemplifies UFRN's commitment to strengthening its research capabilities and leveraging external funding opportunities.

In addition to facilitating fund acquisition, the CIP supports project preparation and submission for various public funding opportunities aimed at bolstering research infrastructure. Notably, funding agencies like Finep, through initiatives such as the CT-INFRA Infrastructure Fund, have been pivotal in providing substantial resources to UFRN, supporting numerous institutional projects.

Despite the success in resource mobilization, managing these projects has posed significant challenges for UFRN. Presently, project administration relies on electronic spreadsheets, lacking systematic utilization of project management practices, thereby impeding comprehensive management analysis. Moreover, the absence of a dedicated project management

tool leaves the process vulnerable to inefficiencies, hindering timely progress assessment and decision-making.

This gap, compounded by the dearth of literature on visual project management's applicability beyond the project's initial stages, underscores the need for this study. Hence, the primary objective is to explore how a visual project management technique can enhance monitoring and control in research infrastructure projects within IFES.

Furthermore, by scrutinizing current practices, this study aims to propose enhancements to drive efficiency in project outcomes. So, the main objective is to advocate for adopting a monitoring and control model based on the Life Cycle Canvas to manage fundraising projects under the supervision of UFRN's Research Infrastructure Coordination.

This research adopts a mixed-method approach, incorporating qualitative and quantitative data collection techniques with coding as an analytical strategy. The study's significance lies in advancing knowledge on the potential of visual project management techniques in enhancing project monitoring and control, addressing a practical challenge faced by society and public sector organizations alike.

In addition to this introduction, the article comprises four sections: theoretical framework, methodological procedures, data analysis and discussion, proposed monitoring and control model, and final considerations, which revisit the article's objectives and outcomes to demonstrate its broader implications.

Theoretical elements of the research

Project management in the public sector

More than two decades after the State's management reform, public administration faces

increasing pressure to meet the demands of stakeholders and enhance transparency and effectiveness in implementing strategies and policies (Crawford & Helm, 2009). This context necessitates new management structures capable of addressing uncertainty, ambiguity, and the multifaceted and complex demands inherent in public service (Crawford, Costello, Pollack & Bentley, 2003).

Project management within this context is viewed as an alternative to centralized and formal management models, offering public organizations the potential for improved results, efficiency, transparency, and accountability (Crawford & Helm, 2009), particularly amidst efforts to implement changes and deliver value to society.

When examining the scientific literature on the topic reveals two lines of thought regarding the adoption of project management practices by public organizations.

On one hand, some studies suggest that this transition is not common (Pontes, Oliveira & Vasconcelos, 2015), as structural distinctions between the public and private sectors necessitate adapting practices to each sector's unique characteristics (Goelzer, Nodari, Socol & Severo, 2014). These differences include the public sector's primary objective not being profit maximization, challenges in identifying real customers, dealing with numerous stakeholders, and being subject to political influence (Fryer, Antony & Douglas, 2007). Moreover, traditional project management procedures, such as extensive documentation and control efforts, could exacerbate bureaucratic tendencies and slow down public administration processes (Nuottila, Aaltonen & Kujala, 2016; Oliveira, Zych, Oliveira & Michaloski, 2020).

Conversely, another perspective suggests that there are minimal differences between project management practices in private companies and

public organizations (Maceta, Berssaneti & Carvalho, 2017; Thomazini, Lacerda, Martens, & Silva, 2023). While structural disparities exist, both sectors share a common pursuit: managing scarce resources to make projects feasible (Teixeira & Rabechini, 2019; Oliveira et al., 2020).

Recent developments in the literature on project management in the public sector encompass a diverse range of topics and approaches. Some studies focus on implementing project management offices in various public departments (Sanches, Yamaji, Vieira & Sugihiro, 2023), while others explore technology projects in public institutions (Alves, Oliveira & Gurgel, 2021; Souza, Cabral & Carvalho, 2023; Takagi, Varajao & Ventura, 2024). Furthermore, there is research that investigates the human aspects of projects, such as team engagement (Nascimento, Oliveira, Medeiros & Gurgel, 2021) and those that explore the characteristics of public project managers (Dias, Oliveira, Carneiro, Moura & Lima, 2023).

Moreover, broader issues related to project management are also investigated. For instance, studies may analyze the complexity of public projects and their relationship with strategy, leadership, and motivation (Tavares & Pedro, 2023), or delve into problems and causes related to project formulation that can influence the success of public works (Braga, Oliveira, Ribeiro, Braga, Bremer & Ribeiro, 2023).

In examining the national literature on the topic, a predominance of propositional or descriptive works is observed. Articles proposing methods and models, as well as those describing or debating specific cases related to public project management, are common.

This study aims to engage with the body of research addressing public project management in the Brazilian context. This choice is motivated by two primary reasons: first, project management at

the national level exhibits specific nuances of Brazilian organizations, whereas international literature predominantly focuses on large corporations; second, the national literature on this topic is extensive, increasingly recognized for its relevance by foreign works (evidenced by the growing number of citations) and addresses the unique aspects of project management in the country.

Visual project management

Despite variations in research perspectives, there is a consensus on the efficacy of alternative tools and models in advancing efficiency in public management (Medeiros, 2017; Oliveira et al., 2020). In this vein, the rise of visual management methods stands out, heralded as proficient alternatives for fostering greater transparency, coordination, communication, collaboration, and simplification of information flow (Medeiros, 2017, p. 18). They offer a fresh perspective on management, making the utilization and application of project management practices more feasible and effective.

Barbosa, França, Rodrigues & Parreiras (2018) contend that adopting visual tools aids individuals in comprehending project information more readily. Similarly, Lopes and Silva (2021) assert that visual methods streamline project management, fostering speed, dynamism, and enhanced communication.

In Brazil, the transition from traditional project management practices to visual approaches gained traction with the introduction of several models. Notable among these are the Project Model Canvas (Finocchio, 2013), the Project Model Mind Map (MEI, 2015), the Project Model Visual (Camargo, 2019), the Suit Model Canvas (Lopes & Silva, 2021), and the Life Cycle Canvas (Veras, 2016), all positioned as visual management techniques aimed at facilitating and

streamlining project management activities across public and private organizations.

Of these techniques, the Life Cycle Canvas (LCC) stands out for advocating the monitoring of the entire project life cycle through a dynamic management flow, while also integrating structural elements from traditional models such as PMBOK and PRINCE2 into its theoretical foundation (Veras, 2016; Veras & Medeiros, 2016).

This study focuses on the visual project management model proposed by Veras (2016), as it was deemed the most suitable for addressing the specific problem under investigation.

Visual project management with Life Cycle Canvas

The primary advantages of visual management for organizations encompass transparency, coordination, communication, collaboration, and simplification (Medeiros, 2017). In the realm of project management, the Life Cycle Canvas (LCC) emerges as a visual management model designed to guide projects through their life cycle via a single screen (Veras, 2016). The concept revolves around streamlining the entire process – from conception, planning, execution, monitoring and control, to project closure – through a dynamic and sequential flow of activities (Medeiros, Araújo & Oliveira, 2018).

The LCC divides project management into four phases, mirroring the stages of the project life cycle: initiation, planning, execution and monitoring, and project closure (Veras, 2016). Each phase is depicted on a screen, organized into key factors or fields representing project management areas and their respective processes (Medeiros, 2017).

Completing these fields aims to address fundamental questions pertinent to all project types, following a logical sequence and utilizing

the 5W2H management technique—a checklist of activities essential for project development (Veras, 2016). This technique has been a reference for new canvas-type models (Medeiros, 2017; Veras, 2016).

To facilitating project life cycle management, the LCC's approach involves adapting screens and suggesting the generation of new screens based on project versions (Veras, 2016). These strategies enable project evolution monitoring, as well as recording and controlling project versions (Medeiros, 2017).

Concerning the management life cycle, it is noteworthy that the LCC adheres to the same logic outlined in the PMBOK Guide, aiming to maintain consistency across process groups and management areas (Medeiros, 2017). Furthermore, the LCC broadly encompasses PMBOK's suggested practices, injecting greater dynamism into project management and fostering simplicity without bureaucracy (Medeiros, Sousa, Nobre & Nogueira, 2017).

Indicators for monitoring and control based on the Life Cycle Canvas

Monitoring and controlling project progress involves closely tracking the project's trajectory to ensure it stays on schedule. As per the PMBOK Guide, the process groups encompassed in this phase include: monitoring and controlling project work; performing integrated change control; validating scope; controlling scope; managing schedule; managing costs; managing quality; managing resources; monitoring communications; monitoring risks; managing procurements; and monitoring stakeholders (PMI, 2017). These groups entail a series of actions and activities recommended by PMBOK to oversee and coordinate project execution, identifying potential changes and implementing necessary adjustments (PMI, 2017).

On the other hand, the Life Cycle Canvas (LCC) advocates for project monitoring and control through performance indicators (Veras, 2017). The inclusion of indicators in this technique is a significant aspect, making management dynamic and easy to visualize and comprehend (Campelo & Silva, 2017).

The LCC categorizes indicators into three types: feasibility analysis, assessed before project execution; operational (efficiency and effectiveness), evaluated during project execution; and effectiveness, appraised post-project completion (Veras, 2016). The number and types of indicators are determined based on the unique characteristics of each project.

Consequently, the technique introduces two screens as visual aids: one for planning and constructing indicators and the other for monitoring these indicators, as illustrated in Figures 1 and 2. These screens are supplementary and exclusive to the monitoring and control phase.

Figure 1
Indicator planning screen

Source: Veras (2017)¹.

Indicators are represented using standardized colors (ratings): green, yellow, or red, as depicted in Figure 1. The indicator planning and construction screen serves as a matrix, facilitating the assignment of specific indicator names, clear definition of indicator types, identification of what will be measured, determination of measurement

methods, indication of when measurements should occur, and establishment of criteria for assigning ratings.

The second screen (Figure 2) reflects the project status and serves as the platform for monitoring indicators. It features columns identifying measurement dates and pre-defined indicators from the indicator construction screen. Each indicator column includes space for assigning ratings, with an overall rating allocated to each scenario.

Figure 2
Indicator monitoring screen

Source: Veras (2017).

Methodological elements of the research

This study has both descriptive and prescriptive purposes (Sampieri, Collado & Lucio, 2013). The focus of investigation lies within the case of UFRN, particularly within the Research Infrastructure Coordination (CIP), aiming to address an existing issue concerning the monitoring and control of projects under its jurisdiction.

Data collection employed a combination of qualitative and quantitative techniques. Initially, semi-structured interviews were conducted with individuals overseeing the projects managed by CIP. Following this, a confirmatory questionnaire was distributed to researchers responsible for project preparation, with a specific focus on

identifying aspects of the monitoring and control process. This sampling approach was chosen due to the direct involvement of these stakeholders in the process, providing clear insights into the challenges of project management. Such experience is crucial for refining the proposed model by pinpointing areas in need of adjustment, thereby enhancing its effectiveness. It's worth noting that the interview and questionnaire scripts were tailored to align with the monitoring and control processes outlined in the PMBOK (PMI, 2017).

Following data collection, the analysis commenced, beginning with coding, adhering to the guidelines set forth by Charmaz (2009) and Sampieri, Collado, and Lucio (2013). This process involved condensing the dataset by assigning meaning (codes) to the collected information. The NVivo 11 Plus® software was utilized for coding purposes. The initial categories of meaning were devised in accordance with the monitoring and control processes outlined in the PMBOK (PMI, 2017), resulting in the creation of 67 codes, as illustrated in Table 1.

Table 1
Code breakdown

Process	Areas of knowledge in the Monitoring and Control phase (PMI, 2017)	Number of codes
1. Monitoring and controlling project work	Integration	22
2. Performing integrated change control	Integration	8
3. Scope validation	Scope	5
4. Control the scope	Scope	3
5. Control schedule	Time	5
6. Control costs	Cost	7
7. Control quality	Quality	3
8. Monitor communications	Communications	2
9. Monitor risks	Risks	2
10. Monitor stakeholder engagement	Stakeholders	10

Source: prepared by the authors.

Presentation and discussion of results

Monitoring and control processes serve as mechanisms to ensure that projects adhere to their initially planned trajectory. Projects are monitored based on parameters established during planning and require associated control actions in case of any detected deviations (Vallerão & Roses, 2013).

Among the processes within the monitoring and control group, two were excluded from the research scope of this study: a) controlling resources; and b) controlling acquisitions. The former was disregarded because project management by CIP does not entail hiring human or technological resources, as outlined in the PMBOK (PMI, 2017). Similarly, acquisitions fall outside the purview of the Coordination, thus were excluded from the analysis.

The objective of data analysis is to identify areas requiring enhanced procedural efficiency, with subsequent presentation of potential solutions to address these issues. Therefore, data collection and subsequent coding were conducted to pinpoint improvement needs in monitoring and control, adhering to the principles established in this domain within the PMBOK.

Table 2 provides a summary of the results gleaned from the application of the collection and analysis methods employed, detailing each of the ten observed processes and the identified (often challenging) aspects.

Table 2
Analysis of results by process

Aspects identified in the analysis
Process 1: Monitoring and controlling project work
<ul style="list-style-type: none"> • Lack of involvement from the overall project coordination in the planning of subprojects; • Absence of a standardized procedure and appropriate technique for monitoring and controlling projects; • Currently, the only indicator meeting the project objectives is time; • Project execution performance is affected due to delays in project initiation;

<ul style="list-style-type: none"> • Extended periods without effective monitoring of project progression; • Limited availability of adequate information for technical report preparation.
Process 2. Performing integrated change control
<ul style="list-style-type: none"> • Occurrence of unauthorized changes without CIP approval; • Communication regarding changes happens through sluggish mechanisms; • Changes may stem from stakeholders outside the project's development, execution, and management processes.
Process 3. Scope validation
<ul style="list-style-type: none"> • Difficulty in receiving feedback regarding deliverable validation; • Lack of standardization concerning validation documents; • Occasionally, scope validation occurs for deliverables that have not been properly completed.
Process 4. Controlling the scope
<ul style="list-style-type: none"> • Scope changes due to delays in project initiation; • Scope changes require approval through the funding agency; • Scope changes sometimes occur directly between subproject developers and the funding agency, with information relayed to the CIP afterward.
Process 5. Controlling schedule
<ul style="list-style-type: none"> • Difficulties in reviewing and updating the schedule lead to emergency actions not based on technical aspects; • The number of changes in a project impacts the assessment by the funding agency; • Lack of project schedule reprogramming in cases of changes (reformulation), hindering analysis and technical report preparation.
Process 6. Controlling costs
<ul style="list-style-type: none"> • Lack of a centralized system for project information complicates cost monitoring and control.
Process 7. Controlling quality
<ul style="list-style-type: none"> • Lack of specific determination for quality indicators.
Process 8. Monitoring communications
<ul style="list-style-type: none"> • Need for an efficient, integrative, and accessible communication channel for all stakeholders.
Process 9. Monitoring risks
<ul style="list-style-type: none"> • Need for a clear risk plan that can be monitored; • Experiences and lessons learned from previous projects are disregarded;
Process 10. Monitoring stakeholder engagement
<ul style="list-style-type: none"> • Lack of discussion and feedback moments among stakeholders; • Need for a plan for motivation/engagement.

Source: prepared by the authors.

The process of "monitoring and controlling project work" is situated within the project integration domain, making it pivotal across its functions. It pertains to planning and involves periodic observation of the project's trajectory to ensure alignment with the management plan.

In this context, a challenge was pinpointed in this process concerning the limited autonomy of the CIP in determining subproject composition. The Coordination lacks the authority to define elective guidelines for subproject selection, solely consolidating the institutional project. Additionally, two other critical aspects emerged from the research: systematic delays in project initiation, often stemming from resource transfer delays by funding bodies, impacting various project management areas; and the linkage of goals and objectives specifically to the physical-financial schedule, hindering the monitoring of other aspects crucial for enhanced control efficiency.

Regarding the "integrated change control" process, which also falls under the project integration domain, it coordinates and harmonizes processes from other knowledge areas. This process, occurring throughout the project, involves reviewing, approving, and managing all change requests to deliverables, project documents, and the project management plan, alongside communicating the decisions (PMI, 2017).

A notable issue identified in this process concerns its integration with communication and stakeholder processes, which diminishes project management efficiency and warrants careful attention.

The third process observed was "scope validation", involving formalizing the acceptance of project deliverables (PMI, 2017). However, difficulties arose in consolidating and formalizing deliveries with the CIP, posing a problem that obscures the Coordination's management capacity. When scope validation is lacking, the subsequent

process, "scope control", is implemented to rectify deviations from the planned status. Observing the baseline drawn becomes imperative to ascertain conformity between the executed and planned activities.

In this research, some difficulties were found regarding the consolidation of deliverables and their formalization with the CIP. Such problem obscures the management capacity of the Coordination, being subject to process review. When "scope validation" is not achieved, the fourth process observed here is implemented, which is "controlling the scope", consisting of applying solutions so that the process returns to the status envisaged in the planning. Therefore, it is important to observe the baseline established to check the level of conformity between what was executed and what was planned (PMI, 2017).

This process ("controlling the scope") was one of the ones that presented the fewest challenges, which were only related to delays in project initiation and changes made throughout the execution period that need to be duly approved by the funding body. Once again, problems in this process commonly affect processes in the scheduling area in a chain reaction.

The process "control the schedule" is carried out throughout the project lifecycle and involves monitoring the project's status to update the schedule and manage changes to the project baseline. Its main benefit is keeping the schedule baseline updated throughout the entire project (PMI, 2017). However, inconsistencies in managing this process often have repercussions on several other processes, as identified in the case analyzed here.

Another area of focus was "controlling costs". Conducted throughout the project, this process involves monitoring the project's progress to update its budget and managing changes made to the cost baseline. Its main benefit is keeping the cost baseline updated throughout the entire project

(PMI, 2017).

The main difficulties observed are related to the simplistic control model, as accountability is based solely on commitments issued in line with expenses incurred. There is a lack of an instrument that provides more specific cost control. Once again, inefficient communication among the actors in this process was found to create several difficulties.

In investment projects, it is crucial to have adequate quality control. The main benefit of this process is verifying compliance with the requirements specified by the primary stakeholders of the deliveries made (PMI, 2017).

However, data analysis reveals that there is no definition or monitoring of quality-related indicators within the equipment acquisition process. Additionally, there is no process for evaluating acquisitions. In this context, the time variable is arbitrarily considered a quality variable. Throughout the research, communication emerged as a recurring problem. Therefore, the process of "monitoring communications" needs to be strengthened to optimize other processes.

Monitoring communications ensures that the project's information needs and those of its stakeholders are met. Its main benefit is an optimized flow of information, as outlined in the communications management plan and stakeholder engagement plan (PMI, 2017).

Unlike the communication monitoring suggested by PMBOK, the diagnosis conducted here suggests that there is no systematic process for disseminating project information. There are no active transparency mechanisms regarding projects, with information being provided reactively to those who request it.

Another process analyzed in this research was "risk monitoring". This process involves monitoring the implementation of risk response plans, tracking identified risks, identifying and analyzing new risks, and evaluating the

effectiveness of the risk management process throughout the project (PMI, 2017). In this sense, Vargas (2018a) emphasizes that risk monitoring is responsible for identifying, analyzing, and responding to new events that may pose threats or opportunities to the project.

It was found that there is no mapping or diagnosis of risks in the equipment acquisition process, nor does it occur when submitting proposals to the development agency. Experiences and lessons learned from previous projects are disregarded in proposal formulation, limited to the empirical knowledge of project participants, highlighting the essential need to develop a risk management plan for each project.

Concluding the analysis, the process of "monitoring stakeholder engagement" was examined. This process observes project participants' relationships and revises strategies to engage them by modifying plans and strategies. Its main benefit is maintaining or increasing the efficiency and effectiveness of stakeholder engagement activities even when the project's environment changes (PMI, 2017).

Among the issues identified are the lack of information about project progress (status) in relevant bodies, failure to hold periodic and regular meetings to discuss project progress, and the absence of a communication policy among researchers. Once again, communication-related problems are highlighted as the main issues in this process.

Thus, it is evident that the interviews conducted contributed to logically constructing the main challenges faced by the Coordination based on the experiences of those directly involved in the process. This information is crucial for this work since, in addition to the literature analysis, these empirical aspects support the formulation of the proposed model presented below.

Proposed intervention model

Following the analysis conducted, several proposals are put forward to help mitigate or resolve the identified difficulties. Some findings stem from external causes and can only be monitored, as indicated by Finocchio (2013). The aspects recognized as internal problems in project management will be addressed within an intervention model.

Among the challenges observed, communication emerged as the primary aspect identified as a fundamental problem across all monitoring and control processes. Therefore, the proposed intervention model must offer solutions that primarily address communication issues. As seen in the literature, visual project management models are well-suited to addressing communication issues (Barbosa et al., 2018).

Furthermore, since these issues are inherent to the project execution phase, particularly in the area of monitoring and control, it is believed that the visual tool capable of meeting this need is the Life Cycle Canvas technique, as it allows for the management of the entire project life cycle (Lopes & Silva, 2021).

The LCC enables comprehensive reflection on all project aspects crucial to its success, such as scope, cost, time, schedule, communications, among others. The suggested solutions aim to apply best practices in project management wherever possible and strive to optimize the use of monitoring and control processes within the Research Infrastructure Coordination.

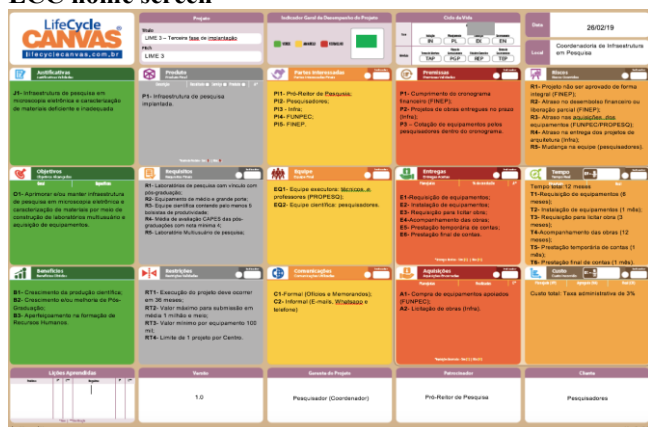
The starting point of this model is to ensure integration among all participants in planning the institutional project. It is recommended that the LCC screens be collaboratively prepared to standardize the way subprojects are developed. During this process, indicators should also be established to standardize the monitoring system.

In this scenario, the CIP begins to proactively

engage in project monitoring, updating data related to indicators at predefined intervals, and overseeing initiatives to address issues if indicator data indicates low performance, as per the previously established baseline. Other LCC support frameworks can be adopted to bolster monitoring and enforcement efforts.

Upon the closure of each project, lessons learned must be identified to mitigate issues in future projects. Ideally, members of the research infrastructure sector and the project coordinator should participate in these meetings. Consequently, the main LCC framework must be updated and compared with frameworks from previous versions. Figures 3, 4, and 5 illustrate the main, indicator planning, and monitoring screens representing the proposed model.

Figure 3
LCC home screen



Source: adapted from Veras (2017).

Figure 4
LCC indicator planning screen



Source: adapted from Veras (2017).

Figure 5
LCC indicator monitoring screen



Source: adapted from Veras (2017).

Finally, it is worth mentioning that at the conclusion of this research process, the model was presented and thoroughly discussed with the CIP to refine and tailor it to the requirements of the project executing agents. Following multiple rounds of discussion and fine-tuning, the model was duly validated, and its feasibility was confirmed.

Final considerations

The process of securing funding for research infrastructure projects at UFRN involves multiple stakeholders who contribute to project success. Despite the potential effectiveness of these efforts, the involvement of various actors often leads to inefficiencies, noise, and problems that are evident to participants and warrant attention from institutional leaders.

The aim of this study was to address the question "how can one visual project management techniques contribute to improved monitoring and control of research infrastructure projects in an IFES?" The objective was to propose the application of the LCC model for monitoring and control activities as a potential solution to identified bottlenecks in project monitoring and control.

The research revealed numerous challenges that can impede project execution. This is

significant considering that failure to execute projects or deviating from schedule, scope, and cost parameters directly impacts the achievement of objectives outlined in UFRN's research policy and Institutional Development Plan.

Therefore, the adoption of visual project management practices, including the Life Cycle Canvas, is imperative for effective management of these projects, as such monitoring can help address current process-related challenges faced by project executors.

Hence, it is recommended to implement a project monitoring and control model that aligns with best project management practices and prioritizes simple and feasible solutions aimed at enhancing project communication among stakeholders, thereby enhancing procedural efficiency and ensuring process viability.

This study contributes both practically and theoretically. Practically, it proposes a model derived from observed institutional issues and supported by literature to address a managerial bottleneck. The theoretical contribution lies in expanding understanding of how visual project management techniques can be applied beyond initial project stages, as existing literature predominantly focuses on their use in project inception.

Lastly, a limitation of this research is its focus solely on the monitoring and control phase. It became evident that to further enhance the premises presented here, it would be beneficial to also analyze the planning phase and its processes. This would allow for better consideration of indicators and control measures. This aspect will be explored in subsequent research endeavors.

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ⁱ The authors would like to inform that the figures embedded in the body of the article are written in the Portuguese language. This is because the LCC screens are constructed

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using an online tool, and due to their registered rights, it is not possible to modify anything in the model. Additionally, their completion followed the language norms of Portuguese.