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Project Management: Shaping dimensions and criteria to achieve success

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Mestrado em Gestão de Empresas

Orientador:

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ISCTE Business School

Outubro, 2022

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BUSINESS
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Departamento de Marketing, Operações e Gestão Geral

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Acknowledgements

"People with passion can change the world for the better."

– Steve Jobs

I would add to Steve Jobs's phrase the importance of surrounding ourselves with people with whom we can share the road to success, celebrate victories and support ourselves in setbacks.

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Resumo

Os últimos anos caracterizam-se por um ambiente dinâmico decorrente de uma instabilidade económica e social. O que obriga à adaptação e evolução das organizações, através da utilização de projetos para se manterem competitivas, levando a que o sucesso dos projetos seja uma parte vital da geração de resultados e melhoria do desempenho das organizações.

Este ambiente competitivo questionou, igualmente, a forma mais tradicional de medir o sucesso (Custo, Tempo, Âmbito e Qualidade), para incluir dimensões como a perceção das partes interessadas. No entanto, não existe um acordo entre profissionais de gestão de projetos e investigadores sobre qual a definição de sucesso do projeto.

Baseado num raciocínio dedutivo e numa estratégia de investigação qualitativa, este estudo visou abordar o sucesso dos projetos e propor uma *framework* que possa ser utilizada por organizações na avaliação dos seus projetos.

O presente estudo realizou uma revisão bibliográfica que analisou *frameworks* existentes, complementada por uma análise de entrevistas semiestruturadas a quinze gestores de projetos e programas com, pelo menos, cinco anos de experiência em gestão de projetos em diferentes setores da indústria.

As descobertas deste estudo permitiram o desenvolvimento de uma *framework* multidimensional, considerada mais abrangente e com uma linguagem comum a outros métodos de avaliação, para avaliar o sucesso dos projetos constituída por quatro dimensões: (1) Eficiência do projeto; (2) Sucesso negócio e estratégia; (3) Sustentabilidade; e (4) Satisfação das partes interessadas; que futuramente poderá ser utilizada por investigadores no desenvolvimento de novos estudos sobre gestão de projetos e por profissionais.

Palavras-Chave: Projeto; Gestão de Projeto; Sucesso da Gestão de Projeto; Sucesso do Projeto.

Classificação JEL:

- M10 – Administração de Empresas; Geral.
- O22 – Análise de Projectos.

Abstract

In the last years, economic and social instability created a dynamic environment that forced the need for organisations, through the use of projects, to adapt and evolve to maintain their competitiveness. In this sense, project success became a vital part of the short- and long-term organisation generation of value and performance improvement.

This competitive and demanding business environment questioned the traditional measurement of success (i.e., Cost, Time, Scope, and Quality) to include other success dimensions (e.g., Stakeholder's perception). Nevertheless, there's no agreement between project management professionals and researchers about the proper definition of project success.

Through a deductive reasoning and a qualitative research strategy, this study aimed to address project success and propose a framework that modern organisations can use to measure the performance of their projects.

This study conducted a literature review that analysed the existing frameworks, complemented by a content analysis of semi-structured interviews of fifteen project and programme managers with at least five years of experience in project management through different industry sectors.

The study findings allowed the development of a multidimensional project success framework, more comprehensive and with a common language with other success evaluation methods, with four distinct dimensions: (1) Project Efficiency; (2) Business & Strategy Success; (3) Sustainability; and (4) Stakeholder Satisfaction; which can in the future be used by different project researchers to further development of new studies in the project management field and by professionals.

Keywords: Project; Project Management; Project Management Success; Project Success.

JEL Classification:

- M10 – Business Administration; General.
- O22 – Project Analysis.

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Abbreviations List

C

CEO Chief Executive Officer

D

DAC Development Assistance Committee

G

GO General Objective

I

IPMA International Project Management Association

K

KPI Key Performance Indicators

O

OECD Organisation for Economic Co-operation and Development

P

PMI Project Management Institute

PRINCE2 Projects in Controlled Environments

R

RQ Research Question

S

SO Specific Objective

Introduction

During the last years, worldwide economic and social instability created a dynamic context that forces organisations to adapt to an always-changing environment with a massive proliferation of projects for the fast production of value (Nieto-Rodriguez, 2021). This pressure to stay competitive, be dynamic, adaptable, and rapidly generate value became a vital characteristic for the survival and sustainability of organisations in the long term (BCI, 2016; Pereira & Teixeira, 2015).

In this sense, the ability of projects to generate short- and long-term results based on a set of criteria makes them relevant to allow organisations to change their business and evolve focused on their strategic objectives (Badewi, 2016; Thiry, 2012).

The dynamic of the actual industry forces projects managers to adjust their mindset to more strategic project leadership, becoming a strategic asset for the organisation (A. Shenhar, 2015). Because, more than ever, organisations are relying on their projects' performance to deliver outputs that can allow the achievement of project objectives and provide strategic value to their multiple stakeholders (Bannerman, 2008; Davis, 2017).

However, on the one hand, the above challenges reflect the management focus on results, leadership and strategy of the Chief Executive Officer (CEO) (Nieto-Rodriguez, 2021). On the other hand, generally, project management is still focused on the traditional pre-defined triple constraint criteria mindset, which is internal to the projects and limits the contribution of the project managers to the organisation (Duggal, 2010; Nieto-Rodriguez, 2021; Thiry, 2012; J. R. Turner, 1999).

Nevertheless, project success researchers have been focusing on expanding the success dimensions¹ and respective criteria (Bannerman, 2008). Defending that the inclusion of new measures and mindsets that can be used together with the existing ones is key to allow the "improvement and break out of the outdated ways of traditional project management and reap the benefits of a modern approach" (Nieto-Rodriguez, 2021). Because if "no one cares during project execution whether the customer will buy the product, the chances of coming up with a profitable product are much lower" (A. Shenhar & Dvir, 2007).

This competitive business environment also questioned the project success definition (Badewi, 2016; Frefer et al., 2018), traditionally based on the usual project constraints (i.e., Cost, Time, Scope and Quality), also known as the Triple Constraint or Iron Triangle (Atkinson, 1999), to include other perceptions of Success based in the stakeholder's judgement, in particular, the Sponsor and Client (Frefer et al., 2018; Serrador & Turner, 2015; Weaver, 2007).

¹ Success Dimension, as the aggregation of correlated success criteria's (e.g., Success Dimension: Project Efficiency; Success Criteria's: Time, Cost, Scope).

Institutions like the Project Management Institute also needed to determine other metrics to expand traditional project management success in their PMBOK® Guide – Sixth Edition (2017).

In short, despite the demanding business context and all the evolution in the way project success is seen, there's no agreement between project management professionals and researchers about the proper definition of project success (Albert et al., 2017; Bannerman, 2008; Davis, 2017; A. Shenhar & Holzmann, 2017), "as a result, scholars end up using different scales to measure the same outcome variable of project success, thereby causing inconsistency in research results" (Zwikael & Meredith, 2021, p.1745).

It's considered essential to contribute with a proper framework of project success measurement that promotes a reflection on the project success evaluation concept, contributes with a proposal to help mitigate the unpredictability of success and can be aligned with the different stakeholder perceptions (Sebestyen, 2017).

In this sense, the identification of dimensions and criteria that project managers can consider to expand from the typical: (1) within Budget; (2) on Time; and (3) according to the defined Scope; is considered relevant because the modern perception of success is also influenced by different stakeholders' perspectives and changes from the short-term output to the long-term organisational outcome (Davis, 2017; Serrador & Turner, 2015; Thiry, 2012; R. Turner & Zolin, 2012).

However, the method must be easy to: (1) integrate with the organisation's existing process; (2) use validated criteria and data; and (3) provide consistent results; these factors will allow it to be trustful and relevant (Davis, 2016).

In this matter, this study addresses projects success, more specifically in the way that different organisation can measure it, and is delimited in terms of:

- Space, to organisations and professions that conduct and manage projects.
- Content, to the best practices, experiences, and success frameworks.

The study's general objective (GO) was to *propose a project success framework that modern organisations can use to measure the performance of their projects*, and the two specific objectives (SO) were:

- SO1: To analyse how existing project success frameworks, referred by researchers and institutions, evaluate project success.
- SO2: To analyse how project management professionals perceive project success.

These objectives were derived from the research question (RQ) - What project success framework can modern organisations use to measure the performance of their projects?

Structurally, this study is organised into five chapters, the first of which is the introduction—the second deals with the theoretical review and the conceptual map. The third chapter presents the methodology and the method used. The fourth chapter includes the presentation and discussion of the results. Finally, the fifth and last chapter presents the conclusions, contributions to knowledge, limitations, suggests possible future studies and recommendations.

Theoretical and Conceptual Framework

This chapter contains the literature review of key concepts related to project success (i.e. the difficulty of defining and perceiving project success), and the impact of different dimensions in achieving project success.

2.1. Project Success

Before entering the definition of project success, it is considered relevant to understand the meaning of project and the impact that it creates:

A project is a unique set of processes, consisting of coordinated and controlled activities with start and finish dates, undertaken to achieve an objective. Achievement of the project objective requires deliverables conforming to specific requirements, including multiple constraints such as Time, Cost, and resources - NP ISO 21500 definition.

The definition provided by ISO 21500 is only one example that creates difficulties in defining project success because it raises the following questions: (1) If the project objective isn't achieved, will the project still be successful for the organisation?; and (2) If the project exceeds Time or Cost, will it be a failure?

It's also important to perceive the definition and correlation between project outputs, outcomes, and benefits that, according to Zwikael & Smyrk (2012), can be defined as follows:

- *Outputs*, are the artefacts produced by the project's work; they assume the form of artefacts (things) and are described as tangible.
- *Outcomes*, are defined as desired targets arising through the output's utilisation by a specific stakeholder; although measurable, they are intangible, representing a change in the value of a variable associated with the desired end effect.
- At last, *Benefits*, can be defined as a "flow of value" triggered by the realisation of a target outcome.

According to de Wit (1988), in a realistic environment measuring a project's success is a complex task because a project is hardly a disaster or a failure for all stakeholders – it could be a success for some and a failure for others, and since it's time-dependent, it could also change during the project life cycle.

That is why researchers, professionals and institutions of project management have been discussing and causing a continuous change in the project success definition over the years (Müller & Jugdev, 2012), escalating the Iron Triangle criteria: Cost, Time, and Quality; at the implementation phase of the project (Atkinson, 1999; Duggal, 2010; Pinto & Slevin, 1988; J. R. Turner, 1999), that is almost considered an immutable standard for criteria of success (Sebestyen, 2017), to a more comprehensive and embracing approach (A. J. Shenhar et al., 2002).

This evolution of the criteria that define project success during its implementation and through the product's life cycle (Müller & Jugdev, 2012) was paramount in allowing the creation and transmission of value throughout the project life cycle (Sebestyen, 2017). In this sense, as mentioned, project success became a broader concept than still considers the traditional measures but is now more inclusive, ambiguous, multidimensional, and highly dependent on the perception and perspective of the "eyes of the beholder" during the project life cycle (Ika, 2009; Müller & Jugdev, 2012; Sebestyen, 2017; Serrador & Turner, 2015; A. Shenhar & Holzmann, 2017).

However, despite all the studies conducted in the last years, the problem persists because there was no agreement as to what project success stands for, and no consensual framework was established to help achieve success in project development (Albert et al., 2017; Bannerman, 2008; Davis, 2017; A. Shenhar & Holzmann, 2017; Zwikael & Meredith, 2019).

There is a clear need to develop an applicable measurement method that uses proven existing and new dimensions and criteria that could be consistently and easily used to prevent project failure (Davis, 2017).

2.1.1. Promote and measure project success

In his article, Cooke-Davies (2002) defines success factors as the inputs to the management process that direct or indirectly promote the projects or business success. On the other hand, the success criteria are the standards by which success or failure will be measured and judged.

According to Müller & Jugdev (2012), the project management literature defines project success factors as the independent variables of a project that makes it more likely to achieve success when considered and project success criteria as the dependent variables used to measure and evaluate project success or failure (this study will focus on the success dimension and criteria).

Following the definition of Baccarini (1999) and after Albert et al. (2017), it's also important to organise the success criteria into two groups: hard criteria, based on a key performance indicator that included measuring quantifiable variables like Time, Cost, Performance, economic success and Quality; plus soft criteria that are more qualifiable and less simple to measure using key performance indicators, because they are used to assess the satisfaction of the stakeholders.

In short, and based on the J. R. Turner (1999) study, there is no relevance for project management professionals to add more tools and techniques or success factors without first defining the project success criteria. Because "projects are not an end in themselves, they should be completed successfully to make a valuable contribution to corporate success." (Albert et al., 2017, p.02); for this to happen, the proper success criteria should be used to measure project success (Albert et al., 2017).

2.1.2. Perception of project success

Authors generally define project management and project success similarly (A. Shenhar & Dvir, 2007). However, the first is related to the project team's efficiency in using the available resources and dealing with the project constraints (staying on budget, on schedule and meeting technical goals), also known as project efficiency (A. Shenhar & Dvir, 2007). The second incorporates efficiency and effectiveness – consisting of all the internal and external success aspects related to short and long-term objectives (Ika, 2009; Munns & Bjeirmi, 1996).

Although in some cases, project success is evaluated by achieving the project management success or the product success, in other cases, this separation is not possible, and project success is a combined perspective of project management success and other dimensions (e.g., Business Success, Stakeholder Satisfaction) (A. Shenhar & Dvir, 2007; A. J. Shenhar et al., 2002).

In his article, de Wit (1988), one of the first to point out a difference between project success and project management success (Frefer et al., 2018), defines that project success is based on the project's overall objectives measurement and project management success is measured against the more traditional criteria of Scope, Cost, Time, and Quality of the project outputs.

According to Munns & Bjeirmi (1996, p.02), "project management success and project success are not necessarily related" they saw project management success as a subset of project success that, on its own, is not entirely responsible for project success.

In this sense, project success could be achieved through project management success, but project management success by itself does not avoid project failure. From another point of view, project management failure usually leads to project failure (Ika, 2009). However, from a practical perspective, this is also not entirely true because a project could still become a success (Munns & Bjeirmi, 1996). A famous example is the Sydney Opera House project, which initially was a four-year project with a \$7 million budget and ended up taking fourteen years to be completed at the Cost of \$102 million. Nevertheless, the building paid for itself after two years and is an unquestionable landmark of Sidney worldwide (Nieto-Rodriguez, 2021).

More recent research argues that despite the distinguishment between project success and project management success, they are related because successful project management could lead to project success (Sebestyen, 2017). For example, in a survey of 1.386 projects conducted by Serrador & Turner (2015, p.09), they concluded that "project efficiency is 60% correlated with project success; this falls to 51% if efficiency is defined as time and budget only".

All these findings support the perception that to correctly perceive project success is essential to consider project management success but also other success dimensions. Because even if project management is achieved, and the project product may appear promising, it may not be entirely accepted or used by the customers after the project implementation is finished, not generating the ambitious project outcomes and consequently the desirable benefits.

In brief, a more comprehensive view of project success is essential to perceive it accurately since it should include: (1) "the companies' goal; (2) the project purpose; and (3) the customer's satisfaction with the product" (Albert et al., 2017, p.04).

2.1.3. Impact of different dimensions on project success

Strategy Impact

In the last years, the business environment has become more dynamic and competitive, raising an investment and endeavour of projects, turning them into "engines that drive innovation and change; they turn ideas and strategy into new products and services, and they make organisations better, stronger, and more competitive" (A. Shenhar, 2015, p.01).

The growing importance of projects in implementing business objectives creates a broader and more strategic notion of project success because projects can ultimately help provide long-term business objectives (Müller & Jugdev, 2012).

According to A. Shenhar & Holzmann (2017), in the last twenty years, the view of project success has been changing because of two significant trends:

- The balanced scorecard framework from Harvard's Kaplan and Norton introduced the idea for companies to look at their success with a broader perspective than just financial metrics.
- Recognitions by project management researchers and organisations that measure success only by Cost, Time, and Quality are insufficient.

A. Shenhar & Holzmann (2017) also consider that a project should be viewed as a strategic process that allows the execution of the company's strategy and aligns all stakeholder's vision to its specific levels of complexity and challenge.

The integration of the organisation strategy in the project success definition appears to be paramount in the achievement of a stakeholder's alignment, resulting in a clear perception of the business needs and allowing the creation of competitive advantage throughout the embracement of the value and benefits generated by using the project's outputs.

Stakeholders impact

The stakeholder's evaluation of project success could vary over Time based on the constantly changing environment (Davis, 2016). Therefore, success could be perceived by a particular stakeholder from a specific context perspective at a particular time, depending on the project type and organisation (Besteiro et al., 2015; Davis, 2016; McLeod et al., 2012; Müller & Jugdev, 2012). In this sense, it is relevant to consider, over time, the point of view of multiple stakeholders in the decision process (Davis, 2017).

Besteiro et al.(2015) point out that the goal of a project is to transmit the interest and values of the key stakeholders. However, measuring success should be perceived as an ongoing process of developing a stakeholder's sense-making, achieved through observation or experiences before, during, and after the project (McLeod et al., 2012).

According to Davis (2014), stakeholders do not value all success dimensions equally, and that creates a lack of agreement in the perception of project success, making it crucial to identify the perception of success between the three main stakeholders' groups: (1) senior management; (2) project core team; and (3) project recipient (Besteiro et al., 2015).

Based on the need to identify different stakeholder expectation, the study developed by Davis (2016) identifies two success dimensions related to it, as follow: (1) Benefit to the Stakeholder group; and (2) Client/customer-specific issues; correlating the Stakeholder's Satisfaction with the Project Success.

Time Impact

According to Besteiro et al. (2015), project success evolves with Time because the project management success (or project efficiency) could be measured at the end of the project; nevertheless, the success of the project, regarding its outcomes, might take months or years to be adequately evaluated.

Following the ideas of Besteiro et al. (2015), also Elbaz & Spang (2018) mentions that inevitably because projects are initiatives to be unrolled over Time, project success should be considered and traced from its starting stage to the long-term project operation (Elbaz & Spang, 2018).

In this sense, it is essential to understand the definition of short- and long-term aspects of project success evaluation. Short-term success is related to project management success (i.e., Project Efficiency) by meeting Scope, Time, Cost, and Quality; and long-term success considers the profitable criteria linked to stakeholder satisfaction, business and strategic results (e.g., opportunities based on new technologies, new markets, or new products (Atkinson et al., 2006; A. J. Shenhar, 2001). Generally, the long-term is related to the value and benefits obtained with the project delivery (Albert et al., 2017).

In line with Albert et al. (2017), Zwikael & Meredith (2019) consider that the short-term perspective is not enough to evaluate project success because the contribution to the overall project success of the criteria used to assess project management decreases over Time after the project is completed and the product is delivered.

In resume, it seems that understanding how to measure the contribution of the project outcomes to the strategy and business success is critical to define if a project is a success or failure. Nevertheless, to properly measure success, it's also relevant to consider that different stakeholders have distinct perspectives of results through different time frames that also impact the perception of project success.

2.2. Analysis Model

Table 1 presents the analysis model used in the study.

Table 1 - Analysis model

General Objectives	To propose a project success framework that modern organisations can use to measure the performance of their projects.					
Research Question	What project success framework can modern organisations use to measure the performance of their projects?					
Specific Objectives	Subsidiary Questions	Concepts	Authors	Dimensions	Indicators	Data Collection Techniques
SO1: To analyse how existing project success frameworks, referred by researchers and institutions, evaluate project success.	SQ1: How do existing project success frameworks, referred by researchers and institutions, evaluate project success?	Project Success	A. J. Shenhar & Dvir (2007) Bannerman (2008) Samset & Christensen (2017) Davis (2014 & 2017) OECD (2021) Zwikael & Meredith (2012&2021)	Promote and measure Success	Success Criteria	Literature Review
				Perception of Success	Project success management success	
				Impact on Success	Strategy Stakeholders Time	
SO2: To analyse how project management professionals perceive project success.	SQ2: How do project management professionals perceive project success?	Project Success	A. J. Shenhar & Dvir (2007) Bannerman (2008) Samset & Christensen (2017) Davis (2014 & 2017) OECD (2021) Zwikael & Meredith (2012&2021)	Success perception	Project success management success	Semi-structured interviews
				Promote and measure Success	Success Criteria	
				Impact on Success	Strategy Stakeholders Time	

Methodology and Method

This chapter will describe the methodology and methods that guided the study.

3.1. Methodology

Methodologically, this study uses deductive reasoning and a qualitative research strategy.

3.2. Research Method

This section describes the study sample and procedures, the collective tools, and the data processing techniques.

Literature review: Procedure

Following the steps of Albert et al. (2017), that conducted a structured literature review on project success, it was selected for this study three groups as potential sources of information as follows:

- Articles, taking into account the specificity of this subject it was conducted a journal search using the search engines Google Scholar, EBSCO, Emerald Insight and Elsevier; with "Project Success", "Project Success Management", "Project Success Criteria" and "Triple Constrain" as search terms. From the obtained results it was chosen the articles with relevant or apparent relevant information, for the research, in the title and abstract; after the first sorting, all the remaining articles were read for information collection with particular attention to articles published less than ten years ago. It was also considered relevant reading material articles cited more than once in the main sorting.
- Books, for this group, were considered some of the results obtained in the previous group research, some books recommendation and past reading experiences, all from project management professionals or researchers.
- Standard, in terms of standards, was considered the publications from the main institutions related to project management, in other words, the Project Management Institute (PMI), the International Project Management Association (IPMA) and the Projects in Controlled Environments (PRINCE2) from Axelos.

Interviews: Procedure and participants

It was conducted in the middle of 2021, a pre-test and test phase of semi-structured interviews. This split procedure allowed adjustments of the interview script after the pre-test to better accommodate the study's goals in Table 1, allowing the development of the script in Annex A.

The pre-test sample consisted of two project managers with more than five years of experience managing projects and one with more than ten years of experience managing projects.

The test samples comprised fifteen project and programme managers with at least five years of experience in project management through different industry sectors and functions. Despite being linked to project management activity, some participants were currently board directors in their organisations. They were selected based on their experience through existing university contacts, review of LinkedIn profiles, and email invitations.

The participant's information is in Annex B; the interviews were conducted via video call or email, and all the interviewees were informed of the study objectives and assured that their answers would be anonymous.

Interviews: Data collection instruments

The semi-structured interviews combined the objectives and issues presented in Table 1, in three main groups as follows:

- Group 1, addressed the meaning of project success for organisations regarding the interview experience.
- Group 2, referred to the perception, definition, and measurement of project success.
- Group 3, intended to perceive how distinct dimensions and criteria affect the measuring of project success.

Literature and Interviews: Data processing technique

The qualitative content analysis methodology aimed to identify priori categories according to the procedure definition by Santos et al.(2019, p.125) and aligned with Table 1.

The MAXQDA 2022 software tool was used to perform the literature and semi-structured interview analysis in more detail (MAXQDA®, 2022).

Data Presentation and Discussion of Results

This chapter analyzes and discusses the study findings and answers the Subsidiary Questions (SQ) and the Research Question (RQ).

4.1. Project success frameworks referred by researchers and institutions

This subchapter presents some of the most cited project success frameworks of researchers in project management and concludes with an analysis to help develop a theoretical framework.

Shenhar & Dvir Framework

Shenhar et al.(1997; 2001; 2002; 2007) consider that project teams in their day-to-day project execution with the "getting the job done" mindset, which is good for not wasting Time but not enough because project success is also linked with the long run, being part of the strategic management in organisations and also contributing to the overall business results.

During their work, Shenhar & Dvir (2007) developed a multidimensional universal framework to assess project success that considers "the strategic as well as the tactical aspects of project performance" (Shenhar & Dvir, 2007, p.24). This framework is based on five main dimensions:

- Project efficiency –focused on the efficiency with which the project has been managed to achieve short-time goals like meeting time, budget, and other project requirements.
- Impact on the customer – related to achieving the Client's requirements and needs.
- Impact on team –the team's satisfaction and morale regarding the project.
- Business and direct success – aim to perceive the impact on the organisation's business and results.
- Preparing for the future – emphasis on the preparation of the organisation for the future, helping it to explore opportunities in the long term.

In their work, they also consider that success is time-dependent; in that sense, the relevance of their project dimensions changes over Time from short-term implication (Project efficiency), medium-term (Impact on customer), and long-term (Business Success) to future implication (Prepare the future).

They also identify that the project success dimension depends on the project type (Shenhar & Dvir, 2007). For instance, Project Efficiency is more relevant for the lower-uncertainty projects that are usually low-tech and done to evaluate for results in the short term. But, on the other hand, efficiency could be sacrificed for a higher uncertain project because the goal is high or even super high-tech products expected to bring returns in the long-term, becoming more relevant to the Business Success or Prepare the Future dimensions (Shenhar & Dvir, 2007).

Contrary to previous studies based on traditional thinking (meeting time, Budget, and performance goals), Shenhar & Dvir (2007) work had the premise that projects are part of the organisation's strategic activity. They believe that Project Success and Project Management Success should not be separated because the project team must address both during project execution (Shenhar & Dvir, 2007). To achieve project success, top management and project management must also understand the different success dimensions, their relationship with different time frames, and that different types of projects may have to consider different relevant success dimensions (Shenhar & Dvir, 2007).

Bannerman Framework

Following Shenhar & Dvir's (2007) work, Bannerman (2008) considers that projects are the "means to an end" (Bannerman, 2008, p.2), and success can be determined from the perspective of the means (the project itself) or the end (what it was intended or expected to accomplish), in that sense he presents a five-level success framework, composed of the following dimensions:

- Process success – generic project discipline and project-specific best practices.
- Project management success – the traditional criteria of project success (Time, Cost, and Scope).
- Product success – measures related to deliverable compliance and client/user satisfaction.
- Business success – positive net benefits to the organisation provided by the project.
- Strategic success – derives from the net improvements in industry position, business growth, and other external advantages.

In Bannerman's (2008) view, project success is defined by the achievement of organisational Benefits related to the business and strategic dimension (i.e., the ends), independently of the results in the previous levels of project and product (i.e., the means). However, a failure in the project and product dimension will impact the achievement of the project's success (Bannerman, 2008).

Although Bannerman (2008) already presents success criteria for different dimensions, he also mentioned that each project could define its criteria.

Samset and Christensen Framework

The framework from Samset & Christensen (2017) is time-dependent, where they reinforce the idea of creating a measuring point through the project's life cycle. For that to be possible, they identify the need for four measurement stages, as follows:

- Ex-ante evaluation – in the project conceptualisation and decision phase, where it should be identified upfront evaluation criteria.
- Interim evaluation – measuring point during the implementation phase of the project.
- Final evaluation – at the end of the implementation phase, perform the final evaluation of the project delivery.
- Ex post evaluation – measuring point during the operation phase to measure the expected benefits from the project.

According to Samset & Christensen (2017) and based on a *Glossary of key terms in evaluation and results-based management* (OECD, 2002), it's also vital to consider: (1) the need for the project (relevance); (2) whether the uses of resources and Time are reasonable (efficiency); (3) whether expectations are fulfilled (effectiveness); (4) what other positive or negative effects may occur because of the project (impacts); and (5) whether the positive effects persist after the conclusion of the project (Sustainability).

Dimension and Criteria Analysis

This study's main success dimensions and criteria are in Annex C, which includes all the present frameworks plus other identified success dimensions and criteria from a total of fifteen frameworks from researchers and the organisation literature review.

It was developed in Table 2 a correlation between the related dimension of the present frameworks (column: Success dimension) with the criteria from Annex C (column: Success Criteria) and presented their percentage of mentioning in the frameworks (column: % Of Mention) to allow the perception of what dimension and criteria are most used by researchers and organisations.

Table 2 - Resume of authors and organisation literature review (n=15)

Success dimension (Researched mention)	Success Criteria (Researched mention)	% Of Mention (In Research)	
- Business and direct success (Shenhar & Dvir, (2007)) - Business and Strategic success (Bannerman (2008)) - Relevance of the project to the organisation (Samset & Christensen (2017))	Business/Organisation Benefits	27%	27%
	Strategic Development		20%
- Project Efficiency (Shenhar & Dvir, (2007)) - Process Success (Bannerman (2008)) - Project Management Success (Bannerman (2008))	Meeting Cost	100%	100%
	Meeting Time		100%
	Meeting Scope		67%
	Meeting Quality		60%

Success dimension (Researched mention)	Success Criteria (Researched mention)	% Of Mention (In Research)	
	Process implementation		20%
	Safety		20%
- Impact of the project to the stakeholder's expectations (Samset & Christensen (2017)) - Product success (Bannerman (2008)) - Impact on the customer (Shenhar & Dvir, (2007))	Customers' satisfaction	93%	93%
	Project Team Satisfaction		27%
	Suppliers Satisfaction		7%
	Shareholder Satisfaction		7%
- Preparing for the future (Shenhar & Dvir, (2007)) - Sustainability (Samset & Christensen (2017))	Economic Success	27%	27%

It's clear that from the analysis of the additional research, the main dimension and criteria to consider in the evaluation are still related to project efficiency (100% of mentioning), having the criteria associated with the Iron Triangle with the highest mention percentages (Cost – 100% of mentioning, Time – 100% of mentioning, Scope – 67% of mentioning, and Quality – 60% of mentioning).

Nevertheless, the Stakeholder's Satisfaction dimension (93% of mentioning) with criteria like Customers Satisfaction criteria (93% of mention), Project Team Satisfaction (27% of mention), Suppliers Satisfaction and Shareholder Satisfaction (both with 7% of mention); the Business and Strategy dimension and the Sustainability dimension (both with 27% of mention), prove that:

- In line with the literature review, the Iron Triangle criteria still have an unquestionable relevance but shouldn't be the unique dimensions to consider.
- The stakeholder dimension, as mentioned in the literature review, is relevant to evaluate project success. Still, contrary to the possible expectations, the study frameworks mainly focus on customer satisfaction, not demonstrating the coverage considered crucial by some researchers.
- Despite the notion given by the literature review that the integration of the organisation strategy with project success definition is paramount, the Business and Strategy dimension was only 27% mentioned in the study frameworks.

A more recent point of view by Zwikael & Meredith (2019) also identifies faults in the existing project success frameworks that are considered the possible reason for the lack of agreement on how project success can be measured and the application of different scales to measure the same dimensions; they mentioned the following:

- *Separate project success measures from individual performance measures*: despite the conceptualisation that project managers should be the strategic leaders that must take total responsibility for project business success (Shenhar & Dvir, 2007), a more recent perspective states that although the value provided by the leadership role of project managers in the realisation of the strategic project goals is unquestionable, he should not be accountable for business results that are beyond their control, that matter should lie with the project funder (i.e. Client) in general and the project owner in particular (Zwikael & Meredith, 2019). In that sense, it's important to identify clear measures that allow the separating in the evaluation of project success from the performance of the individual leaders (e.g., the Project Manager who is accountable for delivering the Project Plan and the Project Owner for delivering the Business Case) (Zwikael & Meredith, 2019).
- *Limited to a specific type of project*: according to Shenhar & Dvir (2007), different projects could have different measures at various times; nevertheless, the present frameworks are not broader enough because, despite some current generic criteria, others are only relevant for a specific type of project (Zwikael & Meredith, 2019).
- *Mix of the different key stakeholder project evaluation perceptions into one global project score*: in general, through different frameworks, users, consumers, and investors are considered into one entity (e.g., customer) (Shenhar & Dvir, 2007) and evaluating the project into one global score without having in consideration the weight and timing of the different stakeholder's perspectives (Zwikael & Meredith, 2019). However, it's relevant to evaluate project success fairly and accurately using multiple time windows (Samset & Christensen, 2017) and considering the perspectives of different stakeholders (Davis, 2014) that are influenced by nationality, culture, interests, hopes and motivation (Zwikael & Meredith, 2019).
- *Confusion between outputs, outcomes, and benefits*: according to Zwikael & Meredith (2019), some of the existing frameworks present confusion between the performance metrics, to the point that some claim to be considering benefits as a performance criterion or to be outcome-oriented but are simply a variation of outputs-based approach.

Zwikael & Meredith's framework

In that sense, the framework proposed by Zwikael & Meredith (2019, 2021) tries to answer the previously identified faults by considering the concept of "worth" by presenting a conceptual project framework that "accepts a close relationship between target outcomes and the benefits that represent the flow of value that arises from the achievement of those outcomes" (Zwikael & Smyrk, 2012, p.12).

In short, the framework has three main dimensions, divided by:

- *Project Management success* – evaluates the performance of the project manager in achieving the project plan, using a regression test that evaluates four criteria related to the delivery of the outputs defined in the project plan: (1) their fitness for purpose, (2) the Time taken, (3) the Cost incurred and (4) the triggering of any detrimental outcomes². All four criteria need to be evaluated to correctly perceive the success or failure because they are correlated with each other (e.g., a project manager could have overlooked the stakeholder's contribution to the project to keep the project within Time and Budget but compromise future outcomes).
- *Project Ownership success* – evaluates the performance of the project owner in realising the Business Case. This dimension is related to the knowledge that "effective outcomes realisation plays a central role in evaluating project performance" (Zwikael & Smyrk, 2012, p.16). According to Zwikael & Smyrk (2012), the evaluation of this dimension determines the "worth" of the project by considering the measurement of the desirable and undesirable outcomes plus the Cost related to them.
- *Project Investment success* – evaluates the project's performance as an investment for its funder. This dimension is based on the *satisfaction theory* (i.e., managers aim to satisfy their objectives rather than maximising or optimising them) and the *concept of regret* (i.e. in addition to what they get, people also care about what might have been obtained had they chosen differently). In that sense, "the project funder may consider a project successful if the results were satisfactory, even if it did not achieve all formal objectives (satisfaction theory) [...] for a funder, a successful investment in a project is one they would have invested in again had they know everything that has happened since (concept of regret)" (Zwikael & Meredith, 2021, p.1752).

By presenting their study, Zwikael & Meredith (2021) considers that they identify a generic framework that can: (1) be applied to any project by "accommodating the unique goal expected from each project into the target benefits and business case" (Zwikael & Meredith, 2021, p.1755), (2) has distinct dimensions that allow different stakeholders perception, and (3) separates the evaluation of the project success from the performance of its project leaders (i.e. Project Manager and the Project Owner).

² Detrimental outcomes are defined as one that is undesirable, unacceptable, and avoidable (Zwikael & Meredith, 2021).

Despite presenting a recently validated framework, Zwikael & Meredith (2021) didn't consider the long-term sustainability perspective that implies the financial, economic, environmental, and social impacts (positive or negative), disregarding the sustainability measuring (i.e., the extent to which the net benefits of the project continue or are likely to continue in the longer term) (OECD, 2021; A. Shenhar & Dvir, 2007).

Brief overview and answer to SQ1

Based on the above analysis, the answer to SQ1 - How do existing project success frameworks, referred by researchers and institutions, evaluate project success? The evolution of studies in project success through the promotion of distinct frameworks suggests that the concept is dynamic and multidimensional and that although the above presented and analysed research had been conducted in different years, they have several points in common even in the use of similar terminologies; nevertheless, there is no standard framework for a general field of application (Albert et al., 2017).

According to Zwikael & Meredith (2019), the absence of a standard framework could be related to the fact that they don't consider: (1) the Separation between project success measures from individual performance measures; (2) Limited to a specific type of project not being possible to use over all kinds of projects; (3) Mix of the different key stakeholder project evaluation perception into one global project score; and (4) Misunderstanding between outputs, outcomes, and benefits.

In that sense, Zwikael & Meredith (2021) present a three-dimension framework (i.e., Project management success, Project ownership success, and Project investment success) that answers to the existing faults.

Despite being one of the most validated frameworks because of the years of study from Zwikael & Meredith (2019, 2021), based on the use of an intuitive implementation through the use of existing documents (Project Plan and the Business Case) plus the funder(s) perspective, compared to other frameworks, it misses the sustainability perspective that is considered relevant for other researches (Elbaz & Spang, 2018; Samset & Christensen, 2017; A. Shenhar & Dvir, 2007) and an independent organisation like the OECD (2021).

4.2. Project success perception by project management professionals in their organisation

This subchapter will analyse the perception of project management professionals in terms of the project success concept.

4.2.1. Project success concept

Before entering into the project success concept perspective, it's considered relevant to share some considerations that, according to the interviewees, influence the evolution of project success, as follows:

- In terms of effort, it's also important to remember that measuring project success should not generate extra complexity in the organisation process. For example, interviewed G (video call, 15 July 2021) mentioned that it "doesn't make sense to have a large team to measure success or to create new projects to measure the success of a specific project [...] this type of actions will only generate extra complexity not adding value to the organisation needs [...]". Therefore, it's expected that a successful evaluation framework brings simplicity to the process avoiding extra complexity and ambiguity in the project management process.
- It is also a generally agreed concept in the literature that the most appropriate criteria to measure project success comes from the project objectives defined or adjusted according to the project context (Shenhar,2007; Castro, 2020). In this sense, the Interviewed R (video call, 03 August 2021) considered, very in line with Samset & Christensen (2017), of extreme relevance the need to, before the project initiation, define the project objectives that will be the basis for the project success measurement and will contribute to the definition of the success metrics. Furthermore, this definition also potentially allows, in an early stage of the project cycle, the validation of the chosen criteria and data quality to measure the defined objectives, leading to a proper and trusty evaluation of the project's success or failure (interviewed M, video call, 27 July 2021).

Success based on the outputs

In line with the literature review, it was a shared perception by the interviewees that the Iron Triangle (Cost, Time, Scope, and Quality) must be included in the project success evaluation process, being stated that "Cost, Time and Scope still have a huge relevance to measure project success [...]" interviewed K (video call, 21 July 2021).

The interviewed N (video call, 27 July 2021) reinforced the previous idea and argued that Cost and Time are more relevant than Scope "[...] my experience over the years had shown me that typically 20 to 30% of the defined Scope usually has no value for the end product and is discarded, that's why for me Cost and Time are more relevant than Scope [...]" this is also in line with the results obtained in Table 2 of SQ1.

It was also mentioned that between Cost and Time, despite the relevance of Cost: "project outputs should be maintained within acceptable costs; otherwise, there is always the temptation for extra work that could make the project unsustainable [...]" (interviewed N, *Op. Cit.*); Time was considered "crucial" (interviewed N, *Op. Cit.*) and more relevant than Cost (interviewed M, *Op. Cit.*), because if the output of the "project exceeds the defined delivery time it could waste a market window and fail to achieve the expected benefits, despite delivering the intended solution" (interviewed R, *Op. Cit.*), this differentiation between Cost and Time was not seen in the literature.

According to Interviewed L (*Op. Cit.*) experience, even less mature project management organisations know that the Iron Triangle is insufficient to evaluate project success. Therefore, when hiring Project Managers, they are more interested in the project outcomes (i.e., the ends) than in the way the project is managed (i.e., the means) (interviewed J, video call, 20 July 2021).

This last perception is in line with the previous idea from Bannerman Framework (2008) study where he defined that process and project management success are lower level dimensions (i.e., the means), and Product, Business and Strategy success are higher level dimensions (i.e., the ends) for the evaluation of the project success. In other words, the focus should be more on the ends of the project. Still, they are influenced by the means.

Despite the clear consensus from the literature review and most of the interview's opinions that the iron triangle is still relevant in the project success evaluation, there is a need to consider other relevant evaluation criteria. Still, interviewed F (video call, 14 July 2021) stated that for him "the vision of success should be segmented, project success should be measure having in consideration the success of its outputs (i.e. delivery of the define Scope, at the determined Time, without exceeding the defined Cost.), because in the long term we are entering in the success of the organisation strategic and for that we use program and portfolio management [...] ". This interview perception could be consider partly aligned with the Zwikael & Meredith (2019, 2021) study in the point where interviewed F (*Op. Cit.*) mention "the vision of success should be segmented", because Zwikael & Meredith (2019, 2021) also consider the need of separation of the individual performance success from project success measurement, in other words the Project Plan achievement (i.e. Project Management success) and Business Case achievement (i.e. Project Ownership success) from the overall project success, still Zwikael & Meredith (2019, 2021) didn't considered that project success is only related with the Project Efficiency dimension.

For Interviewed Q (video call, 2 August 2021), the agile methodologies evolution, leveraged by a demanding business need, created a convergence of paradigms between projects and programs. Having become a widespread practice and perception, the concept of value delivery through the achievement of results (outcomes) using the product delivery (output) of projects, which was the basis of programme management but now is also the concept of project success perception (interview Q, *Op. Cit.*). In short, for a project to be successful, it must deliver value to the organisation (interview G, *Op. Cit.*).

Success based on the outcomes

Today's organisations use projects to facilitate the achievement of results (interviewed E, *Op. Cit.*) and more than ever, the focus is on the project outcomes (i.e., the ends) (interviewed O, *Op. Cit.*). To help achieve organisation strategy success (interviewed A, *Op. Cit.*), clearly, yesterday, today, and tomorrow it's necessary to have a top-down and bottom-up connection between projects and organisation strategy (interviewed L, *Op. Cit.*). According to interviewed F (*Op. Cit.*), this connection and alignment are paramount independently of the organisation, the project type and methodology, plus successful strategy implementation is linked to the achievement of project success (interviewed A, *Op. Cit.*; interviewed H, video call, 15 July 2021).

Despite being considered essential, the connection and breakdown of the organisation's strategy to projects (interviewed A, *Op. Cit.*) it's also considered difficult and not seen in the majority of the organisation (interviewed H, *Op. Cit.*; interviewed O, *Op. Cit.*). Still, to correctly measure project success, it's critical the existence of Projects Key Performance Indicators (KPI) linked to a Business and Strategy Success dimension (interviewed C, *Op. Cit.*; interviewed E, *Op. Cit.*; interviewed N, *Op. Cit.*).

For interviewed L (*Op. Cit.*), having in mind that the project directly or indirectly contributes to the organisation's strategy (interviewed A, video call, 29 June 2021) aligned with the concept that organisations exist in the logic of benefits achievement (interviewed E, *Op. Cit.*), project success should be linked to the accomplishment of the expected target benefits. Still, this business strategy dimension is based on the long-term and, in general, is challenging to measure (interviewed G, *Op. Cit.*; interviewed R, *Op.Cit.*).

In the literature, the relevance of the Business and Strategy Success is equally important; still, it's only mentioned in 27% of the frameworks analysed, according to **Table 2** of subchapter 4.1., as a success dimension. This dimension can be perceived in the evaluation of the Business and Direct Success by Shenhar & Dvir (2007) or the Business Success and Strategic Success dimensions by Bannerman (2008).

Nevertheless, only Zwikael & Meredith (2019, 2021), through the evaluation of the Business Case achievement, evaluate it separately from the other dimension (e.g., Project Management success) to perceive the success of the Project Owner performance in the Target Benefits and Business Case achievement.

Success based on sustainability

In general, according to interview N (*Op. Cit.*), the economic sustainability of the project and the project solution always existed, and during the last years, the social and environmental components have grown in importance, and today the different sustainably axes assume a relevant dimension of any project (interviewed E, *Op. Cit.*).

Despite being linked to a more responsible project management posture: "management for projects rather than management of projects" (interviewed O, *Op. Cit.*), sustainability it's inevitably dictated by the organisation's values, vision, and business strategy (interviewed G, *Op. Cit.*; interviewed N, *Op. Cit.*) yet is gaining relevant importance for project success evaluation (interviewed K, *Op. Cit.*).

The perception of the Sustainability dimension relevance by the interviewees is clearly in line with the OECD (2021) and researchers like Elbaz & Spang (2018), Samset & Christensen (2017) and Shenhar & Dvir (2007); in that sense, it should be considered in a framework of project success evaluation.

Success based on stakeholder satisfaction

When managing projects, it is essential to consider that they are done by people for people that could represent internal or external stakeholders (interviewed E, *Op. Cit.*), with volatile ideas that can sometimes easily build or destroy their expectations (interviewed N, *Op. Cit.*).

Stakeholders Satisfaction was considered by most of the interviewees as a relevant dimension for project success evaluation, being defined by interviewed A (*Op. Cit.*) as "the most important success dimension" because the identification and prioritisation of the project's objectives, in general, are dictated by the perceptions, organisation relevance and vision of the different stakeholders (interviewed R, *Op. Cit.*).

In this sense, often, the expectations of the key stakeholders are the baseline for the project Target Benefits definition, yet they can change over time, making measuring success sometimes challenging to control (interviewed N, *Op. Cit.*; interviewed O, *Op. Cit.*).

For Interviewed C (*Op. Cit.*), Stakeholder Satisfaction is a nonlinear and volatile dimension that has significant relevance in the measurement of project success because it deals with people's expectations, and it is considered linked to the project's expected Target Benefits (interviewed L, *Op. Cit.*).

In other words, "we are not managing projects to achieve the success criteria defined in a project methodology; we manage a project to achieve the expectations of our stakeholders, especially the key ones" (interviewed N, *Op. Cit.*).

This idea is much in line with the study of Davis (2014) where it's stated that the perception of success has been changing from the technical perspective of the Iron Triangle to a more stakeholder-oriented view, where the Stakeholder Satisfaction dimension assumes a relevant position on the evaluation of project success.

In resume, as also defined in the literature review, Stakeholders' Satisfaction is critical when evaluating project success, in a way that success is always dependent on the stakeholders' expectations because they usually define the weight and relevance of each evaluation dimension and criteria having in consideration their objectives for the project.

4.2.2. Project success time-dependency perspective

Following the literature review, project success is defined as time-dependent Besteiro et al. (2015); according to interview I (*Op. Cit.*), in a short-term measurement, it's easy to perceive the output success based on the more traditional criteria like Cost, Time, Scope, Quality and even stakeholder satisfaction regarding the reception of the desired solution and/or service.

Nevertheless, the short-term window doesn't allow an organisation to perceive the project's long-term impact on their business strategy because it usually only measures the delivery point (interviewed H, *Op. Cit.*). To correctly perceive the result of the project is essential to analyse it after the delivery (interviewed R, *Op. Cit.*).

However, despite being considered relevant, the long-term measurement it's challenging to be performed because of the level of uncertainty that characterises it (e.g., market context changes) (interviewed O, *Op. Cit.*), plus organisations, in general, don't have the required level of discipline (interviewed R, *Op. Cit.*) and resources (interviewed Q, *Op. Cit.*) to perform it.

Although challenging, interviewed O (*Op. Cit.*) points out that a long-term effort to perceive the project's results should not be neglected because it's the only way to perceive the impact of projects on the organisation's business.

This perception is aligned with the literature where different research indicated the need to measure project success in distinct stages (Samset & Christensen, 2017; A. Shenhar & Dvir, 2007; Zwikael & Meredith, 2021) because depending on the measuring point, different perceptions of success could emerge (interviewed M, *Op. Cit.*).

4.2.3. Project success and project management success

According to the interviewees, defining project success in more than just the Iron Triangle creates an opportunity but also a challenge in separating project management success from project success because, despite the evolution of project management (interviewed R, *Op. Cit.*), this segregation is considered exceedingly difficult to achieve (interviewed A, *Op. Cit.*).

In general, different circumstances create difficulties in the capability of organisations to distinguish project management success from project success as follows:

- *Lack of Culture and Maturity in Project Management*, promotes an absence of transparency and responsibility in the definition of success criteria between the project and the project management, much related to the difficulty of dealing with failure (interviewed F, *Op. Cit.*; interviewed L, *Op. Cit.*; interviewed O, *Op. Cit.*).
- *Lack of empowerment and perception of value*, the Project Manager assumes a critical role in ensuring the adoption of the expected Target Benefits (interviewed L, *Op. Cit.*) because he should be responsible for the project delivery and also for its legacy that could promote a change in the organisation and help achieve the desired benefits (interviewed O, *Op. Cit.*). Nevertheless, it's still common for the lack of autonomy and empowerment of the Project Manager (interviewed N, *Op. Cit.*) that aligned with the separation between the project team and the organisation's business development team (interviewed J, *Op. Cit.*) makes difficult the perception and measurement of the project management value (interviewed N, *Op. Cit.*).
- *Too much focus on the Iron Triangle*, the transformation from a short-term success (outputs – Project Management) vision to long-term success (outcomes and benefits – Project Success) is complex (interviewed J, *Op. Cit.*). Because organisations are still focused on the more deterministic and mechanist mindset of the Iron Triangle (interviewed O, *Op. Cit.*), despite the knowledge that a vision based on outputs limits the business development and the generation of value for the organisation (interviewed J, *Op. Cit.*).
- *Lack of Stakeholder accountability*, the perception of success always depends on who is measuring it (interviewed R, *Op. Cit.*). Nevertheless, it exists a lack of definition of persons accountable for the measuring and achievement of success (interviewed F, *Op. Cit.*; interviewed O, *Op. Cit.*) (e.g., the Project Sponsor or Project Owner figures), in general, are usually not defined or aware of their responsibilities (interviewed O, *Op. Cit.*).

Brief overview and answer to SQ2

The answer to SQ2 - *How do project management professionals perceive project success?* - From the analysis of the interviews, it was clear that evaluating project success shouldn't generate extra

complexity to the existing organisation process. For the evaluation to be possible, it's also paramount that the Project Funders define the project objectives before its initiation. Allowing the validation of the chosen evaluation criteria and their predicted data contributes to an environment of thrust on the project success evaluation.

In line with the literature review, the interviewees considered the concept of value delivery through achieving the results (outcomes) using the project's product delivery (outputs) as widespread practice and perception. In this sense, despite considering the Iron Triangle as a relevant dimension to evaluate the project's success, projects must also consider the delivery of value to their funding organisations to be successful.

This focus on the outcomes is only possible through a top-down and bottom-up connection and alignment between projects and organisation strategy, independently of the organisation, the project type and methodology. Having this in consideration, interviewees identified as critical the existence of a Business and Strategy Success dimension to evaluate the project's contribution to the organisation and link the project's success to the expected target benefits.

In line with the OECD (2021) and researchers like Elbaz & Spang (2018), Samset & Christensen (2017) and Shenhar & Dvir (2007), interviewees recognised that sustainability gained relevance in the definition of project success, becoming a pertinent dimension that should consider the economic, social, and environmental impact of the projects but also their capability to sustain the benefits they generate for project success evaluation.

Also, much in line with the literature review, the Stakeholder's Satisfaction, enhanced by the concept of the time dependence from the project, was considered by most interviewees as a relevant success dimension for project success measures. Because the identification and prioritisation of the project's objectives, in general, are dictated by the stakeholder's perceptions that can be influenced by different variables and evolve with Time.

For the interviewees, the presented perception of success produces a challenge in the distinguishment of project management success from project success, which is difficulted in different circumstances as follows:

- *Lack of culture and maturity in project management*, creates a mindset that rejects the idea of having to deal with unsuccess and failure; organisations prefer not to measure the results of their projects.
- *Lack of empowerment and perception of value*, makes it difficult to measure and validate the added value of project management.
- *Too much focus on the Iron Triangle*, organisations are still focused on the more deterministic and mechanist mindset set of the Iron Triangle, despite the knowledge that this mindset could limit their business development.

- *Lack of stakeholder accountability*, and the lack of persons accountable for the project's success reduces the level of commitment and, consequently, the probability of achieving project success.

Despite the perception of project success from the different interviewees to be much in line with the literature review, none of the study frameworks can completely answer to reported needs and difficulties related to the interviewees (e.g., even the Zwikael & Meredith Framework (2021) lacks in the sustainable perspective).

4.3. Proposal of a project success framework that modern organisations can use to measure the performance of their initiatives

The answer to the RQ - *What project success framework can modern organisations use to measure the performance of their projects?* – to answer this question is relevant to consider that project success evaluation is a time-dependent multidimensional concept, which should consider the singularity of projects, the influence of the organisational context, and the stakeholder's expectations. In this sense, independently of the developed frameworks, its proposed dimensions and criteria, success should always be contextualised and understood from the project's perspective as a singular intervention and accordingly with the involved key stakeholders to better serve the purpose of the evaluation (OECD, 2021).

It's also essential to have in mind that, despite the evolution of project management, Zwikael & Meredith (2019) identified several flaws in the existing frameworks that debatably can influence the difficulties recognised by the interviewees in the project success evaluation process (e.g., the lack of stakeholder's accountability (stated by the interviewees) can be linked with the lack of existing frameworks that separate the project success evaluation from the individual performance (identity by Zwikael & Meredith (2019)).

Considering the reports by the interviewees, a modern framework should also be simple to perceive by organisations, independent of their level of maturity in project management, and easy to integrate into their existing processes. Otherwise, it will be challenging to perceive and integrate into the organisation's existing methods, becoming inappropriate for the involved stakeholders because of the extra complexity.

Even the framework developed by Zwikael & Meredith (2019, 2021) that supposedly addresses the flaws of the existing frameworks and aims to be generic enough to allow its application to any project misses the sustainability perspective recognised as relevant by most of the interviewees and also by other researchers (e.g., Elbaz & Spang (2018), Samset & Christensen (2017) and Shenhar & Dvir (2007) and the OECD (2021).

It was considered appropriate to develop a multidimensional framework based on a "common language for communication and comparison" (Bannerman, 2008, p.01), which has distinct dimensions to promote the inclusion of different key stakeholder's perspectives (A. Shenhar & Dvir, 2007), that enables a separate evaluation of the project success from the performance of its project leaders (Zwikael & Meredith, 2019), can evaluate the expected Target Benefits and Business Case of different types of projects (Zwikael & Meredith, 2019) and it's Sustainability (OECD, 2021; A. Shenhar & Dvir, 2007) through the project life cycle and beyond (Davis, 2016) and evidently should measure the efficiency of the resources used to perform the project (A. Shenhar & Dvir, 2007).

In this sense, Figure 1 proposes a four-dimension project success framework called "The Caltrop - project success evaluation framework", developed by the centralization and aggregation of the OECD (2021), Shenhar & Dvir (2007) and Zwikael & Meredith (2021) frameworks, with the interviewed analysis results.

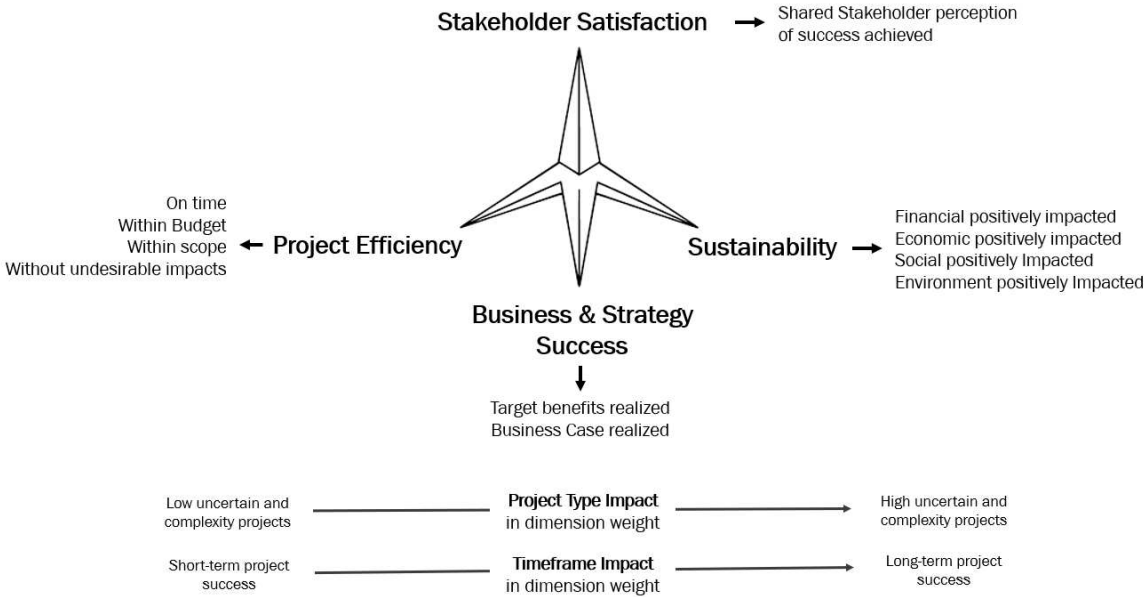


Figure 1 – The Caltrop project success evaluation framework

Considering the Caltrop military definition: a four-spiked iron ball or four joined spikes laid upon the ground as a defensive device against, e.g. cavalry horses (Collins, 2022), the developed framework uses the same defensive idea against the project's unsuccess. For this to be possible, it has one dimension that always points upwards (i.e., Stakeholder Satisfaction) and defines the bias for the other three dimensions. The downward dimensions (i.e., Project Efficiency, Business & Strategy Success, and Sustainability) work as the framework bases because depending on the stakeholder's expectations, the timing and the project type, each base dimension could have a different set of criteria and could be more or less relevant in the project success evaluation but together laid the foundations to achieve stakeholder satisfaction and avoid project unsuccess.

The identify dimension, as mentioned, was adapted from the OECD (2021), Shenhar & Dvir (2007), Zwikael & Meredith (2021) framework and could be defined as follows:

- *Project Efficiency*, evaluates the Project Manager's performance in the use of the project resources to achieve the project plan Zwikael & Meredith (2021); this measurement should be made by comparing the achieved results with the last approved project plan³. In other words, "How well are resources being used?" (OECD, 2021) to achieve the expected delivery by following the plan and not creating undesirables impacts that compromise the subsequent creation of expected value.
- *Business & Strategy Success*, evaluates the Project Owner in the realisation of the last approved Business Case or the Target Benefits (Zwikael & Meredith, 2021). This measurement is based on the concept of value delivery, so it should consider the desirable and undesirable project outcomes achieved plus the related costs to achieve them (i.e., "Is the intervention doing the right things?") (OECD, 2021) and the compatibility and alignment with other(s) organisation initiatives and strategy (i.e., "How well does the intervention fit?") (OECD, 2021).
- *Sustainability*, evaluates the project's performance as an investment for its funder, based on the satisfaction theory and the concept of regret following Zwikael & Meredith (2021) framework. It also includes the long-term achievement, maintenance, and resilience of the expected benefits (i.e., "Will the benefits last?") (OECD, 2021) and the Economic, Social and Environmental impact (i.e., "What difference does the intervention make?") (OECD, 2021).
- *Stakeholder Satisfaction*, represents the interaction (inputs) of the key stakeholder expectation in the other dimensions and their fulfilment (i.e., "Is the intervention achieving its objectives?") (OECD, 2021). Considering that different stakeholders have different expectations through Time and that this dimension tailors the other, it could be described as a transversal dimension from the short to the long term.

In line with the Shenhar & Dvir (2007) study, the Caltrap framework also presents a time-based project success evaluation for a short-term measurement with more focus on the Project Efficiency dimension, in the medium-term on the Business & Strategy Success dimension and the long-term on the Sustainability dimension. In addition, Stakeholder Satisfaction should be considered throughout all the timeframes.

³ It should be considered the last approved project plan and Business Case because they considered the last Stakeholders expectations than could have change from the first approved project plan and Business Case having in consideration time and context (Zwikael & Meredith, 2021).

It also considers the type and context of the project, in the sense that if the project is of low uncertainty and complexity, it's recommended to focus the measurement on the Project Efficiency dimension. On the other hand, if it's a highly uncertain and complex project, it's recommended to focus on the Business & Strategy Success Dimension and/or Sustainability. Once more, Stakeholder Satisfaction should be considered independently of the type and context of the project.

To properly implement this framework and keep in mind some of the difficulties reported by the interviewers, like (1) the importance of empowerment, (2) giving responsibility and (3) promoting accountability of the key stakeholders for the results during the project timeframe. The evaluation process was achieved in Table 3 by merging the Zwikael & Meredith (2021), Shenhar 2007 and OECD frameworks and the interviewed analysis results.

Table 3 - Project responsibility and evaluation during the project life cycle

Project Evaluation Dimensions	Evaluated	Evaluating	Evaluation Focus
Project Efficiency	The Project Manager	The Project Sponsor	<ul style="list-style-type: none"> • The available resources were efficiently managed. • The project delivered the intended product or service. • The team(s) and customer(s) expectations were achieved. • The last approved project plan was achieved. • It created conditions to realise the expected outcomes.
Business & Strategy Success	The Project Sponsor	The Project Funder/Administration	<ul style="list-style-type: none"> • The project contributed to achieve business success. • The founder's and other key stakeholders' expectations were achieved. • The last approved project's business case was realised.
Sustainability	The project's overall success	The Project Funder/Administration	<ul style="list-style-type: none"> • The investment in the project was worthwhile. • The investment in this project generated satisfactory results (even if the business case was not realised). • The funder would have invested/will invest in this project again.

Project Evaluation Dimensions	Evaluated	Evaluating	Evaluation Focus
			<ul style="list-style-type: none"> • The end-user stakeholder expectations were achieved. • The project benefits are sustainable in Time. • The project produced the desired impact. • The project results presented a positive economic, social, and environmental impact. • The project overall was a success.
Stakeholder Satisfaction	Key Stakeholders		<ul style="list-style-type: none"> • Key stakeholders' expectations for the different dimensions and overall project were achieved.

Source: Adapted from OECD (2021), A. Shenhar & Dvir (2007) and Zwikael & Meredith (2019, 2021)

Conclusions

The worldwide economic and social always-changing environment is forcing organisations to perform a massive execution of projects for the fast delivery of value for their funder(s) (Nieto-Rodriguez, 2021). In this sense, the capability of organisations to generate short- and long-term results is paramount (Badewi, 2016; Thiry, 2012).

This competitive and demanding environment inevitably also questioned the definition of project success (Badewi, 2016; Frefer et al., 2018), traditionally based on the Iron Triangle (Cost, Time, Scope, and Quality) (Atkinson, 1999), to include other perspectives of success based in the key stakeholder's judgement (Frefer et al., 2018; Serrador & Turner, 2015; Weaver, 2007).

Despite the effort made by different researchers, during the last years, on the expansion of the project success definition to include other dimensions and criteria to the traditional measurement of success, it was not possible to achieve a consensus between the different project management professionals and researchers about the proper definition of project success (Albert et al., 2017; Bannerman, 2008; Davis, 2016; A. Shenhar & Holzmann, 2017).

This lack of consensus is aggravated by the definition of a project promoted by different organizations and standards like the ISO 21500 or PMI, which, despite evolving, still raises questions like: (1) "If the project objective isn't achieved, will the project still be successful for the organization?"; or (2) "If the project exceeds Time or Cost, will it be a failure?".

In this sense, the present study aimed to analyse and propose a project success framework that modern organisations can use to measure the performance of their projects. Accordingly, the study was delimited in terms of (1) Space, to organisations and professions that conduct and manage projects; (2) Content, to the best practices, experiences, and success frameworks.

To answer the RQ – What project success framework can modern organisations use to measure the performance of their projects? The study used deductive reasoning and a qualitative research strategy.

From the analysis of some of the existing project success frameworks, it was possible to realise that success is a dynamic and multidimensional concept that considers different dimensions and criteria, with a mindset still very much focused on the Iron Triangle criteria. It was possible to identify the mention of criteria like Cost and Time in 100% of the existing framework, followed by Customer Satisfaction (93% of mentioning). Despite the idea promoted by Shenhar (2015) and other researchers that project managers need to adjust their mindset to face the dynamic environment and become a strategic asset for the organization, the Business and Strategy dimension was only mentioned by 27% of the existing analysed frameworks.

For Zwikael & Meredith (2019, 2021), this absence of consensus regarding project success is related to the fact that the existing frameworks, in general, don't consider: (1) the Separation between project success measures from individual performance measures; (2) Limited to a specific type of project not being possible to use over all kinds of projects; (3) Mix of the different key stakeholder project evaluation perception into one global project score; and (4) Misunderstanding between outputs, outcomes and benefits. However, even his evaluation concept misses the sustainability perspective that is considered relevant for other researchers (e.g., Elbaz & Spang (2018), Samset & Christensen (2017), Shenhar & Dvir (2007)) and independent organisations (e.g., OECD (2021)).

From the conducted interviews analysis of different professionals in the project management field, it was possible to perceive that their perspective of project success is much in line with the literature reviews performed and in addition to the traditional success criteria, they identify Business & Strategy Success and Sustainability as relevant success dimensions to be considered. It was also clear that evaluating project success shouldn't generate extra complexity and effort to the existing organisation procedures. Besides the framework used, it's also paramount that the Project Funder(s) define(s) the project objectives before the project initiation.

In resume, from the analysis of the existing framework and based on the perspective of success from the interviewees, it's possible to state that the existing frameworks are not suitable for the purpose. Because despite an ambition for a strategic mindset, they have a high focus on the traditional measurement of project success, an absence of the separation between project success measures from individual performance measures, and always lack at some point (i.e. missing some relevant dimensions).

Focused on the RQ, this study *contributes to knowledge* by presenting a recommendation of a framework based on the centralization and aggregation of the OECD (2021), A. Shenhar & Dvir (2007) and Zwikael & Meredith (2019, 2021) frameworks plus the interview analysis. This framework, named as The Caltrop Project Success Evaluation Framework, aims to be more comprehensive and with a common language with other project success evaluation methods, but also a source of discussion and reflection that different project researchers may use to further developments and hopefully become a tool for project management professionals to use in the evaluation of their project's performance.

In this sense, The Caltrop Success Evaluation Framework consists of the following dimensions:

- *Project Efficiency*, evaluates the Project Manager's performance using the project resources to achieve the last approved project plan (Zwikael & Meredith, 2021); in other words, "was the project output developed according to the last approved plan?".

- *Business & Strategy Success*, evaluates the Project Owner success in the realisation of the last approved Business Case or Target Benefits (Zwikael & Meredith, 2021); this measure should also consider the achievement of the desirable and undesirable outcomes plus the related costs to achieve them.
- *Sustainability*, evaluates the project's performance as an investment for its funder (Zwikael & Meredith, 2021) and the long-term achievement, maintenance and resilience of the expected benefits plus its impacts.
- *Stakeholder Satisfaction*, represents the expectation inputs from the key stakeholders in the other dimensions and their fulfilment based on the perception that different stakeholders have different expectations through time.

Considering the difficulties reported by some interviewers as the importance of project manager empowerment, giving responsibility and promoting accountability of the key stakeholders, it was also included a project responsibility and evaluation process to be used during the project life cycle to facilitate the implementation of the evaluation.

The major *limitation* of this study lies in the number and diversity of interviewees used; despite considering that it achieved a good and reliable perspective, in future studies is recommended the use of a more significant sample from different business sectors (e.g., including real estate and construction, agriculture, energy and natural resources).

Following the study limitations, it's considered that the development of this framework is not the end of the line but the start, because there is still a long way to go in the search for knowledge that allows the answer to the following questions: (1) "How to operationalize this framework?"; (2) "How reliable, is the identified process?"; (3) "How to prioritise the dimensions?"; (4) "How to define or elicit criteria?"; and (5) "When to measure the different dimensions?".

Therefore, *future studies* should be conducted to properly validate the proposed framework and test the level of consensus from the different key stakeholders on its use. Furthermore, it's recommended to study the different proposed dimensions in detail to identify consensual evaluation criteria that can be commonly used, test the developed implementation process and establish an operationalization method.

As *practical recommendations*, it's suggested that to allow a reduction in the implementation effort of the proposed framework or of other existing frameworks to evaluate project success; its criteria should always be contextualised and understood from the perspective of the individual intervention (i.e., the project under evaluation) and accordingly with the involved key stakeholders (OECD, 2021).

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ANNEX A

Interview Questionary

Number	Question
Q01	In which area do you work now? What is your current position? For how many years?
Q02	In how many projects were you involved? What were your positions?
Q03	Considering your experience, and in a higher-level view, what is essential to companies project success?
Q04	What definition of project success should be considered for companies executing projects?
Q05	Do you consider that companies can define project success in the short and long term? In what way? And what are the main difficulties?
Q06	In your view, can companies define and distinguish between project success and project management success? What are the difficulties in doing so?
Q07	Considering companies' present and future needs, do you think the existence of a link between their strategy and business objectives and the success of projects is relevant? How can companies do it?
Q08	And do you consider sustainability a relevant dimension for the success of the projects? How would you relate and measure it?
Q09	What relevance do you think stakeholder satisfaction, such as the project team, the Client, and suppliers, may have for the project's success? With equal importance over time throughout the phases of the project?
Q10	How do you think success measurement should be carried out or can be prioritised over time? What are the difficulties in doing so?

ANNEX B

Interview Participants

Nomenclature	Data Entrevista	Actual Position	Industry Sector	PM Experience
Interviewed A	29 June 21	Project Manager	Elec. Engineering	>05 years
Interviewed B	01 July 21	Project Manager	Software Development	>05 years
Interviewed C	07 July 21	Project Manager	Elec. Engineering	>10 years
Interviewed D	10 July 21	Project Manager	PM Consultancy	>05 years
Interviewed E	10 July 21	PMO Director	Naval	>15 years
Interviewed F	14 July 21	PMO Director	Bank	>20 years
Interviewed G	15 July 21	PMO Director	Insurance	>20 years
Interviewed H	15 July 21	Project Manager	Defence	>10 years
Interviewed I	20 July 21	Project Manager	Elec. Engineering	>10 years
Interviewed J	20 July 21	PMO Director	Bank & Insurance	>15 years
Interviewed K	21 July 21	Risk Manager	Software Development	>10 years
Interviewed L	26 July 21	PM Consultant	PM Consultancy	>15 years
Interviewed M	27 July 21	Project Manager	Public Sector	>10 years
Interviewed N	27 July 21	PMO Director	Public Sector	>20 years
Interviewed O	29 July 21	PM Consultant	PM Consultancy	>15 years
Interviewed P	29 July 21	Project Manager	Software Development	>05 years
Interviewed Q	02 August 21	Program Manager	Pharm. & Biotech	>20 years
Interviewed R	03 August 21	PMO Director	Bank	>20 years

ANNEX C

Detail Results of the Literature Review

Source	Success Dimensions and Criteria
Bryde & Robinson (2005)	Hard criteria: Cost, Time, Meeting the technical specification. Soft Criteria: Customers' satisfaction, stakeholder's satisfaction.
Shenhar & Dvir, (2007)	Dimension: Project efficiency, Impact on the customer, Impact on team, Business, and direct success, Preparing for the future. Hard criteria: Cost, Time, Performance, Economic Success, Benefits to organisation Soft Criteria: Satisfaction of project members, Satisfaction of customers.
Bannerman (2008)	Dimensions: Process success, Project management success, Product success, Business success and Strategic success. Hard criteria: Process implementation effectiveness, Time, Cost, Scope, Business benefits, Strategic Business development enabled. Soft Criteria: Client/user satisfied.
Ika (2009)	Period 1 between 1960s–1980s: Hard criteria: "Iron triangle" (Time, Cost, Quality). Soft Criteria: Not considered. Period 2 1980s–2000s: Hard criteria: Iron triangle, Benefits to organisation (org), Benefits to stakeholders, Benefits to project personnel. Soft Criteria: Client satisfaction, End-user satisfaction, Period 3 21st Century: Hard criteria: Iron triangle, Strategic objective of client organisations and business success, Benefits to stakeholders, Benefits to project personnel and symbolic and rhetoric evaluations of success and failure. Soft Criteria: End-user satisfaction.
Bahia FD (2010)	Hard criteria: Cost, Time, Quality, Scope, Safety. Soft Criteria: Customer Satisfaction, Team Satisfaction, Shareholder Satisfaction.
Khosravi & Afshari (2011)	Hard criteria: Time Performance, Cost Performance, Quality Performance, Health, Safety and Environment (HSE). Soft Criteria: Client Satisfaction.
Gomes & Romão, (2016)	Hard criteria: Cost, Time, Technical Requirements, Objectives Achievement. Soft Criteria: Customer Satisfaction.
Mukhtar & Amirudin (2016)	Hard criteria: Project completed on Time, project completed to specified quality standard, safety, Completion within Budget. Soft Criteria: Client's satisfaction, absence of disputes.
Samset & Christensen (2017)	Dimension: Relevance of the project to the organisation, Efficiency in the use of resources and Time during project implementation, Impact of the project to the stakeholder's expectations and the sustainability. Hard criteria: Efficiency and Relevance of the project to the organisation Soft Criteria: Stakeholder's expectations and sustainability
Davis (2017)	Hard criteria: Time, Cost, Quality Soft Criteria: Benefit to stakeholder group, Client/customer-specific issues

Source	Success Dimensions and Criteria
Elbaz & Spang (2018)	Dimensions: Functional Success (Requirements fulfilment, Sustainability, Life cycle cost efficiency and Client acceptance and satisfaction), Management success (Project and Process Success,) Investment Success (Payback period), Ownership Success (ownership responsibilities and strategies), Organisational Success (Efficiency and Effectiveness), Business Success (financial returns) and Strategic Success (impact of market and competitors, business development or expansion, and ability to react to future opportunities or challenges).
PMI (2017)	Hard criteria: Cost, Time, Quality, Scope. Soft Criteria: Customer Satisfaction
IPMA (2016)	Hard criteria: Cost, Time, Quality, Scope. Soft Criteria: Project members Satisfaction, Customer Satisfaction, Suppliers Satisfaction
AXELOS (2017)	Hard criteria: Cost, Time, Quality, Scope.