

# Value Creation with Project Risk Management: A Holistic Framework

Raffaele Testorelli , Anna Tiso <sup>\*</sup>  and Chiara Verbano 

Department of Management and Engineering, University of Padova, Stradella San Nicola 3, 36100 Vicenza, Italy; raffaele.testorelli@unipd.it (R.T.); chiara.verbano@unipd.it (C.V.)

\* Correspondence: anna.tiso@unipd.it

**Abstract:** The conceptual shift, from a traditional task perspective and a managerial approach to project risks toward a value-centric view, underlines the challenge of creating different forms of value for multiple project stakeholders. This emerging theme arises the need for a new holistic framework for value creation through Project Risk Management (PRM). With this purpose, the paper aims at deepening the knowledge about PRM for value creation. A systematic literature review has been conducted, extracting a database of 116 papers. To address the research questions, a descriptive and a content analysis have been performed. The results of a systematic literature review reveal that the value created through PRM includes both economic and intangible (not monetary) benefits. Moreover, even if international standards are giving greater relevance to value creation and protection, considering also the potential positive effects of risks, empirical results show significant discrepancies. From the analysis of the results, a new theoretical framework emerges that integrates fundamental aspects not fully considered so far, incorporating the concepts of economic, ecological, and social impacts into the notion of value creation through PRM. This work extends the current research in this field and sets forth the definition of a holistic framework to promote the creation of value for project stakeholders in practice, through the management of negative and positive risks, providing a perspective on the sustainability orientation of projects.

**Keywords:** project risk management; value creation; systematic literature review; theoretical framework



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## 1. Introduction

Risk can be defined as an effect, in terms of a positive or negative deviation from expected outcomes, resulting from uncertainty [1], potentially affecting the economic performance, business continuity, reputation, environmental and social outcomes of organisations.

Therefore, risk management (RM) supports companies in achieving their goals, exploring new opportunities, and reducing potential losses in an uncertain and dynamic business environment [1,2]. Despite the range of benefits that arise from a successful RM implementation, including improved implementation of the strategy, efficient operations, and effective projects [3], its main objective consists in creating and protecting value [1].

In particular, projects can be considered vehicles of change characterised by inherent uniqueness and uncertainty [4,5]. Projects constitute the means for companies to implement their strategic objectives, particularly to innovate and grow. Consequently, projects are essential for business success and longevity, whereas project failure can be detrimental to the organisation and society [6].

The RM stream that deals with the management of project risks is called project risk management (PRM) [7]. It is a systematic process that aims at managing the intrinsic risks of any project, acting on their appearance, through the implementation of systems and procedures that identify, analyse, evaluate, and address risks [8,9]. PRM has the goal of fostering the effect of positive events (opportunities) during the project life cycle while mitigating those related to negative events (threats) [10,11]. For this reason, PRM is one of the most widely adopted approaches by companies to achieve success in their projects [12]

and to foster value creation [13]. In particular, the value created through PRM is defined as the ratio between benefits and costs, which is not a quantitative quotient but only a representation [14–17]; indeed, the value generated with PRM includes both economic and intangible (not monetary) components [18,19].

However, the discrepancies between theoretical and empirical evidence on this topic represent a challenge for the current research: despite international standards that place greater relevance on value creation and protection, extending the view to potential positive effects of risks [1,20], the empirical literature reports conflicting results.

For example, normative guidelines are built around the formalisation of a PRM process, suggesting that documenting and reporting practices create value [1,21]. In this regard, many authors confirmed from empirical evidence that a formal PRM process actually increases the chance of project success [9,22–26]. On the contrary, other researchers suggest that disproportionate formalisation can be counterproductive [13,27–31].

Other conflicting results emerge on the adoption of formal reporting, which is a recommended practice to manage risk communication, support decision making, and capture risk knowledge [1,9,13,21]. In particular, empirical evidence indicates that the value of using formal risk status reports depends on the level of organisational maturity, the willingness of project stakeholders to communicate and document risks, and the type of project [13,30,32]. Furthermore, the normative guidelines promote the adoption of an open and honest communication about risk [1,21], which has been recognised as a value-adding practice through empirical results [13,25,33–40]. However, empirical results also report that high transparency can create unwanted and unproductive management attention, depending on the organisational context [13,30,32].

Further conflicting results deal with the adoption of a proactive approach to PRM [41,42], since high proactivity can be perceived as non-value-adding due to organisational culture, a high level of uncertainty, and even its cost [13,43,44].

The richness of empirical studies available in the literature offers a unique opportunity to investigate whether these discordant results can be explained.

For all these reasons and given the importance of the topic, the objectives of this research are (1) to identify all tangible and intangible (not monetary) benefits reported in the literature, obtained through PRM to project stakeholders, including economic, ecological, and social impacts; (2) to analyse the methods reported in the literature, to measure the benefits generated through PRM; (3) to highlight how to grasp all benefits from PRM implementation and promote awareness of the motivations for its adoption, thus fostering value creation in projects; and (4) to identify the literature gaps and suggest future directions not yet explored.

To pursue these objectives, two main research streams will be considered, namely PRM and value creation in the context of projects [13,45,46].

The paper is organised as follows. The next section presents the 'Theoretical Background' of value creation through PRM. In the following two sections, the 'Objectives and Methodology' and the 'State of the art in value creation through PRM' are described. The most relevant findings are discussed in the sections 'Detailed Content Analysis on Value Creation through PRM' and 'A Theoretical Framework for Value Creation Through PRM'; finally, the section 'Conclusion' closes the article.

## 2. Theoretical Background

Value creation through PRM has close connections with two main research streams, namely PRM and value creation in projects [13,45,46]. The current paragraph recalls the fundamental concepts, originated by these research fields, that constitute the conceptual basis of value creation through PRM.

### 2.1. Perspectives on Projects and Value Creation

Projects could be viewed according to different and complementary perspectives that imply a specific approach to PRM, particularly the task perspective and the organisational perspective [47].

Starting with the task perspective, according to the Project Management Institute [11], a project can be defined as a temporary effort undertaken to create a unique product, service, or result [47]. Also, a project may be a way to perform a defined, and non-repetitive task. In this view, the project goals are determined in the initial phase of the project and are expressed under three constraints, regarding the time, cost, and quality of the project output. Moreover, in the initial phase, PRM context analysis and planning are performed and (known) risks are identified. Ideally, the project is detached from the rest of the base organisation and the project team is supposed to concentrate on performing all planned tasks to meet the three objectives. If deviations are discovered, measures are taken to correct them. In this perspective, the focus of PRM tends to be on the management of threats (negative risk) rather than opportunities (positive risk) [47].

Instead, the organisational perspective defines a project as a temporary organisation established by its base organisation to perform an assignment on its own behalf [47–49]. In this sense, the mission of the project is directly related to the business strategy, pursuing the objective of executing the progress of the permanent organisation. The project is considered an open organisation in close contact and cooperation with the base organisation and its business environment. The overall project plan, defined in the initial phase of the project, is considered as the foundation for the following detailed plans, and the project output will be defined as the project progresses and more knowledge is acquired. If interesting opportunities arise as the project proceeds (e.g., positive risks), deadlines can be postponed, and/or the project budget can be exceeded; if the project could be completed sooner than expected or its tasks become impossible, it should be shut down earlier than planned. The project output is not necessarily delivered at the end of the project, but when it is best suited for the base organisation [50]. The main purpose of projects is the creation of value in the base organization rather than the creation of products or services [51], and PRM focuses on leveraging positive risks and managing negative risks [47]. Additionally, project leadership tends to be strongly interested in the ways in which stakeholders can contribute to value creation during the project life cycle and after the end of the project [47].

### 2.2. Project Risk Management Main Concepts and Methods

Different approaches to PRM have been studied in the literature and implemented in practice: the management approach, the evaluation approach, the contingency approach, the agile approach, and diverse combined approaches. All of them provide interesting indications that should be carefully considered when evaluating the value created through PRM.

According to the management approach [25,52], the PRM process consists of a preliminary phase, namely context analysis and planning, and four main phases: (1) risk identification, (2) risk analysis, (3) risk treatment, and (4) risk monitoring and control [53]. This approach focuses mainly on identifying specific project events and situations that could impact the original plan, in order to develop adequate risk responses. The PRM management approach is conceptually more related to the task perspective of projects; thus, the eventual contribution of PRM to value creation is direct.

The evaluation approach considers PRM as a process aimed at determining and addressing the risk factors from the initial stage of the project, through the collection and analysis ex post of the information about the project risks [52,54,55]. In this view, the PRM process consists of three main phases: (1) use of known risk factors in the initial phase to evaluate a new project and address known risks, (2) collection of information about project risks during all stages of the project lifecycle, and (3) analysis of new information on known or new risk factors, as input for future projects. The eventual contribution of PRM

to value creation is indirect and could be seen in terms of fostering the risk knowledge management process.

Another interesting view is offered by the PRM contingency approach [25,56–58]. It focuses on the project capability to deal with uncertainties in the project environment [28,59] and on the fit between contingent variables (such as risk types) and the PRM system implemented. Notwithstanding the effort to predict all possible project risks, there are always residual uncertainties [56], negatively related to the project success. The contingency approach to PRM is particularly suitable when project risks are unknown, and it is difficult to fully understand all relevant variables and interactions. This approach focuses on resilience and adaptability, particularly on (1) constant environmental scanning to recognise unforeseen events when they arise, (2) having a resilient, responsive, and functioning structure at the organisational level, (3) engaging and communicating with stakeholders, and (4) having competent resources with adequate self-awareness and the ability to deal with stressful situations [25,56,58,60]. PRM techniques and tools must be selected according to the characteristics of the project context to achieve the best opportunity for value creation. For example, this includes considering the size, scope and structure of the project, the level of technological uncertainty, the level of company experience with technology, the degree of internal integration, and user participation [18,61]. The eventual contribution of PRM to value creation in projects remains unclear.

Agile methodologies have been developed to improve adaptability and responsiveness to changes [62], and are mainly applied in software development projects. Among them, the most used is Scrum, which aims to perform (1) an initial risk assessment during the pregame and (2) subsequent risk reviews during the review meetings, while reducing the threat of incorrect project output through regular communication with customers, short iterations and tests [62–65].

Finally, different combined approaches are proposed in the literature and implemented in practice. For example, some authors propose a combination of the PRM management approach and the PRM evaluation approach, in order to reuse the knowledge on risks collected in previous projects to improve PRM [52,66–68]. Marle (2020) [62] proposes a combination of the agile approach with complex systems methods (CST-based methods), considering that the two approaches have complementary advantages and limits. A further example is provided by the iterative seven-step PRM process for SMEs suggested by [69].

Despite the richness of the PRM literature, the contribution of the different PRM approaches to value creation in projects, which value is created, how PRM creates value, and the potential influence of the project context, remains unclear.

### 2.3. Value Creation through PRM

In this research, value is defined as the ratio between benefits and costs, which is not a quantitative quotient but only a representation [14–17]. Indeed, the value generated through PRM includes both economic and intangible components [18,19], it is a context-specific concept, it depends on the level of analysis, it is perceived differently by project stakeholders [14,16,45,70], and it integrates the notion of economic, social, and environmental sustainability.

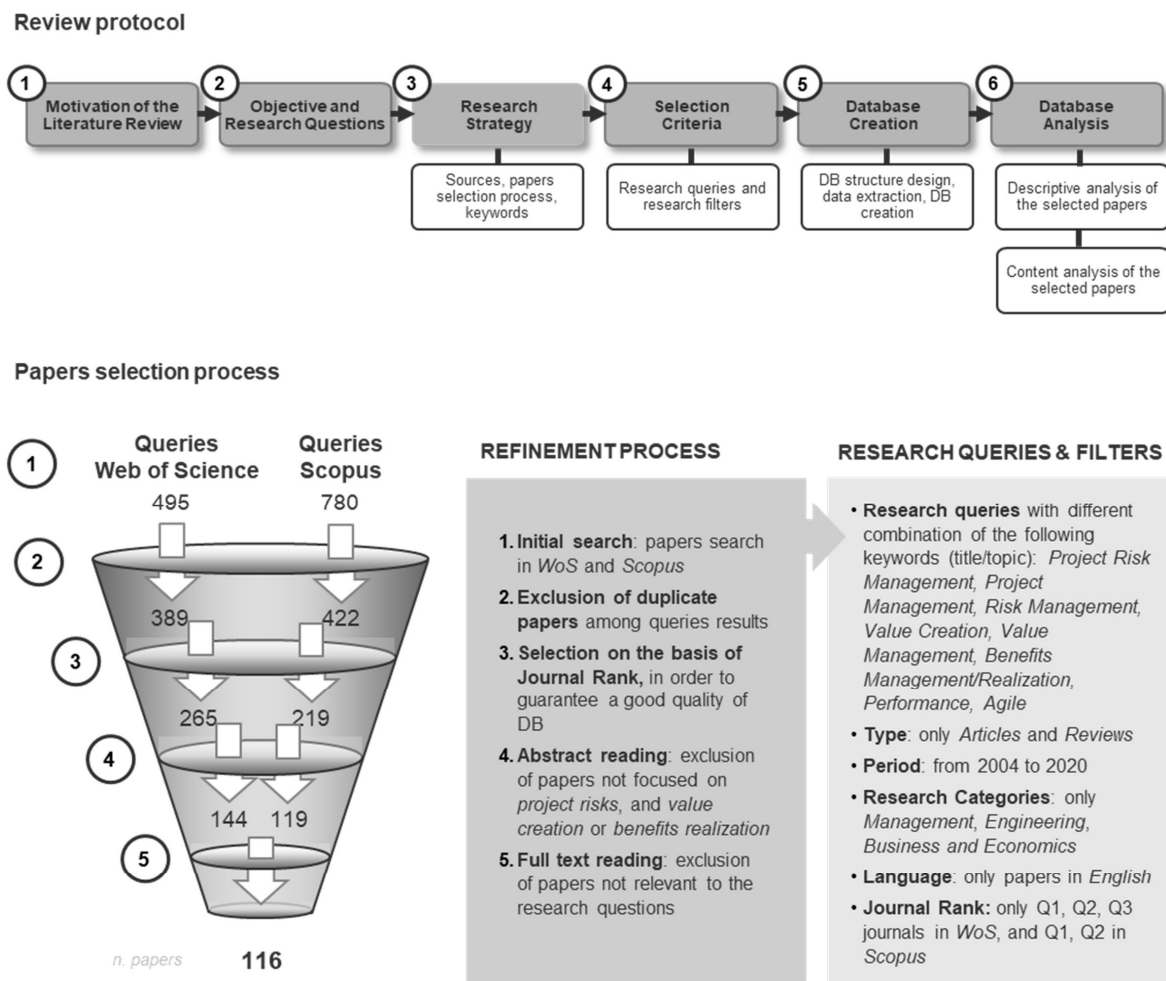
Project stakeholders play a central role in the creation of value through PRM [25,45,71,72]. Indeed, stakeholders can be considered both as a target of value creation and as potential sources of risk in projects, due to their diverse behaviours, expectations, and perceptions. Several attempts have been reported in the literature to classify project stakeholders and their behaviours. For instance, it is possible to identify stakeholder groups at different levels of analysis, specifically at customer, project, company, business ecosystem, and society levels. Mendelow, (1991) [73] groups stakeholders according to their power and interest in the project, while Mitchell et al. (1997) [74] categorise them according to their power, urgency and legitimacy. Most recently, Murray-Webster e Simon, (2006) [75] suggested a classification of project stakeholders according to their (1) power, defined as the stakeholders' ability to influence the project, which is derived from their positional or resource

power in the organisation or from their credibility as leaders or experts; (2) interest in the project, measured by the extent to which stakeholders will be active or passive towards the project; and (3) attitude toward the project, measured by the extent to which stakeholders will back (support) or block (resist) the project.

Despite the great emphasis on stakeholders in the PM literature, the value created for them and how it could be measured remain unclear.

### 3. Objectives and Methodology

A systematic literature review (SLR) on value creation through PRM was performed between July and November 2020, and was accomplished following the guidelines proposed by Macpherson e Holt, (2007) [76], Liberati et al. (2009) [77] and Tranfield et al. (2003) [78], adapted to this specific research and detailed in the review protocol (Figure 1).



**Figure 1.** SLR—Review protocol and paper selection process.

The objectives of the SLR are to answer the following research questions:

- SLR RQ1: What is the value created through PRM for different project stakeholders?
- SLR RQ2: What PRM activities, practices, and tools lead to value creation?
- SLR RQ3: What contextual factors can moderate value creation through PRM?
- SLR RQ4: How can the PRM value be measured?

To build a database (DB) with the relevant studies available in the literature on the topic, the two most widespread literature DBs were consulted: Elsevier's Scopus and the Web of Science Core Collection by Clarivate Analytics [79,80], using different combinations of the following keywords (title/topic): 'Project Risk Management', 'Project Management', 'Risk Management', 'Value Creation', 'Value Management', 'Benefits Management', 'Benefits



Realization’, ‘Performance’, ‘Agile’. Research was limited to articles and reviews, research categories related to ‘Management’, ‘Engineering’, ‘Business’, and ‘Economics’, and Q1, Q2, Q3 journals in WoS, and Q1, Q2 in Scopus (Figure 1). Finally, 116 articles were identified, published during the period from 2004 to 2020. The final database extracted from the current literature is reported in Table S1.

Subsequently, a descriptive analysis was performed considering the following variables:

- First author, to identify the authors who are more devoted to the research topic;
- Country of the first author, to identify whether there is a country or region in which more studies have been carried out;
- Year of publication, to identify whether there is a trend in the number of studies;
- Journal, to identify whether one or more journals are dedicated to the topic.

For the content analysis, a framework that includes seven dimensions of analysis has been designed. In particular, the following dimensions have been considered, as suggested by Lepak et al. (2007) [45]: (1) value creation process, (2) content of value creation, (3) targets of value creation, and (4) levels of analysis. Furthermore, two other dimensions of analysis have been added, specifically (5) stakeholders’ perspectives, as recommended by International Standards [1,81,82] and (6) value measurement, as suggested by many authors [15]. Finally, the type of research adopted has been used as a traversal dimension of analysis, and (7) the PRM literature has been classified as conceptual and empirical based on the research approach adopted [13] (Figure 2).

**Key Dimensions of PRM Value Creation**

		<b>A. Process Perspective</b>	<b>B. Content Perspective</b>	<b>C. Contextual Factors</b>	<b>D. Depth of Analysis</b>	<b>E. Stakeholders’ Perspective</b>	<b>F. Value Measurement</b>
<b>Classification of PRM Literature</b>	<b>Conceptual Literature</b>	How is PRM value created in the conceptual literature?	What is PRM value in the conceptual literature?	Which contextual factors could affect PRM value creation in the conceptual literature?	How many level of analysis have been considered? Where is value created and to whom, in the conceptual literature?	How is stakeholders’ perspective considered in the conceptual literature?	How is PRM value measured in the literature?
	<b>Empirical Literature</b> <i>Quantitative Approach</i>	How is PRM value created in the empirical literature (quantitative)?	What is PRM value in the empirical literature (quantitative)?	Which contextual factors could affect PRM value creation in the empirical literature (quantitative)?	How many level of analysis have been considered? Where is value created and to whom, in the empirical liter. (quantitative)?	How is stakeholders’ perspective considered in the empirical literature (quantitative)?	How is PRM value measured in the literature (quantitative)?
	<b>Empirical Literature</b> <i>Qualitative Approach (Perceptions)</i>	How is PRM value created, according to empirical literature (qualitative)?	What is PRM value, in the empirical literature (qualitative)?	Which contextual factors could affect PRM value creation in the empirical literature (qualitative)?	How many level of analysis have been considered? Where is value created and to whom, in the empirical liter. (quantitative)?	How is stakeholders’ perspective considered in the empirical literature (qualitative)?	How is PRM value measured in the empirical literature (qualitative)?

**Figure 2.** SLR—Framework for Content Analysis [13,18,45,81].

The descriptive and content analysis of the literature database allowed researchers to answer the research questions, identify literature gaps, and indicate potential future research directions.

#### 4. State of the Art on Value Creation through PRM

The descriptive analysis performed showed a growing and global interest in the topic during the last 17 years.

Indeed, 98 authors from 35 different countries have contributed to the topic, particularly from the UK (20%), the USA (7%), Australia (7%), the Netherlands (6%), Finland (5%) Brazil (5%), and China (5%). Regarding business sectors, it must be noted that the analysed

papers refer both to business sectors with project-oriented and process-oriented companies. Finally, the Scimago Journal Rank reveals a good quality of the final database (Figure 3).

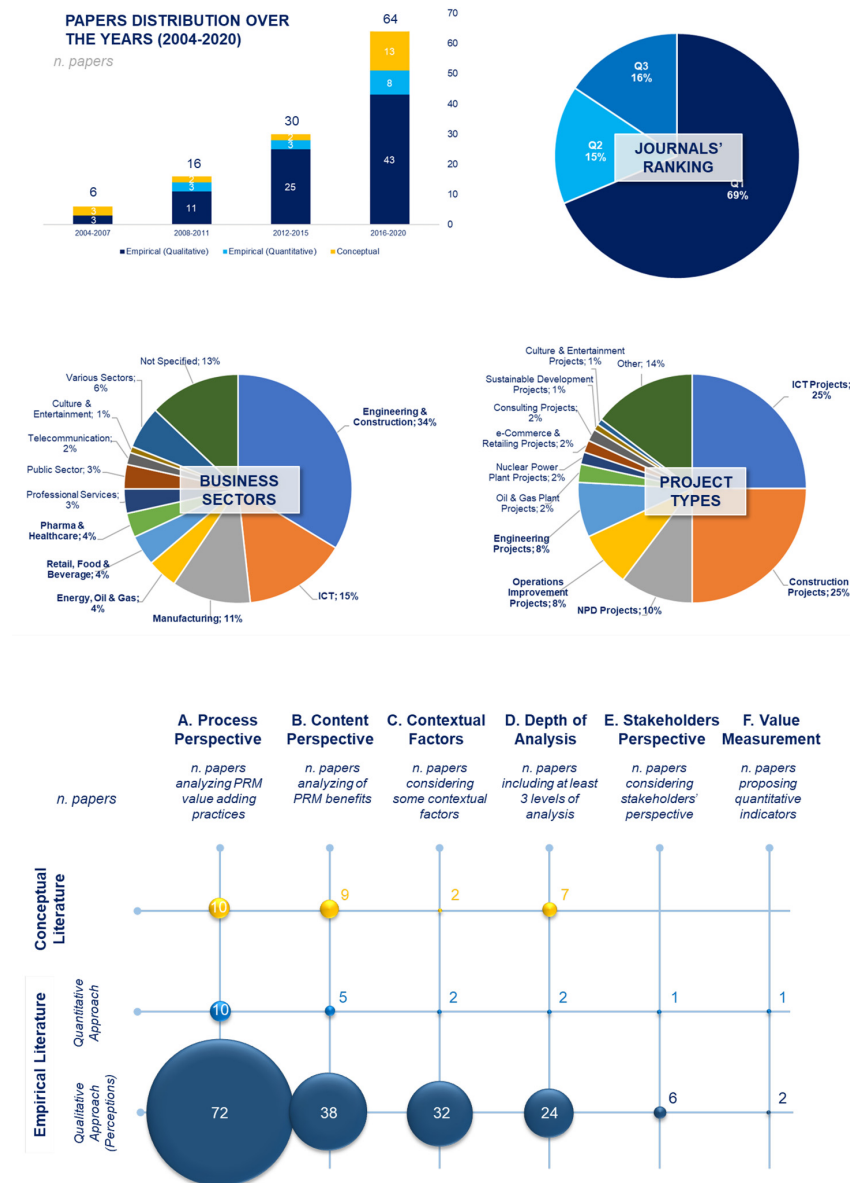


Figure 3. Results Emerging from a Systematic Literature Review.

From the content analysis, it emerges that most of the analysed literature is empirical (83% of the analysed papers), and that the first perspective adopted has been the process perspective concentrating on PRM practices and activities (70%). Subsequently, the scientific literature has gradually been extended to include the content perspective, analysing the benefits obtained (45%), although only 20% of the papers adopt more than two levels of analysis. More recently, the research field has been expanded to include contextual factors (31%). Finally, few articles consider the different stakeholders' perspectives on PRM value creation (5%) or indicate how to measure this value created (2%), suggesting new directions for scientific research in this field.

In addition, the analysed literature considers the following levels of analysis: (1) project level, including the individual level related to project team members; (2) company level, intended as the mesolevels related to program and portfolio levels; (3) customer level, including customers and customers of customers; (4) business ecosystem level, involving suppliers, R&D partners, and business partners; and (5) society level, composed of groups

of citizens and the society as a whole. Most of the literature considers the value created only at one level of analysis (40%), mainly the project level; 23% of the papers extends the analysis to two levels of analysis, mainly the project level and the customer level, or the project level and the company level, while only 2% of the analysed papers considers five levels of analysis. Furthermore, a limited number of articles adopts different stakeholders' perspectives (6%). Finally, approximately 20% of the articles analysed indicates value measurement as a relevant direction for research in this field.

### 5. Detailed Content Analysis on Value Creation through PRM

#### 5.1. Content Perspective: Benefits Generated through PRM

Answering SLR RQ1, both economic and intangible (not monetary) benefits are reported in the literature at different levels of analysis, while empirical results reveal some discrepancies in relation to the benefits obtained through PRM (Figure 4a). Indeed, some authors found relevant benefits generated through PRM in successfully identifying and mitigating project risks in advance [32,83–90], reducing risk impacts [91], containing project costs, time and scope [29,32,83,87,90,92–95], promoting the quality of project results [28,32,34,44,86,96], and facilitating decision-making [87,88,90,91,97].

a) Content Perspective: What is the Value Created through PRM for Stakeholders? (SLR RQ1)

Customer	Company	Project	Society
<ul style="list-style-type: none"> <li>Increased customers satisfaction</li> <li>Higher level of customer's trust</li> </ul>	<p><b>Strategic Level</b></p> <ul style="list-style-type: none"> <li>Improved strategic goals accomplishment</li> <li>Better strategic evaluation and selection of projects</li> <li>Acquisition of new technologies</li> <li>Higher level of brand recognition</li> <li>Entering new markets or higher market share</li> <li>Increased sales and profit</li> <li>Higher internal stakeholders satisfaction</li> <li>Higher overall business risk level mitigation</li> </ul> <p><b>Organizational Level</b></p> <ul style="list-style-type: none"> <li>Acquisition of new core competencies or organizational capabilities</li> <li>Improved organizational learning</li> <li>Value Management, Benefits Management Practices</li> <li>Enablement of other Managerial Processes: Innovation Management, Knowledge Management, New Product Development, Strategic Sourcing</li> </ul>	<p><b>Project Management</b></p> <ul style="list-style-type: none"> <li>Timeline compliance (time)</li> <li>Budget compliance (cost)                             <ul style="list-style-type: none"> <li>Better project strategy alignment with the overall business strategy</li> </ul> </li> <li>Better stakeholders alignment                             <ul style="list-style-type: none"> <li>Better planning and forecasting</li> <li>Better project resources allocation</li> <li>Better complexity management</li> <li>Higher overall business risk level mitigation</li> </ul> </li> <li>Improved decision-making</li> <li>Improved problem-solving                             <ul style="list-style-type: none"> <li>Improved conflict management</li> </ul> </li> <li>Better post-completion management</li> </ul> <p><b>Project Output</b></p> <ul style="list-style-type: none"> <li>Higher quality of outputs</li> <li>Scope Compliance                             <ul style="list-style-type: none"> <li>Higher level of innovation</li> </ul> </li> </ul> <p><b>Project Team</b></p> <ul style="list-style-type: none"> <li>Better usage of resources</li> <li>Better team performance</li> <li>Higher team's skills and capabilities (on PRM)</li> <li>Higher team satisfaction and morale</li> <li>Higher level of retention and lower burn-out</li> </ul>	<p><b>Environment</b></p> <ul style="list-style-type: none"> <li>Better legislation and standards compliance</li> <li>Higher level of respect for the environment</li> </ul> <p><b>Society</b></p> <ul style="list-style-type: none"> <li>Higher level of respect for the society</li> <li>Higher level of of security</li> </ul>

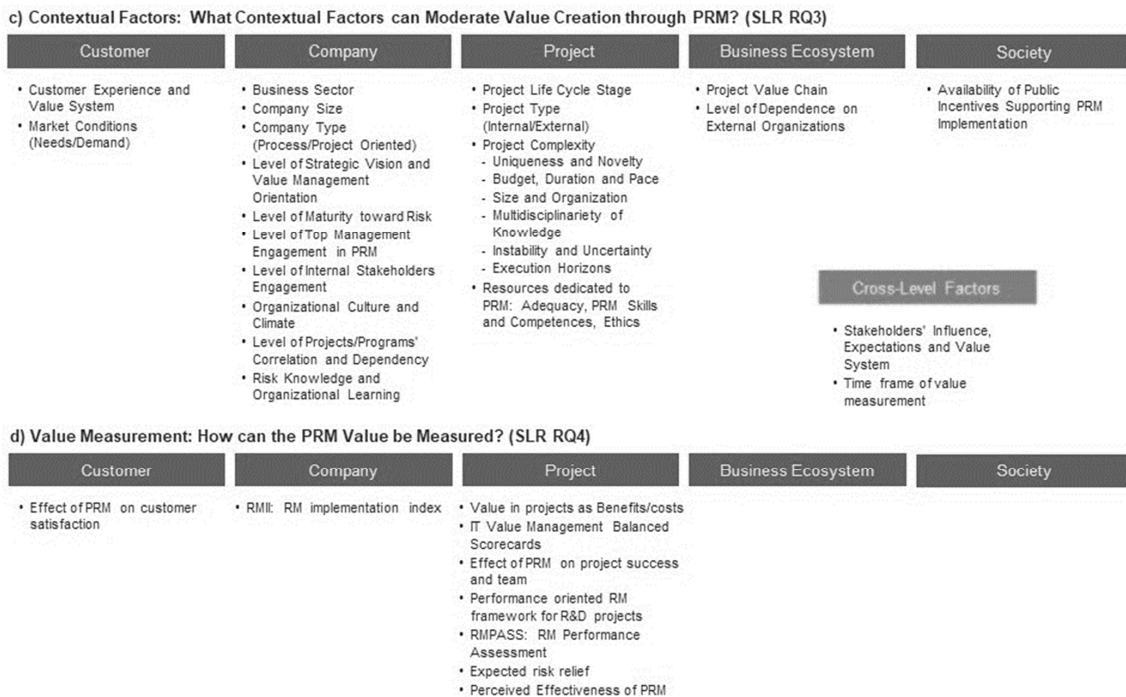
b) Process Perspective: What PRM Activities, Practices, and Tools Lead to Value Creation? (SLR RQ2)

Customer	Company	Project	Business Ecosystem	Society
<ul style="list-style-type: none"> <li>Customer Engagement in PRM Process</li> </ul>	<p><b>Strategic Level</b></p> <ul style="list-style-type: none"> <li>Top Management Commitment to PRM</li> <li>Strategic Evaluation of Projects</li> </ul> <p><b>Organizational Level</b></p> <ul style="list-style-type: none"> <li>Company Risk Maturity Evaluation</li> <li>Risk Culture Development</li> <li>Integration of PRM with Value Management and Benefits Management Practices</li> <li>Integration of PRM at Program and Portfolio levels</li> <li>Integration of PRM with Knowledge Management</li> <li>Integration of PRM with New Product Development</li> <li>Integration of PRM with Strategic Sourcing</li> </ul>	<p><b>Strategic Level</b></p> <ul style="list-style-type: none"> <li>Internal Stakeholders Continuous Engagement</li> <li>Clear and Unambiguous Goals Definition</li> </ul> <p><b>Organizational Level</b></p> <ul style="list-style-type: none"> <li>Integration of PRM with Project Management</li> <li>Formalized PRM Process</li> <li>Proactive Approach to PRM                             <ul style="list-style-type: none"> <li>PRM Tools and Techniques</li> <li>Risk Monitoring</li> <li>Risk Reporting</li> <li>Risk Communication and Transparency on Risks Status</li> </ul> </li> <li>PRM in Decision-Making</li> <li>PRM Performance Indicators                             <ul style="list-style-type: none"> <li>Use of Contingencies</li> </ul> </li> <li>Appropriate Resource Allocation to PRM                             <ul style="list-style-type: none"> <li>Clear Assignment of Responsibilities on Risks</li> <li>Education on PRM and Skills Development</li> <li>Team Integration</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Cross-organizational collaboration on PRM</li> </ul>	<ul style="list-style-type: none"> <li>Public Incentives to Companies Conditioned to PRM Implementation</li> </ul>

⚠ Conflicting results emerging from the literature review

Figure 4. Cont.





**Figure 4.** Detailed results emerging from content analysis.

On the contrary, other results suggest that these benefits are influenced by context, namely the level of project complexity [34,98], the project manager's level of awareness about risks and PRM [27,29,43], and his ability to reduce the impact of risk-related interventions, especially those related to stakeholders' management [27,34].

### 5.2. Process Perspective: PRM Activities, Practices, and Tools

Answering SLR RQ2, the results emerging from the SLR highlight discordant findings about PRM practices that actually create value (Figure 4b).

According to normative guidelines, the formalisation of a PRM process through documenting and reporting practices creates value [1,21]. In addition, the empirical evidence confirms that a formal PRM process increases the chance of project success [9,22–26] and helps the project team make the best decisions at the right time [99,100]. However, other researchers suggest that disproportionate formalisation can be counterproductive, in particular in highly uncertain environments, where flexibility and the ability to react are crucial for timely and rapid decision making [13,27,28,30,31,96].

Moreover, the adoption of formal reporting on risk status is also promoted [1,21] to manage communication between different levels of the organisation, to support decision-making, to capture risk knowledge from projects, and to trace errors (particularly in certain sectors, for instance, the medical sector) [13]. It is also considered a key aspect in the evaluation of the level of maturity toward risk [101,102], which finally contributes to project success [9]. The empirical evidence shows that the value of using formal risk status reports depends on the context and, in particular, on the level of organisational maturity, the willingness of project stakeholders to communicate and document risks, the type of project (e.g., projects on a fast track), but also on the report formats and on the information actually reported [13,30,32].

Facilitating open and honest communication about risk within the project team and with other project stakeholders represents another recurring theme in the PRM normative guides [1,21]. This transparency is recognised as a value-adding practice also through empirical results, reducing the risk of mistakes detrimental to project output [33], improving decision-making [13,25,34–37], and fostering the creation of a common shared vision by influencing stakeholders' perceptions and expectations [38–40]. On the contrary, according

to other empirical results, excessive transparency can cause unwanted and unproductive management attention, suggesting a balance of the level of shared information according to content, context, and the project lifecycle stage [13,30,32].

Furthermore, both normative standards and several empirical studies advocate proactiveness as a key best practice and a basic premise for PRM [41,42]. Oppositely, other authors suggest that an excessive proactivity can be perceived as nonvalue-adding due to a high degree of uncertainty, previous experiences, its costs [13,56], and also the organisational culture [44].

Based on normative guidelines, PRM creates value in decision making using the best possible fact-based information [1,21]. Empirical research, confirming these indications [103] also suggests the integration of PRM with value management to support the definition and selection of strategic scenarios [87,99]. On the contrary, different authors underline the need for a PRM-based decision-making of a certain level of experience to allow a higher degree of flexibility and faster decisions [13,27].

In addition, risk knowledge sharing and the knowledge base are important to promote the effectiveness of PRM [68,83,84,104–107]. However, considering that the eventual contribution of risk knowledge management is indirect, the link to project success remains unclear [25,52].

Finally, many authors emphasise the importance of cross-organisation collaboration to co-create value [108]. For example, the participation of customers/users and suppliers in PRM is positively correlated with project success [25,28,31,33,89,93,104,108,109], particularly in specific phases of the project life cycle, such as the design phase [88]. Other authors underline the importance of understanding the stakeholders' value systems [110], their professional knowledge, and understanding of the project [40], given their tendency to focus on specific types of risks according to their interests [111].

### 5.3. Contextual Factors

Answering SLR RQ3, both the content and the process of PRM value creation are influenced by contextual factors at different levels of analysis (Figure 4d). For example, Carvalho e Rabechini Junior, (2015) [34] and Hartono et al. (2019) [98] state that the value created is influenced by the level of project complexity; others [27,29,34,56,59] indicate that the project manager's level of awareness about the context and the ability to manage stakeholders impact on PRM value creation; and Crispim et al. (2019) [30], Perrenoud et al. (2017) [32] and Willumsen et al. (2019) [13] declare that the value created depends on the level of organisational maturity, and the willingness of project stakeholders to participate in PRM.

### 5.4. Value Measurement

In response to SLR RQ4, some attempts have been made in the literature to quantitatively measure the PRM value, while a wide number of qualitative measures about perceptions of PRM results are available in the literature.

In particular, Wang et al. (2010) [112] suggest the adoption of a RM framework that integrates balanced scorecards and the deployment of quality functions, together with a performance measurement system. Similarly, McShea, (2006) [113] recommends combining a multicriteria approach, derived from the multi attribute utility theory, with strategy frameworks to define strategic objectives and thus deduct the key parameters for value management. Ahmadi-Javid et al. (2020) [114] propose to evaluate the expected positive effect of risk responses for a risk event (expected risk relief) as the difference between the expected impact of risks evaluated before and after the implementation of risk responses.

Other authors focus on different measures in specific industries and types of projects. Among them, Zhao et al. (2014) [29] focus on calculating the costs of PRM implementation in construction projects, while Hwang et al. (2014) [96] use a RM implementation index to evaluate the extent of RM implementation. Moreover, Kloss-Grote e Moss, (2008) [83] propose some indicators to measure PRM performance and knowledge management in aerospace design projects.

Finally, Surlan et al. (2016) [110] highlight the importance of considering the critical success factors of the project that must be aligned with the client value system and its understanding of the project.

### 5.5. Reasons for Conflicting Results in the Literature

The conflicting results emerging from the SLR could be due to different and interlinked reasons:

- Contextual factors: most of the PRM literature is based on the assumption that it is possible to identify ‘universal’ best practices regardless of the context (Figure 3);
- PRM system: the conflicting results emerging from the SLR suggest that PRM value creation is influenced by the PRM system implemented in the project;
- Levels of analysis: the value created through PRM at the project level can slip to different levels of analysis and be captured by diverse stakeholders [45]; thus, unless a multilevel approach in the analysis is adopted, it is impossible to have a comprehensive view of the value created through PRM;
- Project stakeholders: project stakeholders have conflicting interests and subjective value systems; therefore, the perceived benefits of PRM can vary depending on the project stakeholder considered. Therefore, it is impossible to truly consider the value and suitability of PRM results without understanding their relevance to project stakeholders [45,111,115–117].

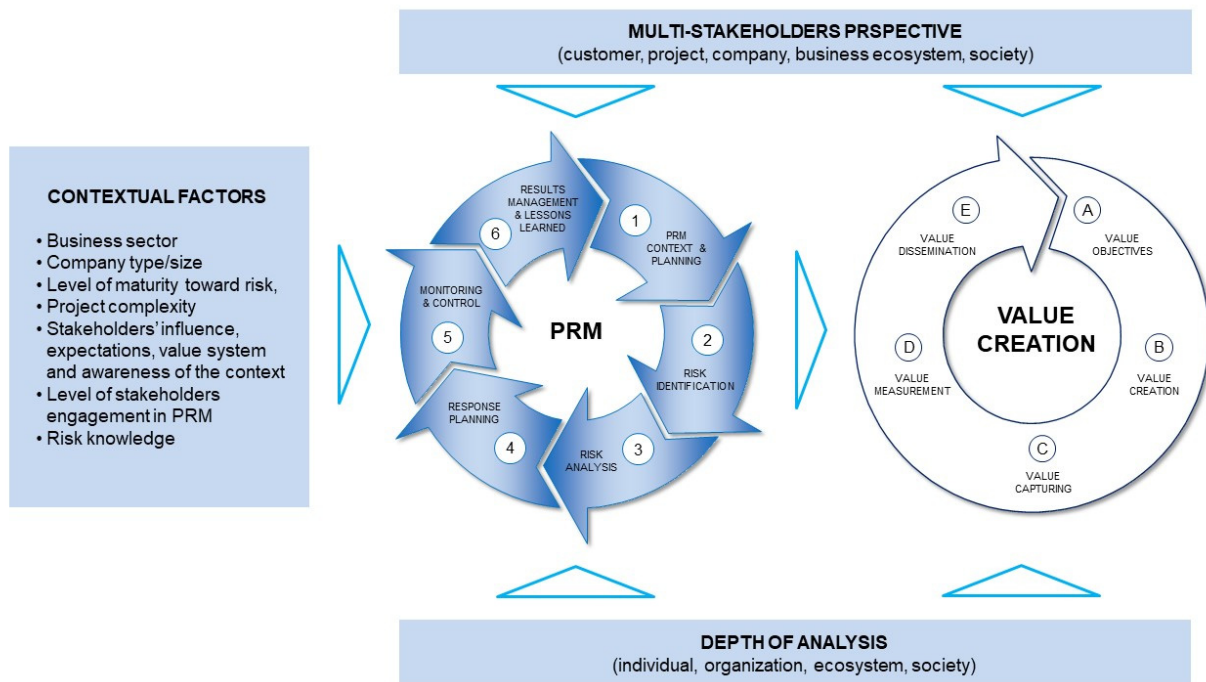
The results of the SLR lead to the integration of the different aspects emerged in a comprehensive theoretical framework, to provide a clear and holistic view of value creation through PRM (Figure 5).

#	Area	Gaps Emerging from SLR	Guidelines to Design a Theoretical Framework
1	<b>Contextual Factors</b>	Most of the PRM literature is based on the assumption that it is possible to identify ‘universal’ best practices regardless of the context. Empirical results suggest that the context influences the PRM system implemented.	Contextual factors must be considered in the definition of the PRM system.
2	<b>PRM System</b>	Conflicting results emerging from the SLR suggest that the PRM value creation is influenced by the PRM system implemented.	The PRM system implemented in the project (practices, activities, tools) influences PRM value creation.
3	<b>Value Creation</b>	Value created through PRM is defined as the ratio between benefits and costs that is not a quantitative quotient but only a representation.	The PRM value created includes both economic and intangible components. The PRM value created is context-specific, depends on the level of analysis, and the stakeholder or stakeholders’ group considered.
4	<b>Depth of Analysis</b>	Value created at the project level through PRM can be captured at different levels of analysis (e.g. individual, organisational, business ecosystem, society levels).	A multilevel approach to PRM value analysis has to be adopted to have a comprehensive view of the value created through PRM.
5	<b>Stakeholders’ Perspectives</b>	Project stakeholders have conflicting interests and subjective value systems; therefore, the perceived benefits of PRM can vary depending on the project stakeholder considered.	A multistakeholder approach has to be adopted to consider PRM value creation from the diverse perspectives of stakeholders.

**Figure 5.** Gaps emerging from SLR, Guidelines to design a theoretical framework.

## 6. A Theoretical Framework for Value Creation through PRM

The results emerging from the SLR have been incorporated into a comprehensive theoretical framework for value creation through PRM (Figure 6).



**Figure 6.** The proposed framework for value creation through PRM.

The proposed framework includes five components:

- **Contextual factors:** It is fundamental to identify the relevant contextual factors that influence the definition of a suitable PRM system.
- **PRM:** The PRM system can be implemented at different maturity levels, in terms of the practices, activities, and tools adopted. Specifically, the PRM process is composed of the following steps: (1) PRM Context and Planning, (2) Risk Identification, (3) Risk Analysis, (4) Response Planning, (5) Monitoring and Control, (6) Results Management and Lessons Learned. The selection of PRM practices, activities, and tools is guided by the project context. Information on risks collected during each iteration of the PRM process are analysed and formalised (Step 6) to support the subsequent iterations (in the current project or in future projects). A process iteration will be started when a new project is launched or, alternatively, during the execution phase of a project, if its scope or goals are changed to take advantage of certain opportunities (positive risks), or if negative risks require reconsidering the planned approach to PRM (e.g., diverse strategies for risk responses, skills or effort, different practices and activities). The implemented PRM system influences the creation of value.
- **Value creation:** The PRM value creation process is context-specific and depends on the level of analysis and on the stakeholder or stakeholders' group considered. It includes the following steps: (A) Value Objectives: definition (or revision) and planning of value objectives, in terms of economic and intangible value for stakeholders, according to the identified risks, the levels of analysis, the type of project stakeholders and the project context; (B) Value Creation through the management of project risks and opportunities; (C) Value Capture from project stakeholders; (D) Value Measurement of economic and intangible value created for project stakeholders, compared with the defined value objectives; (E) Value dissemination (intentional or unintentional) to different project stakeholders from those who captured the PRM value in previous iterations (even after the termination of the project). The value created through PRM is defined as

the ratio between benefits and costs, which is not a quantitative quotient but only a representation and includes both economic and intangible (not monetary) components.

- Depth of analysis: A multilevel approach to value analysis is required to have a comprehensive view of the PRM value created. The levels of analysis considered influence the PRM system adopted in the project and the evaluation of the PRM value created.
- Multi-stakeholder perspective: It is fundamental to adopt the different perspectives of the project stakeholders, considering that subjective stakeholders' perceptions and interests influence the PRM system adopted in the project and the evaluation of the PRM value created.

It is important to note that the PRM process and the related value creation process are not synchronous. A new iteration of the PRM process could initiate (or not) a new cycle of the value creation process; it depends on whether PRM actually creates additional value for any project stakeholders in the specific iteration. Furthermore, value creation process iterations could be completed even after the completion of the project.

#### *Implications for Engineering Managers*

This work provides engineering managers with a framework for the analysis of the relationships between context, the PRM system, and value created through PRM, while contributing to fill the identified gaps in the PRM literature. The framework integrates the fundamental aspects for the definition of the appropriate PRM system to foster value creation in projects.

In particular, the proposed framework (1) explains the motivations for the adoption of the different stakeholders' perspectives in PRM value creation; (2) indicates the levels of analysis to be considered to have a comprehensive view of the PRM value created; and (3) suggests the relevant contextual factors that can influence value creation through PRM. This contribution supports engineering managers in planning and implementing a PRM system with an appropriate level of maturity, with the aim of maximising value creation for stakeholders, according to the project context.

## **7. Conclusions**

A systematic literature review reveals that the value created through PRM includes both economic and intangible (not monetary) benefits. Value management standards place greater relevance on the creation and protection of value, extending the view to the potential positive effects of risks. Conversely, the literature indicates that significant obstacles remain in managing value at risk in the implementation of value management. Indeed, the empirical results show significant discrepancies even compared to the indications and best practices provided by international standards and normative best practices. From the analysis of the results, this work contributes to develop a new holistic theoretical framework that integrates disparate relevant aspects not considered so far, fostering the value creation for project stakeholders through the management of negative and positive risks. In addition, the new holistic theoretical framework allows the integration of economic, ecological, and social impacts into the notion of value creation, providing a perspective on the sustainability orientation of projects.

The relevant innovations suggested by the emerging framework for PRM value creation are (1) the inclusion of all the contextual factors that can influence the choice of the most suitable PRM system for the project; (2) the impact of the adopted PRM system on value creation for stakeholders; (3) the adoption of a multistakeholder perspective in PRM; and (4) the use of a multilevel analysis to evaluate the value created, including the individual, project, organisational, business ecosystem, and society levels.

Furthermore, the value obtained through the adoption of PRM, the practices and activities that create value, and the relevant contextual factors, which can moderate value creation, are identified along with the research gaps and opportunities.



From a theoretical point of view, this study promotes PRM knowledge by adding the perspective of value creation for project stakeholders. From a managerial point of view, it supports companies to grasp the value created by their projects, through the adaptation of PRM to the specific context.

In other words, the proposed holistic framework improves on the one hand the awareness about the motivations for PRM adoption, specifically to foster value creation in projects and organisations, and, on the other hand, extends the understanding of how all the benefits of this adoption can be grasped.

## 8. Limitation and Future Research Directions

This analysis also has some limitations. First of all, the proposed framework is deduced only by the analysis and integration of the state of the art of the scientific literature on PRM value creation. However, an empirical study of value creation through PRM would offer additional elements for research. Indeed, future efforts devoted to empirical testing of the comprehensive framework could provide verified references in different types of projects, companies, industries, and geographical settings.

In addition, other interesting areas for further developments concern the identification of variables and measures to assess both economic and intangible value and to guide the implementation of PRM, based on measurable results.

In conclusion, this study, starting from the results of a systematic literature review, suggests an evolution of the approach to PRM and proposes an emerging framework for value creation through PRM that can effectively foster value creation for project stakeholders.

**Supplementary Materials:** The following supporting information can be downloaded at: <https://www.mdpi.com/article/10.3390/su16020753/s1>, Table S1: Systematic literature review database.

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