

# Identifying Project Opportunity Gaps Using a Descriptive Literature Review: 2010-2019

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**Abstract:** The purpose of this paper is to identify gaps in the opportunity management literature (as a subset of overall risk management) and to identify future research in opportunity management. The methodology is non-experimental, using a descriptive literature review content analysis of opportunity management articles published between 2010 and 2019. The identified strengths and weaknesses establish a future research agenda, including process steps and tailoring, risk exposure, and balanced risk. The research resulted in a repeatable methodology that can be applied to other research domains in addition to the opportunity management research agenda.

**Keywords** risk management; opportunity management; positive risk; project management; qualitative; descriptive literature review

## Introduction

Risk management is commonly accepted as a foundational project management practice to increase the likelihood of project success. However, ongoing discussions with practitioners reveal a dizzying array of terms and inconsistent use, particularly with respect to opportunity (positive) risk management. The term *risk* is used extensively both within project management and in other disciplines. Often, it is used as a colloquial term for negative events and has little to do with project management. Anecdotally, a search using the ProQuest Central Database for peer-reviewed articles yielded over 1.6 million articles with the term "risk" in the abstract. Limiting the search to journal articles with the term "project" in the title and the term "risk" in the abstract still yielded 690 peer-reviewed articles for the same period. When the search is restricted to the decade 2010-2019, the search still yielded over 400 peer-reviewed articles. However, most are not about project risk management. As shown in this paper, the same pattern applies to the term "opportunity". Thus, searching for relevant articles on a topic with multiple usages, functions, or purposes remains difficult. These are overloaded terms as they perform

different functions or operations depending on the domain context. This paper demonstrates an approach to working with overloaded terms.

A number of prior literature reviews on project management have been conducted but either did not take into account current literature, lacked a focus on risk management, lacked a focus on opportunity management, or only provided a rudimentary topical analysis. Padalkar and Gopinath (2016) conducted a meta-analysis and identified 36 literature reviews from 11 peer-reviewed journals. However, they used samples instead of reviewing each article in detail. The next most recent meta-analysis (Pollack & Adler, 2015) covered 50 years of project management research, but only included articles through 2012 and did not include risk management. Exclusion made that study of limited value since Padalkar and Gopinath (2016) concluded that risk management was the leading knowledge area by research article quantity from 1961 through 2015. While Lehtiranta (2014) covered both threats (negative risks) and opportunities (positive risks) in a literature review, the focus was on risk management roles and responsibilities and only through 2012. Other older noteworthy literature reviews include Arto, Martinsuo, Gemünden, and Murtoaro (2009), Crawford, Pollack, and England (2006), Kloppenborg and Opfer (2002), and Kwak and Anbari (2009).

This paper begins where other literature reviews left off. Here, a systematic literature review covers scholarly papers published between 2010 and 2019 in six ranked journals identified in the SCImago database: Journal of Modern Project Management (JMPM), Project Management Journal (PMJ), International Journal of Managing Projects in Business (IJMPB), International Journal of Project Management (IJPM), Impact Assessment and Project Appraisal (IAPA), Built Environment Project and Asset Management (BAM). Fifty-five (55) papers met the search criteria and were analyzed for context. Text and content analysis, and qualitative coding process using the NVivo-12® software package were conducted consistent with Corbin and Strauss (2015) and Saldana (2015). This analysis addresses: 1) the preferred view of positive and negative risk, 2) the preferred view of the risk management process, and 3) the key concepts associated with risk management.

## Research Questions

The effective practice of risk management, in particular opportunity management, is a source of ongoing debate in the scholarly community, and even more so between scholars and practitioners. Ultimately, the question is what is the best practice for performing positive risk (or opportunity) management and what are the gaps in practice? Before this can be answered, the body of knowledge and scholarly work needed to be characterized and baselined.

Narrowing the scope to opportunity management instead of all of project risk management provides a viable goal for a framework for future scholarly research. Additionally, establishing a framework provides a mechanism to involve practitioners and baseline current opportunity management literature. The research question addressed in this paper is as follows: What concepts represent the practitioner view of project risk management as instantiated in a globally accepted project practice standard?

## Background

This section quantifies the growth of risk management research, including opportunity management. The complete scholarly literature review for 2010 through 2019 is provided in the analysis, discussion, and findings section of this paper as the primary paper methodology. Risk

management is a critical activity in project management (such as from Al Nahyan, Hawas, Raza & Aljassmi, 2018; Anderson, Samset & Welde, 2016) and has been a focus of research beginning in the early 1980's.

### **Focus on Opportunity Management vs. Threat Management Literature**

Even with the growing recognition of the importance of risk management, there are no universal definitions for risk, or risk management (Becker & Smidt, 2015). Two primary schools of thought exist according to Lehtiranta (2014). First, risk is defined predominantly from a negative lens (Adler, Pittz, & Meredith, 2016; Becker & Smidt, 2015; Browning, 2019; Dandage, Mantha & Rane, 2018; Farooq, Thaheem & Arshad, 2018; Loosemore, 2010; Zhang & Qian, 2017). The second is broader and examines risks for both negative and positive elements. Positive risk (or opportunity) management provides benefits to the current project (Atkinson et al., 2006; Becker & Smidt, 2015; Browning, 2019; Eskerod, Ang & Andersen, 2018; Haq, Gu, Liang & Abdullah, 2019; Hillson, 2016; Lechler, Edington & Gao, 2012; Perminova, Gustafsson & Wikström, 2008; Farooq, Thaheem & Arshad, 2018; Kendrick, 2015; Zaman, 2016).

While examples of opportunity management appear plentiful, thorough context analysis shows that many are not fully applicable. Lehtiranta (2014) found only 15% of the articles held a primary risk view of opportunity, while the remaining held a primary risk view of threats. Examining the practice guide (Department of Defense Risk, Issues, and Opportunity Management Guide for Defense Acquisition Programs, 2015) supports this finding. The DOD Guide acknowledges that opportunity management is complementary to threat management – although disproportionately so. The document contains 96 pages and of these, 49 percent are focused on threat and issue management, whereas only five percent are focused on opportunity management.

Structured searches using the ProQuest Central Database were used to quantify the number of articles about threat vs. opportunity. This yielded results that are contrary to Lehtiranta (2014) and DOD (2015). Two types of searches were conducted: (1) "threat management" OR "negative risk"; (2) "opportunity management" OR "positive risk". Opportunity articles outpace the threat articles by about 1.3 times and appear to show an increased interest in the topic, at least within academia (Denney, in press).

### **Bias toward the Negative**

Risk bias toward the negative or avoidance of the positive is well documented as described below. Optimism bias results in the underestimation of the strategic importance of risks (Andersen & Vidar Hanstad, 2013; Andersen, Samset & Welde, 2016; Bradly & Hobday, 2011). Farooq, Thaheem and Arshad (2018) conclude that opportunities are underestimated by 7.5% and threats overestimated by 8% because of optimism bias.

There are some intriguing reasons why this exists. First, assumptions for opportunities are often embedded in the baseline of a project (Kendrick, 2015). In fact, opportunities that did not appear to be a substantial shift in the scope are often called just good planning. Lechler et al. (2012) claimed that project management primarily focuses on optimization within the constraints of time, budget, and scope to achieve stakeholder satisfaction. As such, this does not include the concept of opportunity pursuit. According to Hillson (2004), an individual or organization with relative risk discomfort might both overstate the significance of threats and underplay potential opportunities.

Project managers and participants may be unaware of opportunities and focus on personal experience. Olsson (2007) claims that the main reason for risk management processes is to manage well-constrained projects, not complex ones. Hillson (2004) asserts that human nature finds it easier to find faults or to be concerned about potential hazards (negative risks) than constructive (positive risks). Additionally, Hillson (2004) hypothesized that the PMBOK Guide (PMI, 2017a) focuses more on threats because it reflects practitioner experience.

Even if managers are aware of risks, it has negative psychological effects on the team including disappointment and unnecessary pressure (Anderson & Vidar Hanstad, 2013). Additionally, there is a difference in the approval process to implement opportunities as discussed by Kendrick (2015). While a project team uncovered new opportunities, taking action, particularly if the scope is involved, usually required escalation to upper management.

### **Research Design and Methodology**

The opportunity management, or positive risk management, aspect of project risk management was selected based on discussion with practitioners who identified inconsistent terminology and practice in opportunity management as a frustration. The methodology is non-experimental, using search and content analysis consistent with Crozby and Bates (2018) and Bordens and Abbott (2018). There are three parts to the methodology. Part 1 developed a risk management framework iteratively as a hierarchy of terms. The qualitative analysis used NVivo-12® (QSR International Pty Ltd., 2018) which is a computer-assisted qualitative and mixed methods data analysis software package used to input, organize, manage, analyze, and visualize the literature using a coding procedure via content analysis. For the researchers, the toolset became an efficient way to collect, and generate initial groupings and codes to test alternatives throughout the analysis. Coding was performed consistently with Miles, Huberman and Saldana (2020) and Saldana (2015). Content analysis is conventional (Hsieh & Shannon, 2005) letting the data speak for itself instead of using a predefined hierarchy. Fundamentally, this research is a ground theory (Glaser & Strauss, 1967).

The purpose of the second part is to select appropriate, peer-reviewed, project management-related journals and articles about positive risk management resulting in an opportunity data set. Corbin and Strauss (2015) discuss the validity of using a literature review for making comparisons between data sets. Here, literature review principles were applied including Cooper (1998), Hart (2018), and Robinson and Lowe (2015). More specifically, a descriptive literature review was used (King & He, 2005; Jaidka, Khoo & Na, 2013) in order to employ frequency analyses to identify common research topics and identify gaps for future research. Coding was performed using the same sources as part one.

The third part is a gap analysis between the coding hierarchy and the opportunity data set. Qualitative coding principles (Miles, Huberman & Saldana, 2020; Saldana, 2015) were applied, but the coding is summative (Hsieh & Shannon, 2005) since the coding hierarchy from part one was used to understand the context of the words from the opportunity data set. The methodology loosely followed the content analysis flowchart described by Chambliss and Schutt (2019) while looking for patterns in the text (Creswell & Creswell, 2018; Trochim, Donnelly & Arora, 2016). The following paragraphs describe each of the parts.

## Part 1: Risk Management Coding Hierarchy Methodology

The purpose of the risk management coding hierarchy is to develop a risk management framework for comparison. A number of professional publications and associations defined risk management frameworks (including APM, 2017; IEC, 2013; IRM/ALARM/AIRMIC, 2002; ISO, 2009; OGC 2010; PMI, 2017a). Additionally, Becker and Smidt (2015) summarized additional frameworks including Project Risk Analysis and Management (PRAM) (APM, 2004), and Risk Analysis and Management for Projects (RAMP) (Institution of Civil Engineers, (ICE/IFA, 2014). The Project Management Institute (PMI), PMBOK Guide (PMI (2017a), chapter 11 Project Risk Management, is selected because the PMI, is the leading global professional membership association for the project management profession (PMI, 2018a). Qualitative analysis was performed using NVivo-12®, coding and conventional content analysis. There are four steps in part 1 and they are described in the paragraphs that follow:

**Step 1: Import data and perform first cycle coding.** This includes creating a PDF of the data file for easy import into NVivo-12®. Once imported, attention turned to first cycle coding. This is also referred to as manual coding (as opposed to NVivo-12®-generated codes). This began by physically examining the PMBOK Guide Risk Management chapter (PMI, 2017a) including previewing the chapter outline, examining commonly used words, and emphasized topics. The PDF, Risk Management file, was read, line-by-line, and initially coded based on researcher expertise of key terms and phrases.

**Step 2: Perform second cycle coding.** At first, the researcher used the automated coding feature of NVivo-12® to generate themes. Using this feature demonstrated one of the limitations in using NVivo-12® automated theme-generation for highly specific domains. In this case, the entire text file is about project risk management and thus identifying three themes (one for project, one for risk and one for management) were not particularly helpful. However, NVivo-12® identified other topics (68 for risk, 28 for the project, and 22 for management) that became the starting points for the iterative coding process. Reviews indicated that some of the topics from the automated coding were related (as synonyms or stem words). After abandoning automated theme generation, attention turned to text word frequency searches. NVivo-12® provides five options for word frequency searches including exact word match, stemmed words, synonyms, specializations, and generalizations. For each option, the results were limited to word counts of three or more characters. This resulted in hundreds of potential codes, and many of them with low-frequency count.

**Step 3: Aggregate queries into preliminary codes.** Hundreds of potential codes of low-frequency count were of little value for drawing conclusions. Therefore, the results from the five groupings were merged into a single Microsoft® Excel® spreadsheet. Here, duplicate groupings were merged, and frequency counts of three or less were removed from the search results to allow focus on the higher value matches. Still, this preliminary grouping resulted in over 100 potential codes.

**Step 4: Subject matter review and revision.** Inspecting the preliminary results demonstrated an additional limitation of NVivo-12®. Subject matter experts were used to refining the codes further (Corbin & Strauss, 2015). Initially, the researcher, who has domain expertise as a program manager with risk management experience, reviewed each word, and combined them into groups. Next, three senior industry program managers acted as subject matter experts to review and update the preliminary results. The groupings were updated and iteratively mapped to the initial categories and prior cycle codes.



## Part 2: Opportunity Management Literature Selection Review Methodology

The purpose of part 2 is to select appropriate journals and articles resulting in an opportunity data set. This part consists of the four steps described below. The analysis was performed using NVivo-12®, descriptive literature review principles, and conventional coding.

Step 1: Identify appropriate source journals. Selected journals and associated articles were based on their relevance and influence in the scholarly communities. SCImago (<https://www.scimagojr.com/aboutus.php>) was used since this journal ranking measures the influence of scholarly journals including both the number of citations and the prestige of the journal itself. Part of the challenge in conducting this research is narrowing the applicable material given the broad, overloaded use of terms. While there were specific project management journals, the topic "project management" appeared in many other journals such as leadership, management, and operations. Without limiting the journal name, most articles were not relevant to project opportunity management. Often, the terms "opportunity" and "project" were used as generic terms rather than being relevant to this specific domain. This potentially eliminated valid articles for this research. Narrowing the search to "project" journals resulted in a more applicable data set for analysis and coding. While the data selection is a study limitation, the researcher used only the journals that had the term "project" in the journal-title to maximize applicability. This set of journals represents the current formalized, discipline-specific theoretical knowledge base. The six journals include the Journal of Modern Project Management (JMPM), the Project Management Journal (PMJ), the International Journal of Managing Projects in Business (IJMPB), the International Journal of Project Management (IJPM), Impact Assessment and Project Appraisal (IAPA) and Built Environment Project and Asset Management (BAM).

Step 2: Specify the search criteria and extract the data set. Using SCImago and the six journals with "project" in the journal-title, an iterative process was used to refine the search criteria and select the appropriate articles. To compile the most representative sample, the researcher searched for the term 'opportunit\*' (where '\*' is a wildcard) and 'risk\*' in various combinations of article title, and abstract. The term "project" was not included in the search criteria since the articles are from dedicated project management journals. The search criteria were narrowed to include only peer-reviewed papers published between 2010 through 2019.

Step 3: Aggregate results to form the opportunity data set. Five separate searches were performed as follows:

- 1-ABSTRACT = oppor\* AND ABSTRACT = risk\*
- 2-(article) TITLE =oppor\*
- 3- ABSTRACT = oppor\* AND (article) TITLE=risk\*
- 4- (article) TITLE=oppor\* AND ABSTRACT = risk\*
- 5- (article) TITLE = oppor\* AND (article) TITLE = risk\*

No single search included all the articles in this opportunity data set. This is another indication of the complexity of finding applicable articles for terms that have inconsistent meanings.

Step 4: Perform subject matter expert reviews. As previously discussed, opportunity management is an overloaded phrase. In this step, the researcher, as a domain expert in project management with risk management expertise, reviewed each article in the opportunity data set to determine applicability for further analysis. To ensure accuracy and avoid single researcher bias,

the researcher reviewed the results individually with three senior industry program managers from the Aerospace industry and feedback was incorporated into the groupings.

### **Part 3: Opportunity Strengths, Weaknesses, and Gap Analysis Methodology**

The purpose of the opportunity management gap analysis is to identify differences between the coding hierarchy and the opportunity data set, and to identify future avenues for opportunity management research. First, strengths and weaknesses were identified and then consolidated to make recommendations. Qualitative analysis was performed using NVivo-12® text search, summative content analysis, and expert opinion.

#### **Analysis**

##### **Risk Management Coding Hierarchy Analysis**

First cycle coding resulted in three categories: process, concept, and tools. This first pass resulted in six codes for a process (plan, identify, monitor, analyze, respond, and monitor), and six for concept (unknown, positive vs. negative perspectives, probability, decision-making and iteration). Specific codes for tools were not identified in this first cycle since so many tools were discussed and visual inspection did not result in a clear grouping.

Steps 2 and 3 consists of second cycle coding, and aggregating query types. To ensure accuracy and avoid single researcher bias, step 4 consists of reviewing the results individually with four senior industry program managers and incorporated the results into the coding hierarchy used in this analysis. The four subject matter experts resulted in near-universal agreement. The frequency column identifies the number of times NVivo-12® found for the search words in the PMBOK Guide chapter (PMI, 2017a). Search word stems were used to ensure all variations of the word were captured. Note that the three initial categories remained the same, but three of the reviewers suggested adding a category for domain (such as construction, engineering, information technology, etc.). This process rigor serves not only to define the categories, but the search stems ensure a transparent, repeatable research process for future research.

##### **Opportunity Management Literature Selection Review Analysis**

The analysis used six journals (Journal of Modern Project Management (JMPM), Impact Assessment and Project Appraisal (IAPA), Built Environment Project and Asset Management (BAM), International Journal of Managing Projects in Business (IJMPB), International Journal of Project Management (IJPM) and Project Management Journal (PMJ)), to select articles published between 2010 through 2019. This resulted in 55 articles in the opportunity data set for this study.

##### **Opportunity Strengths, Weaknesses, and Gap Analysis**

This analysis applies the opportunity data set using the risk management coding hierarchy. This is used to identify strengths and weaknesses. The results of the analysis are described for the process and concept categories. Word stems for each code were decomposed into lenses. As previously described, the tools and domain elements of the coding hierarchy were not analyzed further since the coding hierarchy source document did not provide adequate detail. This is an opportunity for future research.

Strengths and weaknesses for the process category analysis. A summary of code hierarchy, strengths and weaknesses are shown on table 1 and described further in the paragraphs that follow. For the most relevant references, the matching count is shown as [N=count].

### Process Category

*Risk Planning* consists of the seven lens, however, only three lens (cost or budget, estimate, and framework) were detailed in the opportunity data set. The cost or budget lens is the most frequently discussed planning lens in the literature. Andersen, Samset and Welde (2016) [N=280] discussed the topic extensively with an emphasis on cost estimation, underestimation of risk and over-estimation bias. Other discussions, in order of significance included cost overruns (Lehtiranta, 2014), cost and budget elements in organizational and financial risks (Al Nahyan, Hawas, Raza & Aljassmi, 2018), the inadequate nature of tools for cost planning (Browning, 2019), and treating cost constraints as a risk (Loosemore, 2010).

The estimating lens includes a strong contribution from Andersen, Samset and Welde (2016) [N =199] about cost estimation. Al Nahyan, Hawas, Raza and Aljassmi (2018) state that estimating is subject to the level of risks, opportunities, and constraints, however, those claims were not defined further. The frameworks, processes, methods or phases lens (as part of overall risk management plan) is addressed elegantly by Becker and Smidt (2015) [N=28], however the focus on the process for opportunity management is lacking. Other contributions to this lens include the need for a strong framework and a process to reflect the project risk environment (Lehtiranta, 2014; Padalkar & Gopinath, 2016).

Of the remaining four lens, two provide minor treatment. Only Browning (2019) discussed the planning lens but did not discuss it in detail. Only Becker and Smidt (2015) mentioned the practice, procedure or policy lens. The remaining two lens (record, register, or document, and scale or tailor) had weak to non-existent treatment in the opportunity data set.

Table 1  
*Code Hierarchy and Analysis Summary*

Categories, Codes & Lens	Opportunity Data Set
<b>Category: Process</b>	
<b>Code: Planning</b>	
Lens: Record, Register or Document	RED- Weak to non-existent
Cost or Budget	GREEN- Extensive discussion with an emphasis on cost estimation, underestimation of risk and underestimation bias.
Estimate	GREEN- Strong discussion about cost estimation
Framework, Process, Method or Phase	YELLOW-Good discussion, but the focus on the process for opportunity management was lacking
Plan	RED- Weak
Scale or Tailor	RED- Weak to non-existent
Practice, Procedure, or Policy	RED- Weak
<b>Code: Analyzing</b>	
Analysis	YELLOW- Limited treatment by a few authors



Prioritize	YELLOW- Limited treatment by a few authors
Categorize	YELLOW- Good coverage, but imprecise terminology
<b>Code: Monitoring or Controlling</b>	
Monitor or Control	YELLOW- Good discussion on key performance indicators for monitoring and once risks and opportunities, but only once they have materialized
Lessons Learned	RED- Weak to non-existent
Contingency or Reserve	YELLOW- One discussion on importance of improve contingency reserve precision using quantitative means
Trends or Thresholds	GREEN- Strong discussion about using trends to find future opportunities
Measurement or Forecast	YELLOW- Several discussions, but details are lacking
Track or Revise	YELLOW- One discussion
Audit	RED- Weak to non-existent
<b>Code: Responding</b>	
Negative Responses	YELLOW- Good coverage, but imprecise terminology
Accept	RED- Weak
Escalate	RED- Weak to non-existent
Enhance	GREEN- Strong discussion about enhancing opportunities
Emergent	RED- Weak
Exploit	RED- Weak
<b>Code: Identifying</b>	
Identify	YELLOW- One discussion, but not the primary part of the paper
Environment	RED- Weak to non-existent
Detect	RED- Weak
<b>Code: Integration</b>	
Integrate	RED- Weak
<b>Category: Concept</b>	
<b>Code: Unknown</b>	
Change	YELLOW- Few specifics for application of the concept
Strategic	YELLOW- Good discussion of strategy as an avenue for opportunities, but little specifics on how
Assume	YELLOW- Only mentioned in another literature review
Uncertainty	YELLOW- Good coverage as a concept but turning uncertainty into opportunities is not described well
Ambiguity	RED- Weak to non-existent
<b>Code: Positive/ Negative Perspective</b>	
Threat and Opportunity	GREEN- Extensive coverage
Positive and Negative	GREEN- Extensive coverage
<b>Code: Stakeholder Orientation</b>	
Stakeholder	YELLOW- Good treatment, but narrow review of stakeholders by most
Team	GREEN- Extensive coverage
Risk Exposure	RED- Weak: only one source

Risk Appetite or Risk Tolerance.	RED- Weak: only one minor source
Balanced, Net or Shared Risk	YELLOW- Good start, but without specifics
<b>Code: Probability</b>	
Probability	YELLOW- Good start by a few
<b>Code: Decision Making</b>	
Decision	YELLOW- Good start by a few
<b>Code: Iteration</b>	
Iterative or Progressive elaboration	YELLOW- Good start by a few
Proactive or Reactive	RED- Weak
Continuous Nature of Risk Management Process	YELLOW- Mentioned, but without specifics

*Notes:* Color in the right column represents the strength of the material in the opportunity data set with RED as weak to non-existent, YELLOW as moderate, and GREEN as strong.

*Analyzing* consists of three lens. The categorization of risks lens is poorly addressed in the opportunity data set. Al Nahyan, Hawas, Raza and Aljassmi (2018) [N=9] describe characterization of risks into technical, organizational, management, economic, financial, stakeholder and lifecycle groupings. However, there is no discussion of how categorization differs, if at all, between threats and opportunities. Jang, Lee and Choi (2014) describe using Strengths, Weaknesses, Opportunities and Threats (SWOT) as a method of risk characterization. The analysis lens uses the same title as the code itself and includes both qualitative and quantitative aspects. Al Nahyan, Hawas, Sherif and Basheerudeen (2019) [N=21] provide an excellent discussion on the need for a continuous, qualitative focus on decision-making. Entacher and Sander (2018) [N=42] advocate a need for both qualitative and quantitative risk decision analysis. Entacher and Sander [N=15] also provide an excellent discussion on the need for risk prioritization.

*Monitoring or Controlling* consists of seven lens. The monitor or control lens takes the same title as the code itself. Sanchez and Robert (2010) [N=23] used key performance indicators for monitoring but only once risks and opportunities had materialized. This is an interesting application as this is contrary to the generally accepted intent of risk management. Waiting for risks to materialize likely means that risk management had not effectively achieved the desired proactive effect. Loosemore (2010) discuss the *illusion of control* by simply transferring a risk and references the cost of controlling risks.

The contingency or reserve lens receives fair treatment from Farooq, Thaheem and Arshad (2018) [N=39] by showing the importance of improving contingency reserve precision using quantitative means. The only other reference of note is Di Muro and Turner (2018) who provides an excellent discussion on types of contingencies and how opportunity contingencies are different from threat contingencies. However, the method of defining these is unclear.

The trends or thresholds lens, is clearly addressed by Padalkar and Gopinath (2016) [N=27] and Sanchez and Robert (2010) [N=14] who describe using trends to find future opportunities. Farooq, Thaheem and Arshad (2018) make a strong connection between thresholds and opportunities, and in particular, how opportunity thresholds are often different from threat thresholds.

The measurement or forecasting lens provides little specific guidance for practitioners. Sanchez and Robert (2010) [N=53] discuss overall risk effectiveness as a measure. Other contributions included budget forecasting and earned value (Padalkar & Gopinath, 2016), and measuring project success (Browning, 2019; Holm, Ritchie, Snyman & Sunderland, 2013).

The tracking and revisions lens is adequately addressed by Browning (2019) [N=22]; this includes tracking cost, schedule, technical performance, and quality. While Sanchez and Robert (2010) give a weak treatment of the topic, the background material referred to the 1976 origination of key performance indicators and the 1979 origination of critical success factors. The remaining two lens (lessons learned and auditing) has weak to non-existent treatment in the opportunity data set.

*Responding* consists of six lens. The most commonly discussed lens is to enhance. The best treatment addresses opportunity exploitation and enhancement by focusing on stakeholder engagement (Holm, Ritchie, Snyman & Sunderland, 2013 [N=14]). Others (Esteves & Barclay, 2011; Jang, Lee & Choi, 2014) use the term more generically, but still provide a context appropriate to improving the probability of occurrence.

The negative risk response lens receives adequate coverage in the opportunity data set, but provides little value to this study since the focus of this study is on positive risk. Negative responses included transference, mitigation and avoidance. Holm, Ritchie, Snyman and Sunderland (2013) [N=26] and Entacher and Sander (2018) [N=17] use the term mitigation as a generic term for handling negative risks, and not as a specific risk response mechanism.

Three lens are weakly covered. The acceptance lens, is loosely addressed by Vanclay (2017) [N =9], but the concept is that of acceptable damage relative to a specific domain (displacement and resettlement of people) and not of risk management, per se. The emergent lens, is addressed only briefly by Di Muro and Turner (2018) [N=13], however the discussion seems to be reactive in nature, as opposed to proactive. For the exploitation lens, only Andersen and Vidar Hanstad (2013) [N=10] use the term, but it is used generically without process details. The final lens, escalation, which is the process of raising the opportunity to higher authority or to the project or portfolio level, is poorly addressed in the opportunity data set.

*Identifying* consists of three lens. The identify lens takes the same name as the code itself. While not a primary focus of that paper, Lechler, Edington and Gao (2012) [N=6] provided an excellent treatment of the subject. Here, specific classes of opportunity and contextual situation are identified through a case study. Categories include technology implementation, project business, and future projects. Others (Becker & Smidt, 2015) mention that the identification phase generally lacks rigor or discussed a specific methodology that might be used for risk identification (Cuppen, Bosch-Rekvelde, Pikaar & Mehos, 2016). The detection lens is only addressed by Sanchez and Robert, 2010 [N=9]. However, while the term “detection” is used, the focus is on identifying when risks have materialized. The environment lens, which has an emphasis on understanding the areas not under immediate control of the team, is non-existent in the opportunity data set.

*Integration* is a single lens. Both treatments in the opportunity data set (Andersen & Vidar Hanstad, 2013; Lehtiranta, 2014 [N=12]) lacks specifics regarding the process to achieve integration.

## Concept Category

*Unknown* consists of five lens. The change lens is most commonly discussed in the opportunity data set. Di Muro and Turner (2018) [N=50] discuss turning opportunities from a state of possibility to a resulting element of a project. The authors also include the concept of entrepreneurship and beneficial change. Lechler, Edington and Gao (2012) discuss that opportunity results from change, but provide little specifics for application. The strategic or strategic plan, lens focuses on the future or long-term impact as a source of opportunities. This receives good treatment in the opportunity data set as a concept description (Andersen, Samset & Welde, 2016; Di Muro & Turner, 2018; Loosemore, 2010; Sanchez & Robert, 2010 [N=76]) but provide few implementation details for the practitioner.

The uncertainty lens is commonly discussed in the opportunity data set. The implication is that uncertainty is a generic word, understood by everyone. The distinction between uncertainty, risk, opportunity, and similar words is not clearly defined in the data set. The uncertainty concept is integrated with risk as “an uncertain event or condition, which if it occurred, had a positive or negative effect on one or more project objectives” (p. 720). Lechler, Edington and Gao (2012) [N=131] focus on turning uncertainties into opportunities including contextual turbulences (regulatory, legal, market), stakeholder uncertainty, technological uncertainty, organizational uncertainty, project uncertainty (unknown complexity), and self-induced uncertainty (malpractice). Lechler also implies there is a clear distinction between uncertainties and risks, but definitions are unspecific, along with a discussion of unknown-unknowns as uncertainties and known-unknowns as risks. Furthermore, Lechler explains the differences between perceived uncertainties, and turning these into opportunities.

In the uncertainty discussion, Browning (2019) [N=51] most succinctly describes the difference between certainty and uncertainty, and the subcategories of uncertainty as positive and negative risks. Others (Cuppen, Bosch-Rekvelde, Pikaar & Mehos, 2016; Di Muro & Turner, 2018) use the term in context, but lack definition or detail. The assumptions lens only receives mention from Lehtiranta (2014) who describes how unrealistic assumptions are sources of threat and opportunities. Finally, the ambiguity lens is non-existent in the opportunity data set.

*Positive/Negative perspective* consists of two lens, plus a discussion of opportunistic behavior. The threat and opportunity lens is used to describe negative and positive risk, and is a frequent topic in the literature (Al Nahyan, Hawas, Raza & Aljassmi, 2018, Al Nahyan, Hawas, Sherif & Basheerudeen, 2019; Di Muro & Turner, 2018 [N=170]; Entacher & Sander, 2018; Esteves & Barclay, 2011; Farooq, Thaheem & Arshad, 2018; Lehtiranta, 2014; Samset, Andersen & Austeng, 2014; Vanclay, 2017).

While the terms threat and opportunity are prevalent in the literature, they are far from universally applied; this is the origin of positive and negative lens. Almost as many authors (Al Nahyan, Hawas, Sherif & Basheerudeen, 2019; Andersen & Vidar Hanstad, 2013; Browning, 2019; Eskerod, Ang & Andersen, 2018; Lechler, Edington & Gao, 2012; Loosemore, 2010; Sanchez & Robert, 2010) refers to positive risk as an opportunity, but negative risk as simply risk without the terms positive and negative being introduced. Herein is one of the difficulties of researching positive risk: the term risk either meant both positive and negative or meant only negative risk (threat). Others (Browning, 2019; Eskerod, Ang & Andersen, 2018 [N=15]; Esteves & Barclay, 2011; Farooq, Thaheem & Arshad, 2018 [N=15]; Lechler, Edington & Gao, 2012; Wang, Wood, Abdul-Rahman & Lee, 2016) use an adjective before the word risk as either

positive risk or negative risk to distinguish between the two. However, this is not as commonly used as either threat and opportunity, or risk and opportunity.

One more variant of opportunity is referred to as opportunistic behavior (Haq, Gu, Liang & Abdullah, 2019; Laan, Voordijk & Dewulf, 2011; Liu, Gao, Cheah & Luo, 2016; Mohamed, Khoury & Hafez, 2011; Ning, 2018; Um & Kim, 2018; You, Chen, Wang & Shi, 2018; Zhang & Qian, 2017). In this context, opportunistic behavior does not result in positive results for the project. Quite the contrary, opportunistic behavior should be discouraged as this behavior results from self-interest instead of applying the objectivity of the project (Liu, Gao, Cheah & Luo, 2016).

*Stakeholder orientation* consists of five lens. The stakeholder lens uses the same name as the code itself. While the terminology is frequently used (such as in Loosemore, 2010 [N=79] and Eskerod, Ang & Andersen, 2018 [N=64] there is a narrow view of the role of stakeholders in positive risk management (Holm, Ritchie, Snyman & Sunderland, 2013; Lechler, Edington & Gao, 2012; Padalkar & Gopinath, 2016). In a notable exception, authors (Al Nahyan, Hawas, Raza & Aljassmi, 2018; Al Nahyan, Hawas, Sherif & Basheerudeen, 2019) include negative, positive, internal, and external stakeholders including clients, sponsors, government agencies, project managers, consultants and contractors. The team lens is a further narrowing of type of stakeholders referring only to internal, or local stakeholders (Andersen & Vidar Hanstad, 2013 [N=34]; Lechler, Edington & Gao, 2012).

The next three lens are risk exposure, net (or balanced or shared) risks, and risk appetite (or tolerance). They are grouped as part of the stakeholder category, since the level would be evaluated by stakeholders to determine the attitude toward risk. Exposure receives rather minimal treatment in the literature. Only Farooq, Thaheem and Arshad (2018) [N=9] describe this aggregate impact of risks with any specificity. The concepts of balanced, net or shared risk receive good treatment by Browning (2019) [N=18] describing the probabilistically weighted average of potential outcomes for both positive and negative risks, resulting in a net value. Similarly, Farooq, Thaheem and Arshad (2018) [N=9] mention balancing positive and negative risks, but without specific methods. The risk appetite or risk tolerance lens are both measures of the attitude the stakeholders and only weakly discussed in the opportunity data set literature (Loosemore, 2010) [N=3].

*Probability* is a single lens. In the opportunity data set, Entacher and Sander (2018) [N=59] clearly discuss probability as part of the risk management process while advocating the need for continuous treatment of risks on a risk matrix. Farooq, Thaheem and Arshad (2018) [N=30], build on the historical treatment in Vose (2008). Farooq proposes a method for improving traditional risk quantification by incorporating a weighting function resulting from an individual's preference.

*Decision-making* is also a single lens. Several authors (Al Nahyan, Hawas, Raza & Aljassmi, (2018) [N=82]; Al Nahyan, Hawas, Sherif and Basheerudeen (2019) [N=72], Farooq, Thaheem & Arshad, (2018); Samset, Andersen & Austeng, (2014) discuss risk management as part of an overall decision-making system. In particular, the two papers by Al Nahyan et al. provide an excellent discussion of a fuzzy-based decision analysis in risk management.

*An iteration* consists of three lens. Continuousness is used synonymously for iteration. While this term is not frequently used in the opportunity data set, a few authors (Andersen & Vidar Hanstad, 2013; Cuppen, Bosch-Rekveltdt, Pikaar & Mehos, 2016; Di Muro & Turner, 2018 [N=6]; Eskerod, Ang & Andersen, 2018; Sanchez & Robert, 2010) mention continuously



evaluating opportunities, but without procedural details. Entacher & Sander (2018) [N=14] describe the continuous tracking of risks by using a continuous heat map.

The proactive vs. reactive behavior lens, is similar in treatment in the PMBOK Guide (PMI, 2017a) in defining progressive elaboration. Here, the focus of effective risk management is on prevention; in particular focus is on prioritizing threats or opportunities. In the opportunity data set, Lehtiranta (2014) [N=10] has the only treatment of this concept. However, as a literature review, Lehtiranta reviewed prior treatment of the topic and concluded that proactive risk management “ha[d] been a trendy practice for a couple of decades” (p. 648), giving the impression that the emphasis is less currently. The iteration, or progressive elaboration, lens receives little to no treatment in the opportunity data set. In risk management practice, the concept of progressively elaborating, or iteratively implementing the risk management process is a key element (PMI, 2017b).

### Findings

The research question asks what the hierarchy of terms represents the practitioner view of project risk management as instantiated in a globally accepted project practice standard. The findings are shown in table 1 and summarized here. The four categories include process, concept, tools and domain. The process category consists of six codes corresponding to the processes in the PMBOK Guide Risk Management chapter (PMI, 2017a) plus an integration code. In order of frequency from the coding hierarchy, they are planning, monitoring and controlling, analyzing, responding, identification and integration. The concept category consists of six codes. In order of frequency, they are unknown, positive and negative perspectives, stakeholder orientation, probability, decision-making and integration. Limitations for this reusable hierarchy are discussed later in this paper.

Using the coding hierarchy as a framework, the results show the relative strengths and weaknesses of the opportunity data set (table 2). One key observation is the imprecise nature of many of the terms. Adding specific definition to the literature would provide a common language and minimize difficulties in performing keyword searches.

Below, are 10 gaps in opportunity management, which form the basis for future, research plans.

1. How are opportunities documented and tracked? Is a risk register used to track opportunities, or is there a separate mechanism? Source code: Planning
2. What is the best practice for scaling or tailoring the opportunity management process? Source code: Planning
3. How are opportunities funded? There is limited discussion on contingency and management reserve. However, it is not clear that this applies equally for opportunity management. Source code: Monitoring or Controlling

Table 2  
*Relative Strengths and Weaknesses Summary*

Categories and Codes	Search Word Stems*	Summary
<b>Category: Process</b>		
Planning	budget, cost, document, estimate, framework, method, phase, plan, policy, practice, procedure, process, record, register, scale, tailor	Planning received a generally weak treatment relative to opportunity management planning. However, there is a rather extensive discussion on the underestimation of risk and underestimation bias, which might be applied to opportunity management.
Analyzing	analyze, categorize, prioritize, qualitative, quantitative	Moderate discussion of qualitative and quantitative analysis, and the need for prioritization, but by a limited set of authors.
Monitoring & controlling	audit, contingency, control, forecast, lessons learned, measurement, monitor, reserve, revise, threshold, track, trend	There is a strong discussion on using trends to find future opportunities. The opportunity management literature is weak on the use of contingency or management reserve, and of auditing the risk (and opportunity) management process.
Responding	accept, avoid, enhance, emerge, escalate, exploit, mitigate, transfer	There is only responding via enhancement received strong discussion. All others are weak to non-existent in the literature.
Identifying	detect, environment, identify	This is limited to non-existent coverage in the opportunity management literature on identifying opportunities.
Integration	integrate	There is no coverage in the opportunity management literature.
<b>Category: Concept</b>		
Unknown	ambiguity, assume, change, future, strategy, uncertainty	There are few specifics, particularly with respect to how this code is used in opportunity management
Positive/negative perspectives	benefit, negative, opportunity, positive, strength, threat, weakness	There is extensive coverage of the concepts and definitions, however, inconsistent use in the literature.
Stakeholder orientation	appetite, balance, exposure, net, shared, stakeholder, team, tolerance	There is some treatment of incorporating stakeholders in the opportunity management process, but weak to non-existent coverage of risk exposure, appetite, and risk tolerance. Balanced, net, or shared risk is mentioned, but lack specifics.
Probability	probability	There is limited coverage in the opportunity management literature on how to determine the probability of occurrence, except by a few authors.
Decision making	decision	There is limited coverage in the literature on how opportunity management can be used as part of the project decision-making process, except for a few authors.
Iteration	continuous, iterative, progressive elaboration, proactive, reactive	There is limited coverage in the literature weak on the iterative natures of opportunity management, except for a few authors.
<b>Category: Tools</b>		

n/a	brainstorm, breakdown, checklist, expert, facilitate, interview, judge, knowledge, matrix, meet, Monte Carlo, RBS, simulate, SWOT, technique, tool, tornado, workshop	insufficient data
<b>Category: Domain</b>		
n/a	procurement, technical, construction	insufficient data

4. How is the effectiveness of positive risk management tracked? There is only a limited discussion in the literature of thresholds for negative risks, and almost no discussion for positive risks. Source code: Monitoring or Controlling
5. In practice, what qualitative methods or tools are used to analyze positive risk? What methods or tools are used to prioritize positive risks? Source code: Analyzing
6. What is the best practice for identifying positive risks? What tools are most frequently used? What is the best practice to capitalize on how assumptions, strategy, unknowns, concerns and changes lead to the identification of opportunities? Source code: Identification and Unknown
7. In practice, what response mechanisms (such as accept, escalate, enhance, and exploit) are used for opportunity management? What is the best practice for using these responses? Source code: Responding
8. How does stakeholder involvement in positive risk management differ from that in negative risk management? Source code: Stakeholder Orientation
9. How is overall risk exposure, or balanced risk applied in practice? Source codes: Stakeholder Orientation and Probability
10. To what extent is opportunity management conducted in an iterative, proactive, and continuous manner? Source code: Iteration

### Limitations

Although this study provides important contributions to academia and practice, several limitations open up avenues for future research. First, the search using the ProQuest Central Database for peer-reviewed articles yielded over 1.6 million articles with the term “risk” in the abstract. Limiting the search to 2010-2019 yielded over 400 peer review articles. A cursory inspection demonstrated that most are not about project risk management. Narrowing of scope resulted in a reasonable data set for detailed analysis, but may have excluded relevant articles. As such, using only SCImago as a measure the influence of scholarly journals, and using only journals with, the topic “project management” may have unnecessarily limited the opportunity data set.

Second, the coding hierarchy is based on Project Management Institute, PMBOK Guide (PMI (2017a), chapter 11 Project Risk Management, because the PMI, is the leading global professional membership association for the project management profession (PMI, 2018a). Other risk standards (including APM, 2014; APM, 2017; ICE/IFA, 2014; IEC, 2013; IRM/ALARM/AIRMIC, 2002; ISO, 2009; OGC 2010) could yield a different hierarchy, in frequency of terms, and synonyms. However, as previously discussed, the resulting hierarchy from this research is reusable since the method is clearly defined, and extensible for other risk

management applications. Additionally, the methodology could be applied with the NVivo12® toolset to other domains as well using a comparable practice standard.

Third, while the coding hierarchy examined risk management (positive and negative) as a whole, the literature search focused on positive risk. The resulting gap analysis might be narrowed by searching negative risk management sources since some of the process and concept codes might be adequately covered in the negative risk management literature.

Fourth, using NVivo12® relied on the automated coding feature, combined with researcher domain knowledge and subject matter experts, to refine the codes. Different tools, such as SAS® Text Miner could result in a different hierarchy. Additionally, experts could suffer from confirmation bias. However, steps are taken to independently gather inputs from the experts and iteratively ask for clarification. Further, while this study resulted in 10 research questions, a specific literature review on each topic is necessary to confirm the viability of these as independent research topics.

## Conclusions

This research contributes to the project management domain through a current, relevant, systematic study, which developed a standard for comparison using the practitioner body of knowledge. Next, this research identifies noteworthy literature gaps for future research in opportunity management as a subset of risk management. The research is non-experimental, using a descriptive literature review and content analysis of selected articles published between 2010 and 2019. Content analysis of the opportunity data set of 55 articles results in strengths and weakness assessment relative to the coding hierarchy. Those are then used to identify gaps and 10 positive risk management areas for future risk research ranging from process steps and tailoring, to risk exposure, and balanced risk with opportunity.

Risk is everywhere, but the extent to which opportunities (positive risk) is treated equally to threats (negative risk), on projects remains to be seen. While there are standards-based frameworks of risk management, in practice, scholarly research on opportunities is lagging. Further, terminology and definitions of risk remain confusing for academic research and practitioner implementation. This paper serves not only to baseline the current understanding of the opportunity management literature but also as a framework for future research.

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