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Nudge Theory: Potential Impact on Project Management Practices

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Master's in Management of Services and Technology

Advisor:
Doctor Carlos Hernandez Jerónimo, PhD, Assistant Professor, ISCTE Business School

September, 2025

BUSINESS SCHOOL

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Resumo

Os atrasos em projetos continuam a ser um desafio crítico na prática da gestão, frequentemente resultantes de enviesamentos comportamentais e cognitivos que as ferramentas tradicionais não conseguem mitigar. Embora os *nudges* tenham demonstrado eficácia em domínios como a saúde e as finanças, o seu papel na gestão de projetos permanece pouco explorado. Este estudo analisa como os gestores de projeto percecionam os *nudges* enquanto mecanismos de governança comportamental que podem contribuir para mitigar causas estabelecidas de atrasos em projetos.

Foi adotado um desenho qualitativo, baseado em entrevistas semiestruturadas a 24 gestores de projeto de diferentes setores e com diversas abordagens metodológicas. Os dados foram analisados tematicamente com recurso ao NVivo, resultando em 246 códigos iniciais, posteriormente consolidados em 37 subcategorias e cinco grandes temas. Para facilitar a compreensão, os participantes receberam previamente uma lista de *nudges* identificados na literatura.

Os resultados mostram que os gestores percecionam os *nudges* como facilitadores indiretos da adesão a prazos, sobretudo através da influência em comportamentos como comunicação, estimativas, motivação, coordenação e gestão do risco. A perceção da eficácia variou consoante a metodologia: gestores *Agile* destacaram o reconhecimento social, os de *Waterfall* valorizaram *defaults* e revisões estruturadas, e os de modelos híbridos aplicaram estratégias mistas. Surgiram ainda preocupações éticas relativas à coerção, favoritismo e transparência, enquanto fatores contextuais como a metodologia, a maturidade da equipa e o setor influenciaram a aplicabilidade.

O estudo contribui com um quadro conceptual que posiciona os *nudges* como mecanismos de governança comportamental na gestão de projetos. Oferece uma perspetiva exploratória sobre percursos comportamentais percecionados e estabelece a base para futura validação empírica.

Palavras-chave: Atrasos de projeto; Teoria *Nudge*; Economia comportamental; Gestão de projeto; *Agile*; *Waterfall*.

JEL Classification System: D91; O22

Abstract

Project delays remain a critical challenge in management practice, often driven by behavioral and cognitive biases that traditional tools fail to address. While nudges have proven effective in domains such as health and finance, their role in project management is underexplored. This study examines how project managers perceive nudges as behavioral governance mechanisms that may mitigate established causes of project delays.

A qualitative design was employed, using semi-structured interviews with 24 project managers across sectors and methodological backgrounds. Data were analyzed thematically with the support of NVivo, yielding 246 initial codes that were consolidated into 37 subcategories and five overarching themes. To improve comprehension, participants were provided with a predefined list of nudges identified in the literature.

Findings show that managers perceive nudges as indirect enablers of schedule adherence, mainly by shaping communication, estimation, motivation, coordination, and risk management. Perceived effectiveness varied across methodologies: Agile managers emphasized social recognition, Waterfall managers favored defaults and structured reviews, and Hybrid managers applied mixed strategies. Ethical concerns emerged around coercion, favoritism, and transparency, while contextual moderators such as methodology, team maturity, and sector influenced applicability.

The study contributes a conceptual framework positioning nudges as behavioral governance mechanisms in project management. It offers exploratory insights into perceived behavioral pathways and sets a foundation for future empirical validation.

Keywords: Project delays; Nudge theory; Behavioral economics; Project management; Agile; Waterfall.
JEL Classification System: D91; O22

Index

Acknowledgements..... **Error! Bookmark not defined.**
Resumo v
Abstract..... vii
1. Introduction 1
2. Literature Review and Theoretical Framework..... 3
2.1. Project Delays: Causes and Consequences 3
2.1.1. The Impact of Delays on Project Outcomes 3
2.1.2. Communication Issues..... 4
2.1.3. Lack of Team coordination 5
2.1.4. Lack of Team member's motivation 5
2.1.5. Poorly done time estimates..... 6
2.1.6. Task Allocation and Risk/Dependency Management 6
2.2. Behavioral Economics and Nudge Theory..... 7
2.3. Project Management..... 7
2.4. Integration between Nudging and Project Management..... 9
2.4.1. Cause 1: Poor Communication..... 10
2.4.2. Cause 2: Lack of Team Coordination..... 12
2.4.3. Cause 3: Poorly done time estimations 15
2.4.4. Cause 4: Lack of Team Members' motivation 16
2.4.5. Cause 5: Innadequate Task alocation and Dependency/Risk Management..... 19
2.5. Literature Gaps and Research Questions..... 20
3. Methodology 24
3.1. Research Design..... 24
3.2. Data Collection Instrument 25
3.3. Pre-Testing and Refinement 25
3.4. Sample..... 26
3.5. Data Collection Procedures 27
3.6. Data Analysis 27
3.7. Data Handling and Tools 28
3.8. Ethical Considerations 28
4. Findings and Data Analysis 30
4.1. Introduction 30
4.2. Sample Overview 30
4.3. Representative Voices 31
4.4. Causes of Project Delays: A Qualified Confirmation 31
4.5. Perceptions of Nudges..... 32
4.6. Methodological Contexts 33
4.7. Ethical Considerations 33
4.8. Synthesis..... 33
5. Discussion 35
5.1. Introduction 35
5.2. RQ1: How can different types of nudges mitigate the main behavioral causes of project delays? 35

5.3. RQ2: How does the effectiveness of nudges vary across different project management methodologies? 36
5.4. RQ3: What ethical risks and dilemmas are associated with introducing nudges in project contexts? 36
5.5. RQ4: How do project managers perceive the influence of nudges on temporal performance, and which pathways are considered most relevant for improving schedule adherence? 36
5.6. RQ5: Which contextual factors moderate the relationship between nudges and project performance? 37
5.7. Conceptual Framework 37
6. Conclusion 40
6.1. Recapitulation of the Study 40
6.2. Main Findings 40
6.3. Theoretical Contributions 40
6.4. Practical Implications 41
6.5. Limitations 42
6.6. Directions for Future Research 42
6.7. Final Remarks 42
7. References 44

Index of figures

Figure 3.1 Recruitment Flow Source: Own elaboration 26
Figure 5.1 Conceptual Framework: Nudges as Behavioral Governance Mechanisms 38

Index of tables

Table 2.1 Synthesis of Gaps in the Literature on Project Delays and Nudge Theory 22
Table 3.1 Mapping RQs to Data and Analysis Source: Own elaboration 24
Table 4.1 Overview of Coded References by Theme Source: Own elaboration 31
Table 6.1 Practical Applications of Nudges in Project Management Source: Own elaboration 41

1. Introduction

Project delays remain one of the most persistent challenges in project management. Despite advances in methodologies, tools, and governance models, many projects continue to miss deadlines, often leading to significant cost overruns, reputational damage, and strategic setbacks. The literature consistently highlights behavioral and cognitive biases, such as optimism bias, coordination failures, and lack of motivation, as critical contributors to delays, yet these factors are difficult to address with traditional project management instruments.

Behavioral economics offers promising avenues to tackle such challenges. In particular, the concept of *nudges*, small, subtle changes in the choice architecture that influence behavior without restricting freedom of choice, has gained traction in public policy and organizational studies. While nudges have been applied in domains such as health, finance, and sustainability, their role in project management remains underexplored. The potential of nudges lies not in directly solving structural problems, but in shaping behaviors that contribute to project execution, such as communication, coordination, and timely reporting.

Existing research on project delays tends to focus either on methodological aspects (e.g., Agile vs. Waterfall) or on technical dimensions (e.g., tools, scheduling techniques). Far less attention has been given to behavioral interventions as a means of influencing project dynamics. This study addresses that gap by examining how project managers perceive the use of nudges as behavioral governance mechanisms, particularly in relation to well-established causes of project delays.

The study builds on five Research Questions derived from the literature, focusing on: (1) how nudges interact with the main behavioral causes of delays, (2) how their perceived effectiveness varies across project management methodologies, (3) which ethical concerns emerge when introducing nudges in organizational contexts, (4) how project managers perceive the pathways through which nudges may support schedule adherence, and (5) which contextual factors moderate their effectiveness. Importantly, the study does not aim to measure objective performance impacts, but rather to capture project managers' perceptions of how nudges may influence behaviors that indirectly shape project outcomes.

To address these questions, a qualitative design was adopted, relying on semi-structured interviews with 24 project managers across sectors and methodological backgrounds. Data were analyzed using thematic analysis supported by NVivo, enabling both depth of interpretation and descriptive transparency. This approach provides exploratory insights into the behavioral mechanisms and contextual conditions that shape the perceived influence of nudges in project settings.

In doing so, the study makes two main contributions. First, it integrates the literature on project delays with behavioral economics, proposing a conceptual framework that positions nudges as behavioral

governance mechanisms operating through intermediate pathways. Second, it generates practical implications by illustrating how specific nudges may be applied in Agile, Waterfall, and Hybrid environments, while acknowledging potential ethical risks and contextual moderators.

By focusing on perceptions rather than objective outcomes, this research provides an exploratory foundation for understanding the behavioral dimensions of project delays. It opens the way for future empirical studies, quantitative, experimental, and longitudinal, that can test and validate the pathways identified here.

2. Literature Review and Theoretical Framework

2.1. Project Delays: Causes and Consequences

Project delays are one of the most common management failures, with significant impacts on costs, quality, and stakeholder satisfaction (Kerzner, 2017; Williams, 2017). The Project Management Institute (PMI) reports (2017) indicate that a high proportion of projects do not meet their deadlines, compromising value creation and generating indirect costs, such as loss of confidence and team burnout.

Among the main causes of delays are poor communication, inaccurate time estimates, inadequate allocation of tasks and dependencies, lack of team motivation, insufficient risk management practices, and coordination failures (Kerzner, 2017; Williams, 2017).

The literature also emphasizes the role of cognitive biases, such as excessive optimism and the illusion of certainty, which lead to systematic underestimations of deadlines and costs (Mullainathan & Thaler, 2000; Flyvbjerg, 2021). These factors demonstrate that delays do not stem solely from technical or planning failures, but mainly from behavioral and organizational elements.

2.1.1. The Impact of Delays on Project Outcomes

The two most common things projects usually miss on delivery are their cost and time. On one hand, going over budget is often very upsetting for stakeholders, but a lot of times it may not be a problem that will cause the project to be cancelled. On the other hand, a project that is delayed can lead to drastic implications, not only because of the delay itself, but also because delays can have other significant impacts, including cost overruns, reduced project quality, and loss of stakeholder confidence (Kerzner, 2017). Additional to these, a big problem that project delays may cause is the potential impact on other projects' timings and start dates.

Quality can also suffer, as rushed work to meet delayed deadlines may result in lower standards, and in a long term, repeated delays can damage the reputation of the organization, leading to a loss of trust among stakeholders and customers (Turner & Müller, 2005).

Nevertheless, the extent of delays can vary a lot, with some projects experiencing minor setbacks with others facing significant disruptions that threaten their continuity, which is why, in this study, I will be looking through some of the top causes for project delays and researching the possibility of project managers using the Nudge Theory to positively impact a project's results and reduce the risk and impact of project delays.

A research paper done by Project Management Institute (2025) indicates that delays are a widespread issue across industries and showed that only 37% of projects are delivered on time.

Another study shows that over 31.1% of software projects are canceled before they are completed and 52.7% of projects are escalated by 198% of their original estimates (Mohabuth, 2017).

This is exactly where the Nudge Theory can impact and improve project delays, and take project management to another level, not only in efficiency but also in project success.

To do this study, it was important to first identify what are the main causes of these delays. These causes can vary a lot depending on the type of project that is being developed and the industry it sits on. Nevertheless, for this research, I will be focusing on the general causes that are most common in all types of projects around various industries.

According to the study "***A Study of the Identification of the Factors that Lead to Time Delays in Software Developmen****t"* by Abdool Qaiyum Mohabuth from the University of Mauritius, *"70% of software developers confirmed that they have very rarely or rarely been able to meet the timeline scheduled for project completion, while 22.5% attested that they have never been able to complete their project on time despite the fact that 82.5% rated the importance of on-time completion as high and very high."*

The conclusion obtained from this study was that "*the reasons for delays in software development are mostly related to organizational and managerial problems rather than being purely technical in nature. (...) tools and techniques across the phases of development, which are seen to rarely lead to time delays, instead the human aspects are seen to carry more weight on the health of software projects. (...) To date, much care has been given to the knowledge aspect in terms of providing practitioners with the latest skills and the latest available tools and products* (...) *However, little consideration has been given to managerial factors such as communication, coordination, and conflict, which are seen to contribute significantly to software delays."*

To further understand how the Nudge Theory can impact and improve situations with project delays, it is important to first identify what are the main causes for these delays. Analyzing the perspective provided by the study done by Mohabuth, as well as multiple other studies, it is clear there are various potential causes for delays that cannot be reduced to a specific number. So, since most causes of delays often involve a combination of factors that intersect during a project, for the sake of this study, an analysis was made on multiple sources to identify 5 of the most common and most impactful causes for delays are, and these were the selected causes to be studied individually:

2.1.2. Communication Issues

There are some components that are considered almost vital for any project to even think of having any success. One of, if not the most important of those factors is communication. According to the study

mentioned before, ***"A Study of the Identification of the Factors that Lead to Time Delays in Software Development,"*** one of the main reasons for delays in the projects analyzed was poorly managed communication. In fact, the analysis made by the actual developers led to the conclusion that states "Ineffective communication among team members is also recognized as a factor that can lead to delays." One of the developers who was interviewed, referred to as "Reference [9]," reported that "one of the most salient impressions conveyed by observation was the sheer amount of time each developer spent in informal communication."

This is a common point in countless studies conducted on projects, not just software development projects, but any kind of project that can be analyzed. Of all the projects that have been delayed, in most of them, communication issues are mentioned as one of the most impactful issues causing these delays.

2.1.3. Lack of Team Coordination

Another of the developers interviewed by Mohabuth in his study "***A Study of the Identification of the Factors that Lead to Time Delays in Software Development",*** mentioned that coordination issues can cause a substantial loss on the developmental speed of project. "When problems emerge during development, the difficulties of knowing who to contact about what, of initiating contact, and of communicating effectively, led to a number of serious coordination problems. This message was also supported by another of the interviewees, referred as number 17, who stated "who found that cooperation, coordination and integration are critical factors for software projects to succeed." Not only by this developer, but in a general way across the research report, coordination issues were regarded as the second highest cause for delays in projects, when analyzed both how regularly it happens and how each cause impacts a project, only behind communication issues.

2.1.4. Lack of Team Member's Motivation

According to a thesis called ***"IMPACT OF MOTIVATION ON PROJECT TEAMS' PERFORMANCE IN INFORMATION TECHNOLOGY***" by Ramu Karanam, a project management graduate from *Harrisburg University of Science and Technology,* motivation can be defined as "The reason that influences a person to behave in a certain way. Randhawa (2007) also defines motivation as "the act of stimulating someone to get a desired course of action".

Karanam (2018), states that employee motivation is a critical issue to be considered by organizations and project managers, because the performance of the entire project is in fact dependent on it. It also states that the performance of individual team members has the potential to affect the overall performance of the entire project team.

Another fact that has been studied for decades now is that one of the aspects where productivity and efficiency can be lost within a project is the direct work that is being done by the project members on a daily basis (Karanam 2018).

A lot of times it can be a big challenge for the project manager to ensure this connection between all members involved in their project, and this is where nudging techniques may become valuable.

2.1.5. Poorly Done Time Estimates

Poor planning is another significant contributor to project delays (Kerzner, 2017). This includes underestimating the time required for project tasks and not allocating sufficient resources.

"A lack of adequate resources, whether financial, human, or material, is one of the most frequent causes of project delays" (Matos & Lopes, 2013). Projects often require a precise balance of resources to progress as planned. When resources are scarce or misallocated, project tasks cannot be completed on time, leading to delays. The impact of resource shortages is significant, with research indicating that they contribute to delays in 40% of projects (Matos & Lopes, 2013). Additionally, there are also risks of scope creep, or the gradual expansion of a project's scope beyond its original objectives, which often happens due to poorly done estimates and is a leading cause of delays (Williams, 2017). Scope creep often occurs due to unclear project goals, changing stakeholder requirements, or inadequate initial planning. Research shows that scope creep is responsible for up to 50% of project delays (Turner & Müller, 2005).

2.1.6. Task Allocation and Risk/Dependency Management

Failing to identify and manage risks and dependencies is another critical factor leading to project delays. Risk management involves anticipating potential issues that could disrupt the project and developing strategies to mitigate them. When risks are not adequately managed, unexpected events such as technical failures, or supply chain disruptions can cause significant delays (Kerzner, 2017).

According to Kerzner (2017), poor risk management is one of the most recurrent causes of project delays. When potential issues are not systematically identified, assessed, and mitigated, unexpected events such as regulatory changes, supply chain disruptions, or technical failures can significantly impact project timelines. Williams (2017) and PMI (2017) also emphasize that unmanaged risks and dependencies are among the most common sources of delays in large-scale projects.

On the other hand, something a lot of managers tend to underestimate is the fact that every single worker has their own unique set of skills and characteristics, as well as unique preferences for tasks and environments. This being true, as a project manager, it is crucial to be able to keep up with the personal

preferences as well as the superior skills of each of the project's members, to ensure that each worker is performing the correct tasks, in order to achieve maximum efficiency.

2.2. Behavioral Economics and Nudge Theory

Behavioral economics contrasts with the classical view of Homo Economicus, which assumed perfect rationality, stable preferences, and optimal choices (Thaler, 2015). Studies such as those by Mullainathan and Thaler (2000) have shown that emotional, social, and cognitive factors affect decisions, leading to the development of approaches that combine psychology and economics to better understand human behavior (Ávila & Bianchi, 2015).

This new combination of psychology and economy allowed us to comprehend better how humans lead the decision-making process and started to help in various problems not only inside organizations and political systems but also around international markets and intercultural communication.

Along these lines, the Nudge Theory, introduced by Thaler and Sunstein (2008), argues that small changes in the architecture of choices can significantly influence behavior while preserving individual freedom. Nudges can take forms such as default rules, simplification, social norms, increased convenience, dissemination of information, graphic warnings, prior commitments, reminders, and implementation intentions (Sunstein, 2014).

According to Sunstein (2015), nudges function as a sort of "GPS" that guides decision-makers, maintaining transparency and avoiding coercion. Their application must be visible and clear to avoid ethical criticism of manipulation. Studies have demonstrated the effectiveness of nudges in areas such as health (Volpp et al., 2017), sustainability (Schubert, 2017), and organizational behavior (Osman, 2020). However, their application in project management is still in its infancy and there is a clear lack of information about this connection.

2.3. Project Management

Nowadays, Project management plays a crucial role in the strategic pursuits of organizations, aiming to achieve their goals efficiently and effectively. But it wasn’t always like that. Some authors say that project management started being used in the building of the pyramids, but the topic of study was only formally created in the 1950s, where companies started to require a faster and most efficient process to achieve results and production, due to the increase in competitiveness and how fast the organizational world started to evolve and become more globalized during the industrial revolution (Kerzner, 2017).

Companies started needing to develop systems focused on efficiency and speed, and with this came the need to start planning, monitoring, and controlling various activities at the same time, while the goals

set by stakeholders started to shift as well, forcing project managers to adapt the scope of projects over time (Kerzner, 2017). Nevertheless, project management was still very overlooked for a long time, since executives didn't consider it to be an activity important enough to be integrated in the company and felt that project managers could be a threat to their governance models (Kerzner, 2017).

In the 90s project management started to shift again and started turning into what we call today "Modern Project Management", becoming more popular and breaking old traditions of what we thought project management was all about. This change happened mostly through the increased importance of scheduling and planning (Kerzner, 2017), and it was prolonged to the XXI century, where all the technological evolution started impacting the way projects were looked at and changing the frameworks and ways of work inside project management over time (PMI, 2017). Nowadays, the main goal of project management in organizations is to work as a tool that allows them to have targeted goals and keep up with the fast-growing industry and the constant changing environments (Nieto-Rodriguez, 2022).

But how was the framework defined and universally agreed on? At the core of modern project management lie the foundational principles outlined by the Project Management Institute (PMI) in the Project Management Body of Knowledge (PMBOK). This comprehensive framework (PMI, 2017) serves as a guide across diverse project dimensions, including the triple constraint theory, and even the multiple methodologies that are usually applied, including the definition of scope, time, cost, quality, human resources, communication, risk, and procurement. The principles embedded in PMBOK act as a cornerstone for effective project planning, execution, and monitoring, and are crucial for the project manager role.

Collaboration has also emerged as a critical theme in traditional project management but kept being just as important, if not more, in modern times. The rise of technologies came to facilitate communication and allow connections that were unthinkable just 20 years ago and allowed the creation of virtual teams but these distanced work environments require effective collaboration and the correct tools and strategies. (PMI, 2017).

This being a crucial topic in every project management job, over time, there were some collaborative methodologies created, such as Agile and waterfall that focus exactly on prioritizing teamwork and shared responsibility, leading to a more inclusive and cooperative project management culture.

The Agile methodology, originating from the Agile Manifesto (Beck et al., 2001), has gained prominence over the years, and is known for being focused on three main principles: Emphasize people and interactions over processes and tools; achieve working solutions over comprehensive documentation, in order to achieve success it is important to focus on what actually needs fixing to achieve results; and

lastly, focus on customer collaboration, and despite always having a defined plan, having adaptability and capability to respond to change and adversity (Cockburn & Highsmith, 2001). Agile is often associated with a Scrum structure of activities. Scrum promotes transparency, inspection, and adaptation, creating a dynamic project environment where teams can quickly respond to changing requirements, emphasizing how teams must be able to communicate and be in sync for a project to work. (Schwaber & Sutherland, 2020). Through its characteristics it is easy to understand that the Agile methodology is the best one to connect to behavioral economics and Nudging. Through its impact on personal relationships and communication Nudging has the potential to not only improve the results in any type of Agile project.

In contrast to the Agile methodology, there is the Waterfall model, introduced by Royce (1970). This model represents a more traditional approach to project management and follows a sequential and linear process. Despite being considered more "traditional", the waterfall structure was the foundation for the development of the modern project management principles and is still very useful in some scenarios such as industries like construction and manufacturing with very linear structures. Waterfall's main feature is its sequential progress throughout the project. It has a structured progression process, and you can't move into an activity without guaranteeing that the previous activity is completed. It is also important to mention that during each of these steps, from the design phase to the implementation and testing phases, everything must be documented and well defined before it starts getting developed. This allows the project manager to keep up an organized structure with clear responsibilities distributed.

Although precise documentation guarantees that every step gets concluded, this brings a feeling of rigidity and lack of adaptability that has been very criticized over the years, and it is why it isn't very applicable in situations where uncertainties and changes exist (Schwalbe, 2018). Despite this the waterfall system is still very common in modern project management, especially in conditions where the requirements of the project are very clear and understood from the beginning (Schwalbe, 2018).

2.4. Integration between Nudging and Project Management

With modernization, agile methodologies began to prioritize collaboration, adaptation, and customer focus (Beck et al., 2001; Schwaber & Sutherland, 2020). In contrast, the Waterfall model (Royce, 1970), still common in sectors such as construction and manufacturing, remains suitable for linear contexts, although less effective in uncertain environments (Schwalbe, 2018).

The literature shows that nudges may be able act directly on the previously identified causes of delays:

- *Communication:* reminders and personalized messages reduce misalignment.

- *Time estimates:* using historical results and continuous feedback, reducing unrealistic optimism.
- *Coordination:* visual charts and social norms to increase collective accountability.
- *Motivation:* public pre-commitments and social recognition reinforce team commitment.
- *Risk/Dependency management:* defaults that make periodic reviews mandatory and promote discipline.
- *Task allocation:* reinforced recognition and decision-making increasing efficiency and motivation.

Thus, nudges can be understood as behavioral governance mechanisms that complement formal planning and control practices (Levitt, 2011).

It should be noted that the nudges presented here are examples derived from literature and serve as a theoretical basis for the empirical stage of this study. As discussed later in Section 4.2, the empirical evidence confirmed part of these nudges (e.g., historical anchoring and feedback for time estimates, recognition and pre-commitment for motivation), while also highlighting additional ones not initially emphasized (e.g., incentives in communication, reminders in coordination, and visual risk matrices). This reinforces the importance of *combining theoretical insights with practitioners' perceptions* to refine the most effective nudges in project management contexts.

Considering this context, here are the Nudges selected for analysis, with each nudge being applied to the respective cause to which was considered to have a greater impact in reducing how often each cause happens, and, at the same time mitigating its impact on the project's timeline:

2.4.1. Cause 1: Poor Communication

Nudge 1: Message Personalization Based on the Receiver

Message personalization is a technique that, although it may require some effort and time, the potential benefits of efficiency, motivation and overall positive response from the message receiver are numerous. It is important to be able to tailor messages in order to establish a connection with your target audience (Jankovič, Kolenik & Pejović, 2022). Message personalization is a tool that can be used in any form of communication. But how can one decide what to adapt and how to personalize a message?

Although personalization has presented good results in various situations, there are some cases where results indicate that customized messages may work poorly for some individuals. Being this such a specific nudge that needs to be adapted to individual target audiences, it is also crucial for a project manager to understand when not to apply personalization (Jankovič, Kolenik & Pejović, 2022).

Nudge 2: Adaptation of Physical Environment

Considering the evolution seen in communication in the past years, especially after the 2020 pandemic effects on the work environment, the physical environment is often disregarded and not considered a crucial part of communication in projects.

As one of the most innovative companies in the world, Google was one of the first to introduce Micro kitchens to increase knowledge transfer amongst workers from different departments through more casual meetings, creating the best atmosphere for discussion and exchanging ideas fostering a culture of feedback and communication. (Ebert & Freibichler, 2017).

Taking this into consideration, it is also crucial for a project manager to know when not to change anything in the work environment, because adjusting environments may also create disruption in workflows, particularly when employees are comfortable with their existing setups (Bukoye et al., 2022).

Nudge 3: Inclusion of Incentives in Communication

Incentives included in communication don't necessarily need to be actual changes in what is being communicated to the receiver. The communicator can resort to a sound or a different type of notification, to an added note to the message. The main goal of these subtle changes is to motivate the receiver to respond to the message or to at least not ignore it. (Jankovič, Kolenik & Pejović, 2022). These incentives are generated based on personality traits and are supposed positively impact the receiver's experience, however, according to Jankovič, Kolenik & Pejović, 2022, the messages deemed persuasive on their own are not what persuades people to act on them, so this may be a Nudge that doesn't have as much impact on reducing communication issues.

Nudge 4: Visual Reminders (Both Physical and Digital)

One of the biggest problems identified in modern-day projects, generating a lot of communication issues throughout the chains of command, is the lack of attention to detail in messages and communications, as well as progress not being communicated (Ebert & Freibichler, 2017). One nudge that has shown a positive effect in preventing similar situations, is applying visual reminders around the project rooms, or even digital reminders that make sure no communication gets forgotten, and even more importantly, the target audience is reached correctly and on time (Bukoye et al., 2022). A good example that has already started to be commonly applied in projects are visual nudges, such as shared boards, checklists, or colored signals

in the workspace, which help clarify roles and signal important actions, improving explicit and implicit communication (Bukoye et al., 2022).

However, visual reminders need to be carefully used, because they can very easily get overused, reducing their effect and running the risk of frustrating project members (Bukoye et al., 2022).

Nudge 5: Communication Standardization

Standardized communication usually acts as an implicit nudge by establishing predictable routines and expectations that encourage proactive sharing and accountability (Bukoye et al., 2022). This will not only lead to overall communication being better understood, but it also makes it easier for the ones sending the messages, making sure any potential bottlenecks in the communication process are avoided.

A good example of the use of this nudge that is already in practice in a lot of environments is the regular use of company templates for presentations and organizational emails sent by executive members. This guarantees the expectations are set, even before the message is received.

2.4.2. Cause 2: Lack of Team Coordination

Nudge 1: Creation of general communication Channels (Adaptation of Digital Enviroment)

For the past 2 decades communication has changed drastically around the world. Cellphones were invented, computers completely took over the organizational world and, especially after the pandemic, people talk more through phones and computers than in person. With all these changes in technology, coordination becomes a challenge that everyone in an organizational environment needs to adapt to. This is where the digital environment gains crucial importance and becomes a mandatory component that needs to be carefully managed. (Subha, Meena, Aarthi & Bhaavesh Madeka, 2025).

With this technological revolution, new tools, channels and even techniques were developed with the sole purpose of improving communication and coordination while other tools were invented to improve efficiency and individual success. It is by leveraging all the new available tools that projects are getting increasingly larger expectations, and although tools are not enough to ensure project success, these tools and channels enable project managers to centralize communications, promoting transparency and reducing misunderstandings related to dispersed data sharing (Bukoye et al., 2022).

Moreover, this adaptation ensures that relevant information is consistently available to all team members, regardless of location or schedule. This accessibility fosters inclusion, boosts responsiveness, and allows teams to quickly resolve emerging coordination challenges (Mwana Nyandongo & Davids, 2017).

Nudge 2: Team Building and coordination activities (Improve comfort for communication)

Team building strategies can function as important nudges, promoting interpersonal comfort and trust. These activities are usually used for the called “breaking the ice” to improve the relationship with new team members, but they are just as important for teams that have known each other for some time. These activities can go from collaborative problem-solving sessions to a shared activity outside work. These will encourage open dialogue and understanding among team members, leading to stronger coordination and clearer information flows (Mwana Nyandongo & Davids, 2017).

Effective team building can be a great long-term nudging investment, because it instills shared objectives, creates a psychological connection around the team and reduces barriers to transparent exchanges, which are essential for project success (Bukoye et al., 2022).

It is important to note that this nudge isn’t to be made at any random point. When poorly implemented, either for excessive or badly timed team-building initiatives, these can consume valuable work time, disrupt workflows and it may be perceived as “irrelevant” or “forced” for some workers. Furthermore, not all activities suit every team culture or personality, and badly allocated activities may lead to communication or team environment and coordination issues (Kwete Mwana Nyandongo & Davids, 2017).

Nudge 3: Adaptation of Physical environment to improve team relation and make connection easier

As previously mentioned, the physical environment is something that has been discussed numerous times, not just as way to impact productivity, or motivation, but also as a tool to directly impact communication and coordination. Despite this being a component that a lot of companies have started to reduce from their day-to-day use, physical space is still crucial for the success of a lot of projects.

Some of the biggest examples like Google’s office that helped improve communication (Ebert & Freibichler, 2017), and Aldi and Amazon making huge investments in their warehouse layouts to improve efficiency in distribution, but when talking about coordination, sometimes small changes can have great impacts. (Jiang et al., 2025).

Literature reveals that these simple changes like workspace layout adjustments, proximity, and general visibility can positively influence communication and feedback response, as open and adaptable spaces foster formal and informal interactions. (Jiang et al., 2025).

These changes also have the potential of motivating members, by making them feel “seen” with personalized adaptations to improve the workspaces.

Nudge 4: Implement regular coordination meetings between teams

Regular coordination meetings are another nudge people often think it is "obvious", but a lack of coordination meetings is still a reason for loss of information inside projects (Nabintu, 2025).

Danielle Nabintu Zaluke's PhD study ***"Project Team Meetings – Effective or Efficient?"*** focused on analyzing the potential of project meetings, and the risks and impacts of not having them regularly and was achieved by analyzing the change of a project being realized from a scrum approach to a Kaban methodology, with shorter meetings, goal-oriented deadlines and different general task distribution. Throughout the study, a lot of different perspectives were collected through interviews. The consensus result was that having shorter regular meetings that don't necessarily need to involve all team members has increased efficiency and allowed them to direct time to tasks that were able to be done with less pressure and more efficiency.

Establishing regular coordination meetings can act as a behavioral nudge by creating a culture of frequent and open communication, while also providing a formalized space for feedback and support between the various teams (Mwana Nyandongo & Davids, 2017). These meetings are especially important in complex or multi-team projects, where risks of information loss are elevated (Nabintu Zaluke, 2025). But it is important to bear in mind that meetings don't need to have every member involved, and sometimes these only interrupt workflows leading to loss of time and efficiency (Nabintu Zaluke, 2025).

Nudge 5: Creating a Culture of Group Priority Setting and Intention Sharing

Creating a culture of group priority setting and intention sharing is a key nudge for team coordination. Explicit declaration of group goals, priorities, and shared intentions promotes mutual accountability, ensuring all team members are focused on common objectives (Bukoye et al., 2022). This will automatically encourage open discussion of individual and group intentions within regular routines, reducing the need for actual messages or specific meetings (Mwana Nyandongo & Davids, 2017).

The process of normalizing this type of culture is not a simple task with new teams, and will probably require the usage of other nudges, such as the involvement of a digital environment and leveraging team-building activities correctly placed to complement it, but if made successfully, it will lead to improved ability to overcome any coordination barrier (Bukoye et al., 2022).

It is important to note that any cultural change gets harder to implement if project members have been used to previously work with certain strategies that don't usually involve regular communication and knowledge sharing. (Mwana Nyandongo & Davids, 2017).

2.4.3. Cause 3: Poorly done time estimations

Nudge 1: Decision Process Standardization

Decision process standardization is often confused with defining decision makers inside the project. While having a well-defined governance model is crucial for project success, decision process standardization is a direct nudge that helps decision makers make decisions with maximum knowledge and minimal effort.

Standardizing decision processes can be understood as formalizing how estimates are generated, reviewed, and approved. This approach reduces risks and variability in decision quality across project teams, allowing project managers to identify risky decisions and make them whit the most amount of knowledge possible. It also allows project managers to identify any errors or risks related to the decisions made beforehand, and act on them, as soon as possible (Ebert & Freibichler, 2017).

According to PMI (2016) by focusing on consistency and removing unnecessary complexity in decision-making, teams can better forecast timelines based on clear, repeatable processes.

In Nudge Management, it is suggested that introducing clear default rules and consistent decision processes can help reduce distractions and improve results. This structured approach can indirectly improve time estimation by fostering more realistic planning environments (Ebert & Freibichler, 2017).

It is important to note, this standardized decision process needs to be applied carefully, without imposing strict rules or conditions on the decision maker. This way, it preserves personal autonomy while still being able to guide choices (Bukoye et al., 2022).

Nudge 2: Smaller Team leaders included in the decision process

Engaging smaller team leaders in project goal-setting processes ensures diverse perspectives are considered, reducing the risk of overly optimistic time estimates". This inclusion helps prevent estimation errors caused on centralized decisions (Bukoye et al., 2022). By having various perspectives involved in the decision-making of the project, better outcomes are also expected, especially in risk management, plan estimations and overall coordination of goals (Ebert & Freibichler, 2017).

Nudge 3: Definition of Smaller Targets and Objectives

Dividing a project into smaller targets is usually included in various agile project management strategies and is called a bottom-up estimation. In bottom-up estimation, the project is dissected into smaller components, each of which is estimated individually. This method provides a granular view of the project, reducing the risk of overlooking critical tasks (Bukoye et al., 2022).

Although this is a very recognizable technique, what most project managers fail to understand is that it is a low effort and reward nudge, because if used correctly, most project leaders and members will feel more motivated, and the project timeline is better estimated, without even changing any day-to-day activities.

The use of goal-setting nudges, such as breaking down large tasks into smaller, manageable chunks, is usually widely seen as a positive change, for its ability to improve time estimates. However, sometimes, teams unfamiliar with structured workflows may struggle with the transition, causing initial friction. (Bukoye et al., 2022).

Nudge 4: Training for PM and Team Leaders

Training managers in specific estimation techniques (such as analogous and parametric estimation) significantly improves their ability to produce reliable timelines and reduce project overruns. For example, in most management areas, continuous learning helps mitigate risks related to poor time forecasting. (Leybourne, Kanabar, Warburton, 2010).

Nudge 5: Regular Progress Analysis

Risk management isn't a one-time activity. Regularly monitoring and adapting estimates to reflect changing risk conditions is essential for project success. Regular analysis of project progress provides feedback to reevaluate estimates, ensuring timelines can be adjusted before risks become issues. (Bukoye et al. 2022)

Bukoye et al. (2022) also suggests implementing **regular feedback loops** to continuously reassess estimates. Frequent progress reviews, guided by nudges, allow for timely adjustments to project schedules, minimizing the risks of significant delays.

Nudges are meant to be used to guide behavior subtly without removing freedom of choice, and their correct application in project management can help ensure consistent progress monitoring and timely interventions when delays are anticipated, but not to be done excessively, to not run the risk of making workers feel micromanaged, which could negatively affect morale and productivity (Bukoye et al., 2022).

2.4.4. Cause 4: Lack of Team Members' motivation

Nudge 1: Progress Visibility for Team Leaders and Team Members

The concept of progress visibility as a motivational nudge is not new to most people, but it ends up getting forgotten and undervalued by a lot of managers, leading to problems in the decision-making process and coordination between all the teams, and ultimately ending up leading to low motivation.

What research demonstrates is that goal visibility serves dual purposes, achieving both motivation and better progress tracking, leveraging humans' social nature where shared goals create powerful engagement mechanisms, to not only achieve better efficiency in tasks, but also to achieve a better overall environment inside a project.

However, there are also certain risks related to this nudge. Excessive visibility can lead to information overload, overwhelming team members with data. (Bukoye et al., 2022).

Nudge 2: Gamification of Daily Tasks

Gamification is a well-known nudge technique that leverages game mechanics to influence behavior in organizational contexts. The theoretical framework for gamification as a motivational nudge comes from behavioral economics and positive psychology, where elements such as points, levels, and challenges tap into individuals' motivation to compete and collaborate (Bukoye et al., 2022).

This technique is particularly effective because it provides immediate feedback and recognition, which are critical components of sustained motivation (Savvas, 2023).

Despite these benefits, competitive elements like leaderboards run the risk of fostering unhealthy rivalry, reducing collaboration, or creating negative workplace dynamics if not managed carefully. Savvas, 2023.

Nudge 3: Personalized Communication and Task Allocation

Individual preferences, strengths, and work habits are characteristics a good project manager must leverage to increase engagement and satisfaction. Good examples of potential use for these are precisely tailored messages and assignments, which can improve alignment between tasks and skills, resulting in higher motivation and better performance (Sant'Anna et al., 2021).

The theoretical foundation behind this approach lies precisely in the recognition that individuals respond differently to motivational strategies based on their personality, work style, and cognitive preferences. Studies suggest that personalized approaches increase engagement likelihood by determining the most effective communication method and timing for each employee (Harvard Business Review, 2025)

Personalized communication as a nudge technique is something that wasn't as talked about when Nudging first started to be investigated. However, as research gets deeper on what exactly is impacting projects the most, this started to be an approach that differs from static notifications and started to generate results for each team member (Bukoye et al., 2022).

Nudge 4: Adaptation of Physical Environment

Similar to what was mentioned in the potential appliance of this nudge to other causes, the physical environment's importance has been decreasing for the past years.

Nevertheless, this is still one of the most important topics of conversation when talking about personal motivation. Humans are social creatures, and although a lot of positions have been moved to full time remote positions, office space is still one of the components that contribute most to a project's environment. In 2025, companies actually started to force employees to a minimum of 2 to 3 days a week of in person work, for various reasons, with 2 of the most important being "Absorbing organizational culture", "facilitating collaboration and teamwork" and "reigniting energy and morale" (Forbes, 2025).

This just reinforces the idea that having a well-designed and structured physical office space not only can improve communication but may also improve general morale and team motivation, although certain care is necessary when applying this. A lot of employees got used to remote work, and any changes related to their office environment, can actually have a negative impact on motivation, which is why a lot of companies also invested in improving home-office spaces for their employees, as a way to improve productivity and motivation (Jiang et al., 2025).

Nudge 5: Ranking Systems for Healthy Competition

Creating ranking systems can often be confused with a style of gamification, but this nudge application can differ a lot from the previously mentioned. Making performance visible through rankings not only increases accountability but also sets clear goals for everyone to aspire to achieve, encouraging project members to strive for better outcomes (Bukoye et al., 2022). Studies also show that a constructive competitive attitude directly improves personal growth, and increased persistence when facing difficult project tasks, (Modranský & Lajčin, 2021).

Nevertheless, it is important to note there are several potential downsides and risks with ranking systems. Continuous low placement on leaderboards can demotivate individuals, increase anxiety and even increase turnover risk especially for junior or less experienced team members (Bukoye et al., 2022). Additionally, excessive rivalry can develop over time, especially when ranking criteria are unclear or when ranking rewards get too enticing, leading to reduced team cohesion and trust (Modranský & Lajčin, 2021).

2.4.5. Cause 5: Inadequate Task allocation and Dependency/Risk Management

Nudge 1: Visual Reminders

Visual reminders are tools that have been used since the beginning of organizational management. And not just in an organizational environment, people use it in their personal lives, doctors use it in hospitals, and it is even used in environments dedicated to help children learn about responsibilities (Abumalloh, Halabi, Ali, et al, 2024).

According to Abumalloh, Halabi & Ali (2024) “Visual reminders serve as effective nudges by providing salient cues to guide behavior and improve task performance. They reduce the cognitive load by externalizing task tracking, making it easier for team members to keep deadlines in mind without constant mental reminders." This analysis explains visual reminder’s potential impact in the simplest and most effective way, and helps us understand how small notes, messages or alarms, can have a huge impact in making sure no information or task gets forgotten, and risks can get detected in time to be prevented or mitigated.

Nudge 2: Creating a Culture of Group Priority Setting and Intention Sharing Between

Designing spaces or systems that facilitate natural interaction between departments can foster knowledge sharing and innovation. Having said that, promoting transparent communication, such as sharing individual goals and intentions of action, will most likely enhance team synergy and avoid bottlenecks between dependent tasks (Ebert & Freibichler, 2017).

This will also impact team relationships in a positive long-term manner, leading to other benefits for overall results in the project. Despite this being a nudge that can potentially improve dependency management and reduce bottlenecks and being important that team members feel comfortable to start doing more informal communications between them, it is also crucial to keep a structured communication inside the project and avoid people starting to switch from formal written communication to more informal communications for 100% of communications (Ebert & Freibichler, 2017).

Nudge 3: Increase Progress Visibility for Team Leaders and Team Members

Enhancing visibility for project members and leaders is, most times, considered an “obvious” thing to do. Despite this, not understanding tasks’ progress level, especially on the point of view of team leaders for tasks from their teams, is also considered one of the main reasons for delays due to dependencies and lack of coordination in between tasks. (Abumalloh, Halabi, Ali, et al, 2024). By using nudges like regular status updates, progress dashboards or even just a shared calendar with completed tasks, with progress being

shared around the various teams in a project, and aligning it with other **nudge management approaches,** it will generate a general feedback culture that can lead to a great increase in efficiency and communication. These systems can help workers stay engaged and aware of their progress, and most importantly, other workers' progress (Ebert & Freibichler, 2017).

Nudge 4: Automatization

Automating communication between dependent tasks aligns well with nudges targeting **decision-making optimization**. Streamlining communication reduces the need for manual coordination, which can help workers intuitively adjust to task changes (Ebert & Freibichler, 2017).

Although automation is, most times, very beneficial for the productivity of a project, one thing project managers must be aware of is the risk of over-automation. Over-automating communication can 'depersonalize' task activities, causing problems in people's connection inside a project, and creating barriers that didn't exist before automation came into action (Ebert & Freibichler, 2017).

Nudge 5: Personalized task allocation

Nudge theory strongly supports the adaptation of conditions around the environment, and so, personalization is a key strength of the nudge theory.

In Project management, when a task is tailored to individual strengths and preferences, it reduces cognitive overload and fosters motivation. This can lead to both an increase in time efficiency and in personal motivation for each worker. As a leader, it's part of a project manager's job to understand each worker's strengths, and by leveraging these, workers can be nudged onto tasks they are best suited for, sometimes without even being asked to do them directly. (Abumalloh, Halabi, Ali, et al, 2024).

However, too much personalization can generate the risk of creating a negative culture inside the project of not being able to adapt to situations outside of their comfort zone (Ebert & Freibichler, 2017).

2.5. Literature Gaps and Research Questions

The literature review reveals that project delays are not merely the result of technical or procedural shortcomings but are strongly influenced by behavioral and social dynamics. Classic project management authors such as Kerzner (2017), Williams (2017), and the PMI (2017) emphasize planning, control, and risk mitigation as central mechanisms to reduce delays. However, research by Mohabuth (2017) highlights that communication and coordination failures are often the real drivers of schedule slippage, while Karanam (2018) stresses the importance of team motivation as a determinant of project outcomes.

Meanwhile, cognitive psychology and behavioral economics shed light on the structural biases that systematically distort project planning. Kahneman & Tversky (1979) and Flyvbjerg (2021) demonstrate how optimism bias and the *planning fallacy* lead to unrealistic time and cost estimates. These findings complement, but also challenge, the more procedural approaches to project governance by pointing out the inherent limitations of human judgment.

Against this backdrop, the Nudge Theory (Thaler & Sunstein, 2008; Sunstein, 2015) emerges as a potentially transformative framework. By subtly altering the choice architecture without restricting freedom, nudges have demonstrated measurable effects in domains such as health (Volpp et al., 2017), sustainability (Schubert, 2017), and organizational behavior (Osman, 2020). However, their application to project management remains largely underexplored. While the literature provides a comprehensive understanding of project delays and a growing body of evidence on the effectiveness of nudges, there is little overlap between the two streams.

This misalignment opens a series of research gaps that justify the present study.

Table 2.1 Synthesis of Gaps in the Literature on Project Delays and Nudge Theory
Source: Own elaboration

Dimension	Key Authors	Main Contributions	Identified Gaps
Communication and Coordination	Kerzner (2017); Williams (2017); Mohabuth (2017)	Highlight poor communication and weak coordination as key drivers of delays.	Address issues mainly through formal processes; little exploration of behavioral nudges as interventions.
Team Motivation	Karanam (2018); Randhawa (2007); Cialdini (2021)	Stress the role of individual and collective motivation in project performance.	Lack of practical, low-cost mechanisms to sustain motivation; nudges remain under-tested in this area.
Time Estimation Biases	Kahneman & Tversky (1979); Flyvbjerg (2021); Matos & Lopes (2013)	Expose optimism bias and the planning fallacy as root causes of overruns.	Little evidence on how nudges (e.g., historical anchoring, continuous feedback) can correct these biases.
Risk and Task Management	Kerzner (2017); Williams (2017); PMI (2017)	Emphasize structured risk and task management practices.	Minimal integration of behavioral interventions into risk management routines; absence of empirical validation.
Project Methodologies	Beck et al. (2001); Schwaber & Sutherland (2020); Royce (1970); Schwalbe (2018)	Contrast Agile (iterative, adaptive) with Waterfall (linear, sequential).	Lack of clarity on which nudges are more effective in Agile vs. Waterfall environments; no comparative studies.
Application of Nudge Theory	Thaler & Sunstein (2008); Sunstein (2015); Osman (2020); Schubert (2017)	Demonstrate nudges' effectiveness in other domains (health, policy, sustainability).	Very limited application to project management; ethical risks and contextual contingencies remain unexplored.

Research Questions

Building on these gaps, the following research questions are proposed to guide the study:

- **RQ1:** How can different types of nudges mitigate the main behavioral causes of project delays (communication failures, inaccurate time estimates, lack of motivation, weak coordination, and poor risk management)?
- **RQ2:** How does the effectiveness of nudges vary across different project management methodologies (Agile, Waterfall, and hybrid approaches)?
- **RQ3:** What ethical risks and dilemmas are associated with introducing nudges into project contexts, and how can these be mitigated?

- **RQ4:** How do project managers perceive the influence of nudges on temporal performance, and which pathways are considered most relevant for improving schedule adherence?
- **RQ5:** Which contextual factors (e.g., team maturity, project complexity, sectoral environment) moderate the relationship between nudges and project performance?

This set of research questions highlights the need for a qualitative exploration of project managers' perceptions and experiences. Such an approach allows for the identification of behavioral mechanisms and contextual factors that cannot be captured through purely quantitative designs, thereby justifying the methodological choices presented in Chapter 3.

3. Methodology

3.1. Research Design

This study adopts a qualitative exploratory research design, consistent with the emerging nature of the topic and the absence of consolidated empirical evidence on the role of nudges in project management. Rather than testing pre-formulated hypotheses, the study aims to generate insights into how nudges can mitigate behavioral causes of project delays, and how these dynamics vary across project management methodologies (Agile, Waterfall, and hybrid).

This study follows an exploratory, qualitative and interpretive design, focusing on understanding project managers' perceptions of nudges rather than establishing causal effects. The goal is to identify perceived behavioral mechanisms in different methodological and sectoral contexts.

To ensure transparency between research questions (RQ) and techniques, Table 3.1 maps each RQ to its data source and analytical approach.

Table 3.1 Mapping RQs to Data and Analysis
Source: Own elaboration

Research Question	Data Source	Analytical Technique
RQ1 – Nudges vs. delay causes	Interviews (open questions)	Deductive + inductive thematic coding
RQ2 – Variation by methodology	NVivo matrix queries (Agile/Waterfall/Hybrid)	Cross-case comparison
RQ3 – Ethical risks	Segments on ethics	Negative case analysis
RQ4 – Perceived impact on schedule	Narratives and practical examples	Identification of behavioral pathways
RQ5 – Contextual factors	Sector/maturity profiles	Comparative thematic synthesis

The design follows an interpretivist paradigm, privileging the perceptions, experiences, and reflections of project managers. Given the novelty of the subject, qualitative methods are particularly suitable to capture nuances, contextual variations, and the subjective meanings attributed to nudges in real project environments.

Although RQ4 originally referred to objective measures of temporal performance, in this qualitative design the focus lies on managers' perceptions of how nudges may influence schedule adherence. The aim is not to establish causal measurement but to identify perceived behavioral pathways that connect nudges to performance.

3.2. Data Collection Instrument

To address the research questions identified in Section 2.5, a semi-structured questionnaire with open-ended questions was developed. The instrument was designed to elicit rich, descriptive accounts from project managers regarding:

1. Their experiences with the main behavioral causes of project delays (communication breakdowns, time estimation biases, motivational challenges, coordination problems, and risk/task management issues).
2. Their perceptions of the potential of nudges, drawn from the literature, to mitigate these causes.
3. Their views on contextual moderators (e.g., methodology, sector, project complexity) might influence the effectiveness of nudges.
4. Their reflections on possible risks, limitations, or ethical concerns in applying nudges to project contexts.

The questionnaire combined exploratory prompts (e.g., “Can you describe situations where communication breakdowns led to delays?”) with classification tasks (e.g., assessing the perceived usefulness of specific nudges in their context). This dual approach allowed both open narrative responses and structured prioritization of interventions.

To mitigate potential anchoring bias linked to the pre-provided list of 25 nudges, several safeguards were implemented: Interviews began with open-ended questions before showing the list; the order of items in the list was randomized across participants; participants were explicitly invited to propose additional nudges not included in the list; a cognitive pre-test was conducted to ensure understanding of the nudge concept, using neutral examples (e.g., health, consumer behavior).

3.3. Pre-Testing and Refinement

Prior to full deployment, the questionnaire was pre-tested with three project managers to evaluate clarity, comprehensibility, and alignment with the research questions. The pre-tests revealed a critical challenge: several respondents were unfamiliar with the concept of “nudges” and struggled to engage with the questions as originally phrased.

To address this limitation, the instrument was refined by providing all participants with a structured list of 25 nudges, previously identified in the literature (Thaler & Sunstein, 2008; Sunstein, 2015; Osman, 2020; Schubert, 2017). The list included short definitions and examples, ensuring a shared baseline of understanding across respondents. This adjustment facilitated richer responses and enabled managers to reflect concretely on how these interventions related to their own project contexts.

Nevertheless, this adaptation may have introduced a potential bias, insofar as respondents were guided by pre-specified nudges rather than generating ideas entirely independently. This limitation is explicitly acknowledged and discussed in Chapter 6.

While piloting, reflexive memos were taken to capture participants' reactions, which allowed refining the interview language for clarity. All changes were documented in a controlled version of the instrument.

3.4. Sample

The study engaged 24 project managers, purposively selected to ensure diversity across sectors (telecommunications, banking, healthcare, utilities, energy, and services), methodological backgrounds (Agile, Waterfall, and hybrid), and levels of seniority. Participants were required to have at least three years of professional experience in project management to ensure relevance and depth of insights.

Recruitment was conducted through professional networks, with invitations sent to managers across different industries and methodological contexts. This purposive sampling strategy aimed to maximize heterogeneity and capture a wide range of perspectives rather than statistical representativeness. While three invitees declined due to lack of availability, no participants were excluded for lack of profile fit.

Sampling was purposeful and heterogeneous, ensuring diversity across sectors and project methodologies. Inclusion criteria were: (i) at least three years of project management experience; (ii) direct involvement in projects with defined deadlines; (iii) availability for a 60 to 90 minute interview.

Sample size was determined according to theoretical saturation and the concept of information power. Repetitive patterns emerged around the 18th interview, were confirmed by the 22nd, and two additional interviews were conducted for cross-validation.

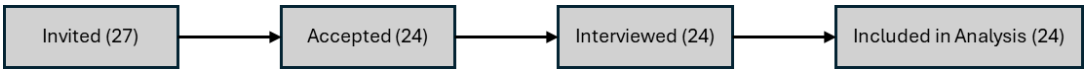


Figure 3.1 Recruitment Flow
Source: Own elaboration

This approach strengthens the external validity of findings by capturing varied experiences across contexts. However, it also introduces a potential bias of convenience, since participants were partly drawn from existing professional contacts. The study therefore does not claim representativeness of the broader population of project managers but rather seeks to generate exploratory insights that inform theory and practice.

3.5. Data Collection Procedures

Interviews were conducted between September 2023 and August 2025, in hybrid format (12 face-to-face, 12 online). All interviews were conducted in European Portuguese, audio-recorded with explicit consent, and transcribed automatically followed by manual revision. Transcripts were returned to participants for factual verification (*member checking*).

Each participant received: An introductory briefing document outlining the study's objectives, assuring confidentiality, and defining nudges in accessible language, with the list of 25 nudges identified in the literature, grouped according to the five main causes of delays, the semi-structured questionnaire, administered through individual interviews lasting between 60 and 90 minutes.

The interviews were conducted in a conversational style, enabling participants to elaborate on their experiences while also engaging with the classification tasks. Notes and transcripts were anonymized to protect confidentiality.

3.6. Data Analysis

Data analysis followed the six-step framework of thematic analysis proposed by Braun and Clarke (2006), combining an inductive exploration of participants' narratives with a deductive alignment to the five categories of project delay causes identified in the literature. NVivo 14 was employed not only as a repository but as an analytical tool that enabled systematic coding, comparison across cases, and the generation of descriptive statistics to support transparency and rigor.

The process unfolded in three main stages. First, all transcripts were coded line by line, producing 246 initial codes that reflected specific events, perceptions, and interventions described by project managers. Second, these were consolidated into 37 subcategories during axial coding, through the identification of relationships and overlaps (for example, "irrelevant emails" and "information duplication" were grouped under "communication overload"). Third, subcategories were organized into five overarching themes aligned with the main behavioral causes of project delays: communication failures, time estimation biases, coordination challenges, motivational issues, and risk and dependency management.

NVivo queries and matrix coding were used to compare distributions across methodologies (Agile, Waterfall, Hybrid), levels of seniority, and sectors. For example, "communication failures" generated 89 coded references (37% of all coded material), with Agile managers emphasizing overload, while Waterfall managers stressed delays in reporting lines. Similarly, "time estimation biases" produced 56 references, 68% of which were concentrated in regulated sectors such as banking and healthcare.

For RQ4, specific attention was given to how participants described the link between nudges and schedule adherence. Rather than seeking direct measurement, the analysis captured perceived pathways,

for example, managers associating nudges with improved coordination or recognition that, in turn, contributed to timely delivery.

Throughout the process, triangulation was applied by comparing narrative responses with classification tasks embedded in the interviews. Additionally, preliminary coding outcomes were shared with selected participants to validate interpretations (*member checking*), thereby reducing the risk of researcher bias and enhancing the credibility of the analysis.

3.7. Data Handling and Tools

Audio files and transcripts were stored on a secure institutional server, encrypted with AES-256, with access limited to the researcher and supervisor. Weekly backups were performed.

In line with Research Data Management (RDM) policies, anonymized transcripts will be retained for five years and then deleted. Only anonymized excerpts may be shared in academic repositories, subject to institutional approval.

3.8. Ethical Considerations

All participants provided informed consent and were assured anonymity. Data were stored securely and used exclusively for academic purposes. Given that nudges can raise ethical concerns related to manipulation, transparency and voluntariness were emphasized throughout the study. Participants were explicitly informed that the interventions under discussion were hypothetical and non-coercive.

Nonetheless, the refinement of the questionnaire by providing a pre-defined list of nudges may have influenced participants' responses, potentially constraining the spontaneity of insights. This methodological choice improved comprehension but also constitutes a limitation that must be taken into account when interpreting the findings.

In compliance with the General Data Protection Regulation (GDPR), identifying information was removed from all transcripts and findings are presented in aggregate form. As the study was exploratory and non-interventional, no formal approval from an ethics committee was required; however, the research was conducted in line with institutional ethical guidelines on integrity, transparency, and respect for participants.

Overall, the methodological procedures described in this chapter ensure that the study is both ethically sound and analytically rigorous. They provide the foundation for addressing the research questions identified in Chapter 2, and for presenting the findings in a coherent and transparent way in the next chapter.

A reflexivity exercise was also undertaken: the researcher acknowledged prior experience in project management as a potential source of interpretative bias. To mitigate this, a reflexive diary was kept, standardized guides were followed, and interpretations were discussed with the contributor of this study (*peer debriefing*).

4. Findings and Data Analysis

4.1. Introduction

The purpose of this chapter is to present the findings of the qualitative analysis in direct relation to the five research questions. Results are organized thematically, with illustrative quotations and descriptive statistics, in order to show how project managers perceive the role of nudges in mitigating behavioral causes of delays.

The findings of the study are based on qualitative data collected from 24 project managers across diverse sectors. The analysis follows a thematic approach (Braun & Clarke, 2006), supported by NVivo 14 for coding and organization. Descriptive statistics provide an overview of the sample, while illustrative quotes bring depth and authenticity to the narratives.

The results offer a qualified confirmation of the literature: while the five categories of project delay causes (communication, estimation, coordination, motivation, and risk) were widely recognized, participants emphasized nuances that differ from how these causes are commonly described in prior research.

4.2. Sample Overview

Descriptive statistics contextualize the participant pool.

- **Professional experience**: 12 senior managers (>10 years), 8 mid-level (5–10 years), 4 junior (<5 years).
- **Methodologies applied**: 10 Agile, 8 Waterfall, 6 Hybrid.
- **Sectors represented**: Telecommunications (5), Banking (4), Healthcare (4), Utilities (3), Energy (3), Services (5).
- **Managerial level**: 14 senior project managers, 7 mid-level, 3 junior.

This distribution ensured diversity of perspectives, with managers from different contexts reflecting on both common challenges and methodology-specific nuances.

A total of 246 coded references were identified across the 24 interviews. Table 4.1 provides an overview of the five main categories, the number of coded references, and illustrative subcategories.

Table 4.1 Overview of Coded References by Theme
Source: Own elaboration

Theme	Coded References	Key Subcategories (examples)
Communication Failures	89 (37%)	Overload, irrelevance, delayed reporting
Time Estimation Biases	56 (23%)	Political pressure, optimism bias
Coordination Challenges	44 (18%)	Tool duplication, unclear dependencies
Motivational Issues	32 (13%)	Lack of recognition, absence of belonging
Risk and Dependency Management	25 (9%)	Dormant risk logs, lack of updates

These statistics highlight that communication and estimation issues dominated participants' narratives, together accounting for 60% of all coded material. This reinforces the emphasis on behavioral and organizational drivers of delays rather than purely technical or procedural shortcomings.

4.3. Representative Voices

To capture the variety of perspectives, several representative profiles are highlighted:

- **Senior Agile Manager (15 years, Telecommunications):**
  "Deadlines slip not because people don't know what to do, but because we overload them with irrelevant stand-ups and dashboards. Nudges should simplify, not add noise."
- **Mid-level Waterfall Manager (8 years, Banking):**
  "Risk logs are always there. The real problem is that we don't revisit them unless the client pressures us. A default review nudge could help."
- **Junior Hybrid Manager (3 years, Healthcare):**
  "Recognition works wonders in Agile sprints, but in hybrid projects we still depend on client-driven milestones. Sometimes nudges feel powerless against external pressure."

These illustrative profiles demonstrate the variety of experiences and set the stage for the thematic analysis.

4.4. Causes of Project Delays: A Qualified Confirmation

Communication Failures

While the literature highlights *lack of communication* as a central issue (Kerzner, 2017), participants described overload and irrelevance of communication as equally problematic.

"We don't just lack information, we drown in unnecessary emails that slow decision-making." (Senior Agile Manager, Telecoms)

Time Estimation Biases

Previous research attributes estimation errors to optimism bias (Kahneman & Tversky, 1979). Participants acknowledged this but stressed organizational pressures to commit to unrealistic deadlines.

"It's not personal optimism, it's political pressure from stakeholders that forces us into impossible commitments." (Mid-level Manager, Banking)

Coordination Challenges

Literature points to coordination gaps (Mohabuth, 2017). Managers confirmed this but highlighted duplication of tools and misaligned processes as new sources of inefficiency.

"We have Jira, Excel, and SharePoint for the same tasks, it creates chaos rather than clarity." (Hybrid Manager, Energy)

Motivational Issues

While motivation is broadly recognized as a driver of performance (Karanam, 2018), participants identified lack of recognition and belonging as the true underlying issues.

"People are motivated when they feel their work matters. Without recognition, deadlines become meaningless." (Junior Manager, Healthcare)

Risk and Dependency Management

The literature emphasizes the absence of risk practices (Williams, 2017). Managers agreed risks were under-addressed, but specified that the problem was risk registers not being actively used or updated.

"The risk log exists but it's dead, nobody looks at it until a crisis." (Senior Manager, Services).

4.5. Perceptions of Nudges

When presented with a list of 25 nudges, participants recognized their potential but stressed the need for contextual adaptation:

- **Communication Nudges**: Personalized reminders were effective but risked saturation.
- **Estimation Nudges**: Historical anchoring was credible; continuous feedback was useful but could feel like micromanagement.
- **Coordination Nudges**: Visual boards were welcomed in Agile but perceived as bureaucracy in Waterfall.
- **Motivational Nudges**: Recognition and public commitments were powerful in Agile but carried risks of stress and shaming.
- **Risk Nudges**: Defaults for periodic reviews were useful but could devolve into "tick-box" exercises.

Participants did not provide quantitative evidence of temporal improvements, but they consistently reflected on perceived pathways through which nudges may support schedule adherence. Managers often linked nudges to intermediate behaviors, such as clearer communication, more realistic estimations, and sustained motivation, that they perceived as ultimately contributing to on-time delivery. These insights are therefore best understood as perceived linkages, rather than objective measures of impact.

4.6. Methodological Contexts

Differences emerged across methodologies:

- Agile Managers valued social and recognition-based nudges, consistent with iterative collaboration.
- Waterfall Managers preferred defaults and structured reporting nudges, aligned with sequential processes.
- Hybrid Managers combined approaches, applying Agile nudges in execution phases and Waterfall nudges in planning.

4.7. Ethical Considerations

Concerns emerged about the thin line between nudges and coercion:

- *"At what point does a daily reminder become pressure?"* (Mid-level Manager, Utilities)
- *"Recognition is great, but if misused it turns into favoritism."* (Senior Manager, Banking)

This reflects Sunstein's (2015) warning that nudges must remain transparent and non-manipulative.

4.8. Synthesis

The findings provide a qualified confirmation of the literature: the same categories of causes appear, but their manifestations differ significantly. Overload, external pressure, and cultural factors complicate the neat categories described in theory.

Nudges are perceived as promising behavioral interventions, but their success depends on contextual fit (methodology, team maturity, sector) and ethical calibration to avoid coercion or overload.

Thus, nudges can be conceptualized as behavioral governance mechanisms, complementary, low-cost tools that enhance but do not replace formal project management practices.

To ensure coherence between the data analysis and the research objectives, the main findings are summarized here in relation to each research question:

- **RQ1: How can different types of nudges mitigate the main behavioral causes of project delays?**

Participants confirmed that nudges could target all five categories of delay causes, but with variations in manifestation. Communication overload, political pressure on estimations, and lack of recognition emerged as key areas where nudges were perceived as most impactful.

- **RQ2: How does the effectiveness of nudges vary across different project management methodologies?**

  Agile managers valued social and recognition-based nudges, Waterfall managers preferred defaults and structured reporting nudges, while Hybrid managers applied mixed approaches depending on the project phase.

- **RQ3: What ethical risks and dilemmas are associated with introducing nudges in project contexts?**

  Managers expressed concerns about coercion, favoritism, and transparency. Ethical boundaries were viewed as necessary safeguards to prevent misuse of nudges.

- **RQ4: How do project managers perceive the influence of nudges on temporal performance, and which pathways are considered most relevant for improving schedule adherence?**

  Nudges were perceived as indirect enablers of schedule adherence by influencing behaviors such as communication, coordination, and motivation. These were understood as perceived pathways rather than objective performance measurements.

- **RQ5: Which contextual factors moderate the relationship between nudges and project performance?**

  Methodology, team maturity, and sectoral environment were identified as key moderators. Regulated sectors favored structured nudges, while dynamic sectors favored social nudges.

This summary reinforces the alignment between the empirical findings and the research questions, providing a structured basis for the discussion in Chapter 5.

5. Discussion

5.1. Introduction

This chapter discusses the findings in light of the literature reviewed in Chapter 2, with the aim of addressing the five Research Questions. The discussion highlights both convergences and divergences with prior studies, emphasizes the contributions of this research to the fields of project management and behavioral economics, and reflects on the practical and theoretical implications of applying nudges as behavioral governance mechanisms.

5.2. RQ1: How can different types of nudges mitigate the main behavioral causes of project delays?

The findings confirm that nudges can address the five categories of behavioral causes identified in the literature but in differentiated ways.

- **Communication failures**: Consistent with Kerzner (2017) and Williams (2017), managers reported communication as a critical source of delay. However, unlike the literature's focus on absence of information, participants stressed *overload and irrelevance*. Here, communication nudges such as personalization and targeted reminders proved valuable, aligning with Osman's (2020) work on behavioral interventions in organizations.
- **Time estimation biases**: Echoing Kahneman & Tversky (1979) and Flyvbjerg (2021), participants recognized optimism bias but reframed it as *externally imposed optimism* driven by organizational politics. Anchoring nudges (linking estimates to historical data) emerged as a promising corrective.
- **Coordination challenges**: Literature emphasizes interdependencies (Mohabuth, 2017), and participants confirmed this but highlighted tool duplication as a new source of inefficiency. Coordination nudges such as visual boards were perceived as mitigating this, though only in Agile contexts.
- **Motivational issues**: Whereas Karanam (2018) highlights generic lack of motivation, participants stressed recognition and belonging. Recognition nudges, particularly public acknowledgment, were effective in reinforcing engagement, aligning with Cialdini's (2021) work on social influence.
- **Risk and dependency management**: Literature often highlights lack of risk practices (PMI, 2017). Participants revealed instead that risks are documented but ignored. Default nudges mandating periodic reviews were suggested as remedies.

In summary, nudges are not panaceas but can target specific behavioral mechanisms, providing subtle yet powerful corrections when carefully designed.

5.3. RQ2: How does the effectiveness of nudges vary across different project management methodologies?

Findings revealed clear methodological contingencies:

- Agile managers valued social nudges (recognition, pre-commitment), resonating with the iterative and collaborative nature of Agile (Beck et al., 2001; Schwaber & Sutherland, 2020).
- Waterfall managers favored defaults and standardization nudges, reflecting the linear and documentation-driven context described by Royce (1970) and Schwalbe (2018).
- Hybrid managers selectively combined both, illustrating that nudges are not universally applicable but context-dependent.

This comparative insight extends the literature by showing that nudges align not only with behavioral causes but also with methodological logics. This confirms the argument of contextual adaptation in project management (Williams, 2017) and suggests that nudges may represent a flexible behavioral layer to be integrated into diverse governance frameworks.

5.4. RQ3: What ethical risks and dilemmas are associated with introducing nudges in project contexts?

The literature (Sunstein, 2015) warns of ethical tensions between subtle influence and manipulation. This study corroborates those concerns: managers worried that reminders could become coercive and recognition could devolve into favoritism.

This finding highlights the importance of **transparency, proportionality, and voluntariness** in applying nudges in project settings. Ethical governance is thus a prerequisite, not an afterthought, for behavioral interventions in organizations.

5.5. RQ4: How do project managers perceive the influence of nudges on temporal performance, and which pathways are considered most relevant for improving schedule adherence?

RQ4 explored how project managers perceive the influence of nudges on temporal performance. The findings indicate that managers view nudges as indirect enablers: by improving communication, coordination, and motivation, nudges are seen as pathways that support schedule adherence. These are perceived linkages rather than objective measurements, yet they highlight relevant behavioral mechanisms for future empirical testing.

This suggests that nudges act as proximal enablers rather than direct determinants of temporal performance. Their impact is mediated by team behaviors, which in turn affect deadlines. This complements Mohabuth (2017) emphasis on the high costs of delays by proposing that nudges can function as low-cost, preventive mechanisms.

Future research should adopt longitudinal or experimental designs to measure causal links between nudges and project performance indicators.

5.6. RQ5: Which contextual factors moderate the relationship between nudges and project performance?

The study revealed several moderators:

- **Methodological approach** (Agile, Waterfall, Hybrid).
- **Team maturity**: Senior teams were more skeptical of recognition nudges, whereas junior teams found them highly motivating.
- **Sectoral environment**: Regulated sectors (banking, healthcare) favored structured nudges, while dynamic sectors (telecommunications, services) leaned toward social nudges.

These findings extend the literature by showing that nudges are not universally effective but conditioned by organizational and cultural contexts, echoing Turner & Müller's (2005) view of project success as multi-dimensional and context-sensitive.

5.7. Conceptual Framework

Building on the findings and their alignment with the literature, this study proposes a conceptual framework in which nudges operate as behavioral governance mechanisms within project management. The framework is structured in three layers:

1. **Nudge interventions** – Derived from behavioral economics, these include defaults, reminders, recognition practices, and anchoring techniques introduced into project environments.
2. **Behavioral pathways** – Nudges influence intermediate behaviors such as clearer communication, more realistic estimations, stronger coordination, sustained motivation, and more active risk management.
3. **Perceived schedule adherence** – Through these pathways, project managers perceive nudges as contributing indirectly to improved adherence to project deadlines. While no direct causal impact was measured, the perceived behavioral linkages indicate relevant mechanisms for future empirical testing.

In addition, the framework incorporates two critical dimensions:

- Contextual moderators such as project methodology (Agile, Waterfall, Hybrid), team maturity, and sectoral environment, which condition the effectiveness of nudges.
- Ethical boundaries, including risks of coercion, favoritism, and transparency loss, which must be considered when applying nudges responsibly in organizational settings.

This conceptual framework synthesizes the study's contributions by connecting the literature on project delays with insights from behavioral economics. It provides a foundation for further research that can empirically test the pathways and evaluate their causal impact on project performance.

Figure 5.1 illustrates the conceptual framework emerging from this study. Nudges are positioned as behavioral governance mechanisms that operate through intermediate pathways, communication, estimation, motivation, coordination, and risk management, rather than exerting direct causal effects. By shaping these pathways, project managers perceive nudges as indirectly supporting schedule adherence. The framework also highlights contextual moderators (project methodology, team maturity, and sectoral environment) that condition the perceived effectiveness of nudges. Finally, it recognizes ethical boundaries, including risks of coercion, favoritism, and transparency loss, which delimit the responsible application of nudges in organizational contexts. Together, these dimensions synthesize the study's theoretical contribution by linking project delay literature with behavioral economics and offering a foundation for future empirical testing.

The conceptual framework presented in the following section (Figure 5.1) therefore constitutes the central theoretical contribution of this study. It integrates nudges, behavioral pathways, contextual moderators, and ethical boundaries into a coherent model that extends the literature on project delays and behavioral economics.

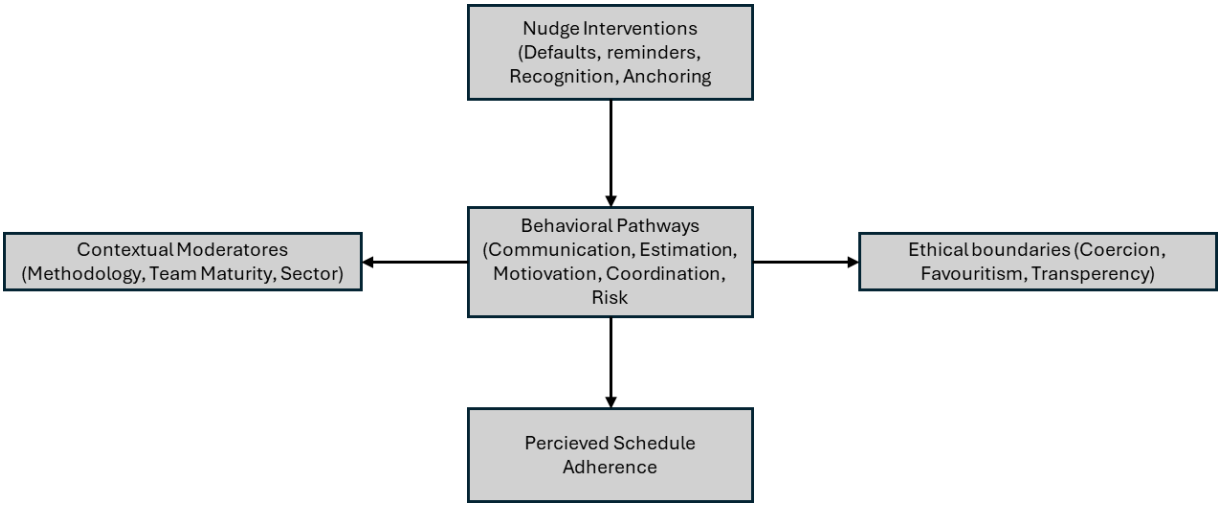


Figure 5.1 Conceptual Framework: Nudges as Behavioral Governance Mechanisms

Source: Own elaboration

6. Conclusion

6.1. Recapitulation of the Study

This research set out to explore how nudges, as conceptualized within behavioral economics, can address the behavioral causes of project delays. Building on the literature that identifies communication, estimation biases, coordination, motivation, and risk management as recurring drivers of delays, the study sought to investigate the potential of nudges as complementary mechanisms in project governance.

To this end, a qualitative research design was adopted. A semi-structured questionnaire, enriched with a predefined list of 25 nudges drawn from the literature, was administered to 24 project managers across sectors and methodologies. Thematic analysis, supported by NVivo, enabled the identification of patterns and nuances, leading to a qualified confirmation of literature.

6.2. Main Findings

The study yielded several key insights:

1. **Qualified confirmation of delay causes**: The five categories established in the literature were validated, yet participants emphasized different manifestations, communication overload rather than absence, political pressure rather than optimism, recognition rather than generic motivation.
2. **Contextual effectiveness of nudges**: Nudges were seen as effective in mitigating delays, but their usefulness varied by project methodology. Agile managers favored social nudges, Waterfall managers defaults and standardization, while hybrid managers combined both approaches.
3. **Ethical considerations**: Concerns about coercion, favoritism, and transparency emerged, confirming the necessity of ethical reflection when applying nudges in organizational contexts.
4. **Moderating factors**: Team maturity, sectoral environment, and project methodology shaped how nudges were perceived and applied.

6.3. Theoretical Contributions

This research contributes to the literature by:

- Providing empirical evidence of how nudges can be understood as behavioral governance mechanisms within project management.
- Extending existing knowledge on project delay causes by adding contextual and behavioral depth (e.g., overload, political pressure, recognition).

- Bridging the fields of behavioral economics and project management, traditionally studied in isolation, into a coherent analytical framework.

A central theoretical contribution of this research is the conceptual framework proposed in Figure 5.1. This model positions nudges as behavioral governance mechanisms that influence project performance indirectly through key behavioral pathways, communication, estimation, motivation, coordination, and risk management. It further highlights the moderating role of methodology, team maturity, and sector, as well as the ethical boundaries that delimit responsible application. This framework synthesizes the empirical findings and extends the literature by offering a structured foundation for future empirical validation.

6.4. Practical Implications

The practical implications of this study can be illustrated through contextualized examples of nudges in different project management environments. Table 6.1 summarizes how specific nudges may be operationalized in Agile, Waterfall, and Hybrid contexts, while also acknowledging potential risks. This perspective emphasizes that nudges are not universal solutions but require careful calibration to context, team maturity, and sector.

Table 6.1 Practical Applications of Nudges in Project Management
Source: Own elaboration

Context	Relevant Nudge	Practical Example	Potential Risk
Agile	Social recognition	Public acknowledgment of sprint achievements in team channels	Stress or favoritism
Agile	Pre-commitment	Team members commit to sprint goals at planning meetings	Pressure on junior staff
Waterfall	Default risk reviews	Pre-scheduled risk log reviews every two weeks	“Tick-box” compliance without depth
Waterfall	Anchoring on past projects	Basing estimates on historical delivery data	Ignoring contextual differences
Hybrid	Visual coordination boards	Integrated dashboard combining Agile tasks and Waterfall milestones	Perceived bureaucracy
Cross-context	Personalized reminders	Automated but tailored reminders for pending deliverables	Overload and reduced attention

These examples show how nudges may be practically embedded in project management practices while also highlighting the risks of misapplication. Managers should therefore treat nudges as complementary tools rather than prescriptive solutions.

6.5. Limitations

The study's limitations should be acknowledged:

- The use of a predefined list of nudges improved comprehension but may have constrained spontaneity.
- The qualitative design restricts generalization and does not establish causal relationships.
- The sample size (24 participants) ensures diversity but not representativeness across all industries or geographies.
- This study was completed about potential impact on Project Management in a general matter, without any segmentation of the various industries that projects may be impacted.

6.6. Directions for Future Research

Building on these findings, future studies could:

- Conduct experimental or longitudinal research to measure the causal impact of nudges on project performance.
- Compare Agile vs. Waterfall interventions systematically across multiple case studies.
- Explore ethical boundaries of nudges in organizational contexts, especially where pressure and transparency collide.
- Investigate sector-specific applications, testing which nudges are more effective in regulated versus dynamic environments.

Future studies should adopt longitudinal or experimental designs to measure the causal impact of nudges on objective project performance metrics.

6.7. Final Remarks

This study has examined how project managers perceive the role of nudges as behavioral governance mechanisms in addressing the well-established behavioral causes of project delays. By integrating insights from behavioral economics with the project management literature, the study has provided an original conceptual framework that links nudges to behavioral pathways, contextual moderators, and ethical boundaries.

At the same time, it is important to emphasize the exploratory and qualitative nature of this research. The findings reflect managers' perceptions rather than direct causal measurements of project outcomes. Nudges were understood as indirect enablers of schedule adherence, shaping behaviors such as communication, estimation, motivation, coordination, and risk management, but their objective impact remains to be empirically validated.

As such, the study contributes primarily by advancing theoretical understanding and by illustrating practical avenues for experimentation in Agile, Waterfall, and Hybrid contexts. Future studies, especially quantitative, longitudinal, or experimental, will be needed to test the robustness of the proposed framework and to measure the actual effects of nudges on project performance.

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