Available online at www.sciencedirect.com

ScienceDirect

International Journal of Project Management 36 (2018) 701 – 715

International Journal of Project Management

www.elsevier.com/locate/ijproman

Towards integrating construction risk management and stakeholder management: A systematic literature review and future research agendas

Nini Xia [a], Patrick X.W. Zou [b], Mark A. Griffin [c], Xueqing Wang [a,*], Rui Zhong [a]

[a] College of Management and Economics, Tianjin University, No. 92 Nankai District, Tianjin 300072, PR China
[b] Department of Civil and Construction Engineering & Centre for Sustainable Infrastructure, Swinburne University of Technology, Hawthorn, Victoria 3122, Australia
[c] Centre for Safety, The University of Western Australia Business School, Perth, WA 6009, Australia

Received 18 November 2017; received in revised form 17 February 2018; accepted 18 March 2018
Available online xxxx

Abstract

We propose that integrated management of construction risk and stakeholder is feasible and can promote the effectiveness of both risk management (RM) and stakeholder management (SM). A systematic literature review is conducted on the current construction literature involving both RM and SM, through which we identify four linkage modes between risk and stakeholder management. We further suggest future directions that enable integrating risk and stakeholder management to benefit the management process and/or management outcome of RM and SM. These linkages and directions shed light on enhancing the effectiveness of RM and SM through new ways of thinking about, analyzing, and then managing risks and stakeholders in a holistic and integrated way, but not the traditional endeavor in individual areas. Integrating risk and stakeholder management is challenging, but can be a novel way for improving project performance for which this research conceptually justifies its feasibility and benefits, which merits further study.

Keywords: Integrated management; Risk management; Stakeholder management; Construction project; Literature review

1. Introduction

"No construction project is risk free" (Latham, 1994, p. 14). To pursue the success of construction projects, risk should be managed effectively (Chapman and Ward, 2004; Du et al., 2016; Zou et al., 2007). Construction projects are also frequently faced with complex problems related to stakeholders, including conflict among project team members such as clients and contractors (Hwang and Ng, 2016; Lehtiranta, 2014), as well as protest from external parties such as the affected community (Mok et al., 2015; Olander, 2007). Meta-analyses of stakeholder theory applications in a project context have shown that management of stakeholders is vital to the successful implementation of various kinds of projects, among which the construction industry is a dominant sector (Achterkamp and Vos, 2008; Littau et al., 2010). Despite the salience of both risk management (RM) and stakeholder management (SM) in construction projects, there are still numerous project failures resulting from poor management in risk and stakeholder (Flyvbjerg et al., 2002; Mok et al., 2015). It thus calls for much more effort from the theory and practice on these two critical issues.

Efforts have been devoted to promoting the effectiveness of both RM and SM. However, these efforts are largely undertaken in isolation, with little crossover between the two areas. That is, the existing literature mostly endeavors to improve either RM or

* Corresponding author.
E-mail addresses: ninixia@tju.edu.cn (N. Xia), pwzou@swin.edu.au (P.X.W. Zou), mark.griffin@uwa.edu.au (M.A. Griffin), wxqlab@126.com (X. Wang), ham_zhongrui@tju.edu.cn (R. Zhong).

https://doi.org/10.1016/j.ijproman.2018.03.006
0263-7863/00 © 2018 Elsevier Ltd. APM and IPMA.

SM in individual areas, whereas integrated management of risks and stakeholders is an overlooked and under-researched area, impeding theoretical and practical developments of an overall approach to risk–stakeholder management. We propose that integrated management of construction risk and stakeholder is feasible and can promote the effectiveness of both RM and SM. We distinguish that both RM and SM comprise a process domain and an outcome domain, and the effectiveness of RM and SM covers the process and outcome domains. Integrated management in the project and the organization context has been demonstrated to reduce objective conflict, achieve more efficient resource allocation, improve mutual management effectiveness, and bring new perspectives for managerial practices, sustainable development, and so on (Bernardo et al., 2015; Kerzner, 2001; Loushine et al., 2006; Love et al., 2016; Rebelo et al., 2016). Hence, risk–stakeholder integrated management, if feasible, will be of benefit to project managers who, in many cases, have to concurrently manage complex, multiple tasks.

We first conduct a systematic literature review to better understand whether and how RM and SM might be connected, namely, the possible linkage modes between construction risk and stakeholder management. After the identification of possible risk–stakeholder linkage modes, we aim to identify two-way benefits for construction RM and SM effectiveness through thematic analysis and discussion on each linkage. Finally, we propose future research directions for each risk–stakeholder linkage and an overall research roadmap for enabling mutual effectiveness in RM and SM and ultimately the establishment of IMSs for construction risks and stakeholders. With the research framework outlined in Fig. 1, the overall goal is to address the following two unanswered questions in the literature: (1) how do RM and SM connect according to the literature; (2) is risk–stakeholder integration feasible in construction and if feasible, can integration produce mutual benefits to the effectiveness of construction risk and stakeholder management in their management processes and/or management outcomes.

2. Risk, stakeholder, and their similarities in the construction context

In the construction project context, the current state-of-art research defines risk as an uncertain event that, if it occurs, has a negative (threat) or positive (opportunity) impact on one or more project objectives (Chapman and Ward, 2003; Lehtiranta, 2014; Olsson, 2007; PMI, 2013). Following this definition, the purpose of project RM is to increase the likelihood and impact of positive events, and reduce those of negative events in the project (Arashpour et al., 2017; Hwang et al., 2014). To fulfill this aim, RM in construction projects is normally characterized by a systematic process of collecting documents and making plans for RM, identifying and classifying, analyzing and assessing, responding, and controlling project risks (Lyons and Skitmore, 2004; J. Wang et al., 2016; Zou et al., 2007). By providing information for risk decision-making, risk analysis and assessment is the core of RM process (Aven, 2016) and this RM stage often involves analyzing the causes and consequences of risks and making judgments about how large or small the risk is. Various metrics were used for assessing risk among different domains, for example, in finance risk management, metrics include both moment-based (e.g., expected loss functions and quantile-based (e.g., Value-at-Risk (VaR)) metrics (Alexander and Sarabia, 2012; Aven, 2016); in the construction industry, the dominant metric is the multiplication of the risk's probability and severity (Taroun, 2014).

Compared to the widely acknowledged risk concept, a clear definition of stakeholder in the project context is lacking (Achterkamp and Vos, 2008). The stakeholder concept originated in 1963 at the Stanford Research Institute (now SRI International, Inc.) (Freeman, 1984). A fundamental question in the stakeholder literature is "who are the stakeholders" (Littau et al., 2010; Mitchell et al., 1997) and there have been two general directions for developing the stakeholder concept. The dominant direction is the broad stakeholder perspective, which argues that the ignorance of any entity can prevent the achievement of organizational purpose, and so encompasses all potential stakeholders (e.g., Freeman, 1984). From this perspective, Freeman (1984) defined stakeholders as "any group or individual who can affect or is affected by the achievement of the organization's objectives." The other direction adopts a narrow stakeholder perspective by contending that organizations should or can only deal with finite stakeholders due to limitations in factors such as resources and capability (e.g., Clarkson, 1995). As argued by construction studies (Oppong et al., 2017; Xia et al., 2017; Yang et al., 2014), a broad stakeholder definition seems to best fit construction

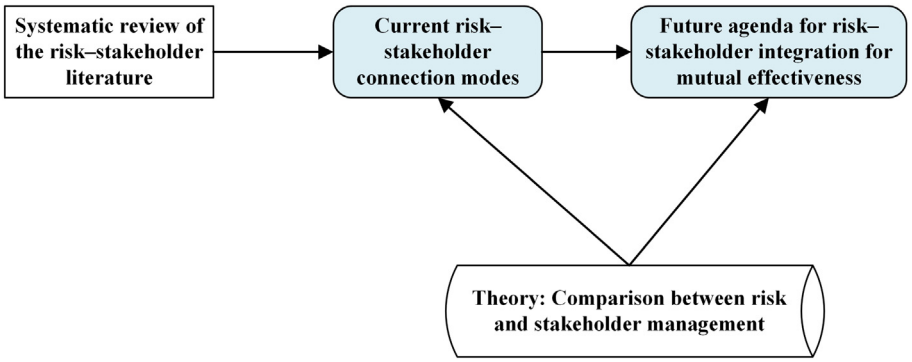

Fig. 1. Research framework.

projects because their wide range of economic, social influences, involvement of a large number of diverse stakeholder groups, as well as the potentially adverse consequences of neglecting certain stakeholder groups.

A stakeholder's position toward the project may vary from being supportive to opponent to the project (McElroy and Mills, 2000). McElroy and Mills (2000) proposed five different stakeholder positions toward a project: active opposition, passive opposition, not committed, passive support, and active support. Accompanying the stakeholder diversity are the various and normally competing interests and concerns among project stakeholders (Olander, 2007; Olander and Landin, 2005). Normally, SM is aimed to identify and address the concerns of stakeholders, mitigate and prevent conflicts, and win supports from them (Bourne and Walker, 2005; Freeman, 1984; Jergeas et al., 2000). Traditionally, full SM process in construction projects involves the following steps: collecting stakeholder-related document and making stakeholder management planning, stakeholder identification and classification, stakeholder analysis and assessment (assessing stakeholder interests/attributes and relationships in a qualitative and/or quantitative way), developing strategies for managing stakeholders, and executing and controlling SM strategies (Aaltonen et al., 2015; Karlsen, 2002; Mok et al., 2015).

Below, we compare the concepts and management principles of risk and stakeholder management in construction projects, as summarized in Fig. 2. Regarding the concept of each area we note, (1) both risk and stakeholder are an inherent attribute of the project with possible influences on project objectives, (2) both risk and stakeholder are in fact a dual variable, which can be positive or negative to the project, and (3) risk and stakeholder issues can arise from both the project and its external environment. As we defined, the process domain and the outcome domain together reflect the effectiveness of RM and SM, and elements of RM and SM share similarities in each domain. The stages for the RM and SM process are similar in identifying and classifying elements (risks or stakeholders), analyzing and assessing, responding, and ultimately controlling each element. Outcomes of RM include reduced negative events, increased positive events, reduced uncertainty (or improved ability in coping with uncertainty), and improved chances of the achievement of project objectives. On the other hand, benefits of effective SM consist of meeting stakeholder concerns, reduced stakeholder conflicts, improved stakeholder cooperative behavior, as well as alignment among stakeholders for the best value for projects but not for their own interests. To conclude, risk and stakeholder management share certain similarities in the definitions, management processes, and outcomes, and these similarities lay the basis for possible connections between these two fields.

3. Methodology

Systematic literature review is an important research methodology, capable of synthesizing the existing body of knowledge,

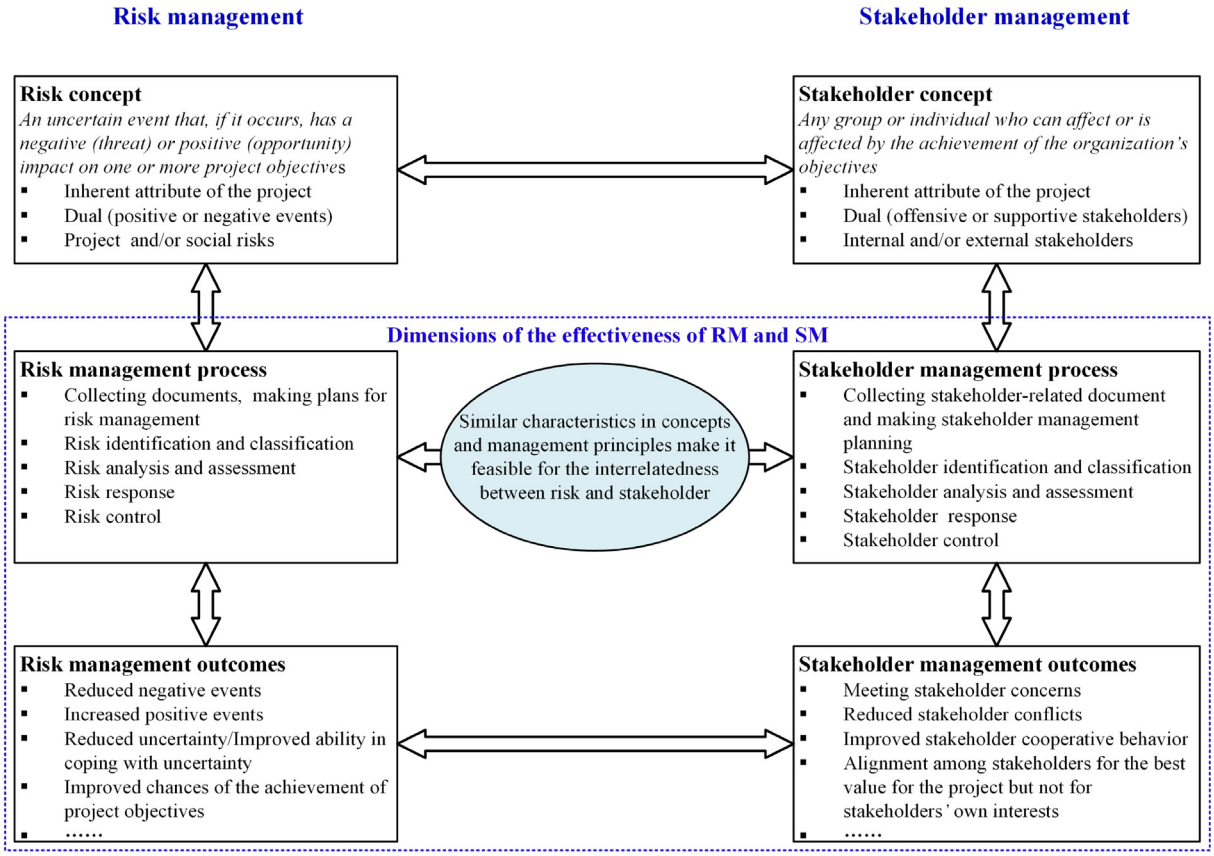

Fig. 2. Conceptual framework: similarities between risk and stakeholder concepts, management processes, and outcomes.

creating new knowledge on a wider scale than is possible with empirical studies, and identifying new agendas for future research (Denyer and Tranfield, 2009; Taroun, 2014; Tsai and Wen, 2005). Consistent with the suggestions made by Denyer and Tranfield (2009), Mostafa et al. (2016), and Tranfield et al. (2003), we implemented the literature review in three stages as shown in Fig. 3.

3.1. Stage 1 (planning the review and computer search)

The first stage includes review planning and searching for relevant articles using electronic databases. The plan for a systematic literature review consists of establishing the literature review purpose and protocol (Denyer and Tranfield, 2009; Tranfield et al., 2003). The purpose of this literature review was clearly defined by the research questions proposed in the Introduction section, while the three-stage protocol can be seen in Fig. 3. Research papers in English were searched in three academic databases, namely, Scopus, ASCE, and ScienceDirect. The search rule employed in the title/abstract/keyword (T/A/K) field of the selected databases was ("stakeholder" OR "project participant") AND ("construction project" OR "infrastructure project" OR "civil engineering project") AND ("risk"). The scope of the research is restricted before 2016/12/19. Book reviews, editorials, and papers in conference proceedings were eliminated, and only peer-reviewed papers were considered in this research. At this stage, a total of 85 papers were retrieved for further analysis, and the search result indicates that the following journals have at least four papers: Journal of Construction Engineering and Management (JCEM), Journal of Management in Engineering (JME), International Journal of Project Management (IJPM), Construction Management and Economics (CME), Journal of Infrastructure Systems (JIS), Engineering, Construction and Architectural Management (ECAM), Built Environment Project and Asset Management (BEPAM), Journal of Computing in Civil Engineering (JCCE), Leadership and Management in Engineering (LME). The target journals (i.e., JCEM, JME, IJPM, CME, and ECAM) fall into the top five construction journals (Chau, 1997); using quality journals as a basis for inclusion of reviewed papers is a good strategy for conducting literature review in the management field (Denyer and Tranfield, 2009; Wallance and Wray, 2016).

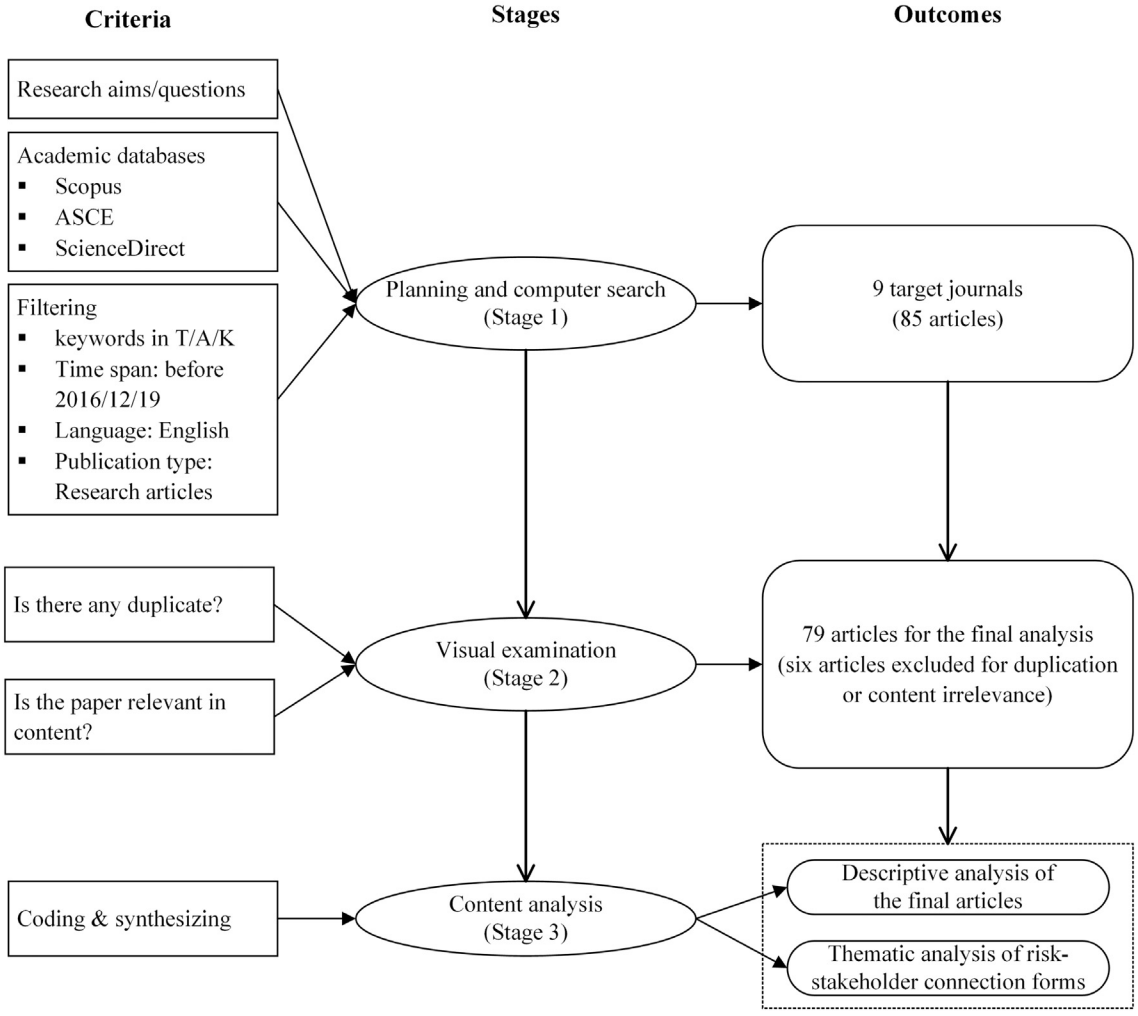

Fig. 3. Research design and stages for literature review in this study.

3.2. Stage 2 (visual examination)

In this stage, we deleted all duplicates according to the title and author and excluded irrelevant papers by reading their titles, abstracts, and keywords. This stage yielded a total of 79 papers for the final content analysis. The distribution of the final papers in terms of the journal is shown in Table 1. The annual distribution of those papers in the selected journals (Fig. 4) indicates an increasing interest on the connectedness between construction risk and stakeholder management since 2011. This finding may indicate the emerging issues and growing academic awareness of the connection between construction risk and stakeholder management.

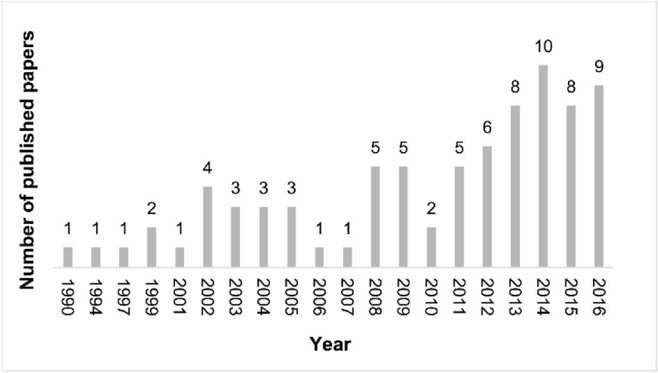

Fig. 4. Number of relevant papers published yearly from 1990 to 2016. Note: Publications in 2016 are not complete with the search period before 19 December 2016.

3.3. Stage 3 (content analysis)

To analyze those papers, the technique of content analysis is employed for compressing many words of text in an organized manner, identifying the focus of subject matter, and diagnosing emerging patterns in the current body of knowledge (Elo and Kyngäs, 2008; Krippendorff, 2004). This content analysis comprises two parts: descriptive and thematic. The descriptive analysis analyzes the basic information of the selected articles, during which an initial codebook was developed. This initial codebook was adjusted and updated to incorporate new categories during the interpretation of the articles until no new categories emerged. Table 2 shows the final codebook for the descriptive analysis. Although a codebook was developed prior to the descriptive analysis, the themes implied in the literature were obtained inductively, namely, during rather than before the process of literature review. Two of the present authors first coded all the target articles published, and subsequently compared and discussed the results case by case to resolve the discrepancies in coding (Lombard et al., 2002). This thematic analysis resulted in four themes connecting RM and SM in construction projects.

4. Descriptive analyses

4.1. Overview of the selected publications

Fig. 5 shows specific research methods used in the literature that was examined and indicates that the top and second frequently used methods are questionnaire as well as algorithms, modeling, and simulation. Fig. 6 further depicts the country or region where empirical data in those analyzed papers were collected from. Asia is the most common region, while research involving multiple countries is relatively limited. This result is understandable as both risk and stakeholder and management practices of them are subject to national or regional context where the project is implemented (McCord et al., 2015; Mok et al., 2015; Zou et al., 2007). Most of the studies that do not state specific regions and/or countries are the ones that employ algorithms, modeling, and simulation research method.

Concerning the project type, most of the literature are set in the general construction (N=34) and infrastructure (N=31) context. Within the infrastructure, thirteen papers discuss the PPP arrangement, indicating risk- and stakeholder-related issues are both the focus of PPPs. Other studied projects include building (N=5), international (N=4), partnering (N=3), mega (N=2), urban regeneration (N=1), and target cost contracts (TCC) (N=1) projects. We further explore the phases of those studied projects (Fig. 7). Previous research has demonstrated that the amount and complexity of risks and stakeholders peak in the execution phase (e.g., Wang et al., 2017; Zou et al., 2007). Thus, it is understandable the research connecting risk and stakeholder also focuses this phase the most (N=26). There is also a considerable proportion (N=22) of the literature considering

Table 1
Distribution of the selected journal papers.

Journal title	Number of papers retrieved from search engine	Number of papers for final analysis
Journal of Construction Engineering and Management (JCEM)	25	22
Journal of Management in Engineering (JME)	19	19
International Journal of Project Management (IJPM)	8	8
Construction Management and Economics (CME)	7	7
Journal of Infrastructure Systems (JIS)	7	7
Engineering, Construction and Architectural Management (ECAM)	6	6
Built Environment Project and Asset Management (BEPAM)	6	5
Journal of Computing in Civil Engineering (JCCE)	3	3
Leadership and Management in Engineering (LME)	4	2
Total	85	79

Table 2
Partial codebook for content analysis of this study.

Code	Description
Year	Year of publication
Article title	Title of the article
Journal title	Publication in which the article was published
Research method(s)	Questionnaire, interview, case study, experiment, conceptual, literature review, others
Geographical jurisdiction	Country or region from which the data were collected
Stakeholder definition and/or classification	How the stakeholder concept or definition, and classification is addressed
Stakeholder type	Specific roles of the stakeholders included, such as clients, contractors, others
Risk definition	How risks are viewed in terms of threats and/or opportunities
Risk type	Categorization of risks according to the specific kind of project objective (s) they can influence
Project type	Subway, building, general construction projects, others
Project phase	Pre-construction (feasibility, design), construction, operation phases, project lifecycle
Research objectives/questions	Research objectives and/or questions explicitly stated in the article
Major findings	Major findings explicitly stated in the article
Contributions	Contributions explicitly stated in the article

risk and stakeholder management as a lasting issue during the entire project life cycle.

4.2. Risk and stakeholder conceptions of the selected publications

We examined concepts in the existing studies in relation to state-of-art risk concepts. The literature covered negative impact of risk on a wide range of project variables, from the success of projects (e.g., Ashuri and Mostaan, 2015) to certain project objectives and activities, including health and safety (e.g., Tymvios and Gambatese, 2016), cost (e.g., Firouzi et al., 2016), revenue/financial viability (e.g., Jeerangsuwan et al., 2014), and sustainable development (e.g., Shealy et al., 2016). That is, the examined literature mainly considered risk as threats, with no studies investigating (theoretically or practically) the upside of risk, despite the wide acknowledgement of the dual nature of risk. This absence of examining risk as opportunities indicated that the risk–stakeholder literature had not considered the positive aspect of risk when connecting management of risks and stakeholders. In the project risk research, it is stated that including the opportunity view of risk in consideration will improve business focus, project probabilities for success, perhaps occasionally beyond expectations (Olsson, 2007; Lehtiranta, 2014). Thus, a holistic negative and positive view on risk may also be potential to breed benefits for integrated management of risks and stakeholders.

We also reviewed the concept of stakeholders in the existing literature. Among the 79 publications, only one paper employs a broad stakeholder definition. That is, Van Os et al. (2015) cites the definition: "individuals or organizations that are either affected by or affect the development of the project" (El-Gohary et al., 2006, p. 595). This is not surprising as two review papers (Achterkamp and Vos, 2008; Littau et al., 2010), related to the application of stakeholder concept and stakeholder theory in the project context, also find that only limited project management papers provided a clear definition of stakeholders, mainly identifying empirical parties without reference to a definition. Fig. 8 shows specific types of stakeholders mentioned in the publications. The most common stakeholders are clients, contractors, and consultants, followed by subcontractors and project management teams.

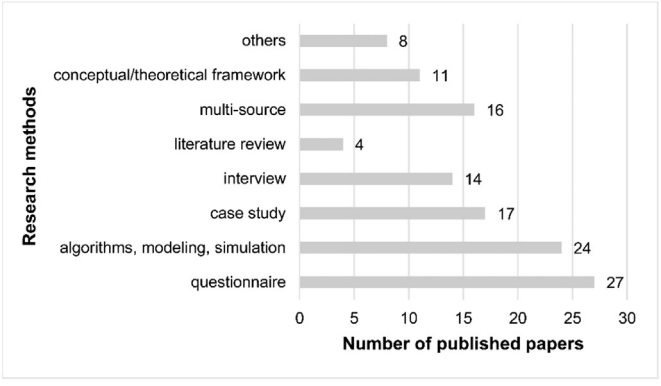

Fig. 5. Research methods used in the literature connecting management of risks and stakeholders.

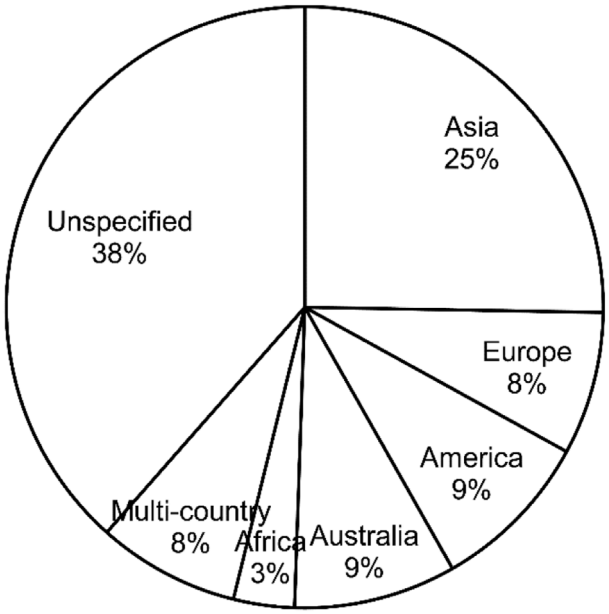

Fig. 6. Distribution of selected publications by geographical jurisdiction.

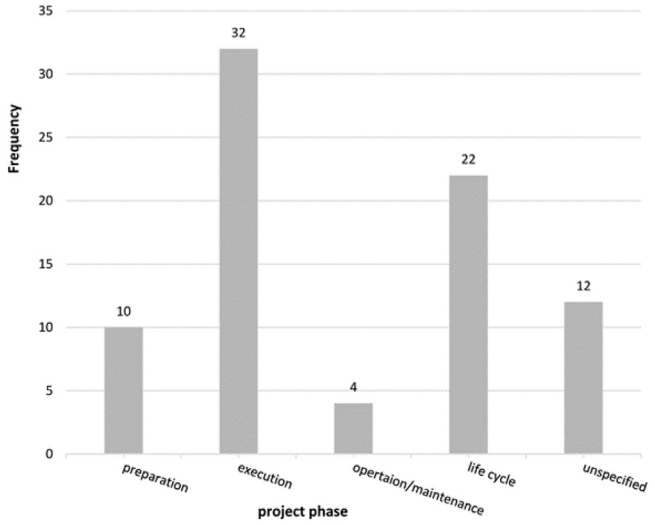

Fig. 7. Project phases involved in the selected papers. Note: The preparation phase include project appraisal and decision activities; the execution phase includes design, construction, and bid activities. Several studies include more than one phase; for instance, both the construction and operation phases are included in Xu and Moon (2014).

When categorizing those diverse stakeholders, the literature adopts different grouping methods catering to specific research objectives. In this paper, we summarize stakeholders into internal and external groups. The internal stakeholders are those who have formal contracts with other participants and have a role in the actual realization of the project outcome (Xia et al., 2017). They mainly invest capital in the form of physical materials, human resources, or finance (i.e., something of value) in a project (Cleland, 1985). In contrast, external stakeholders are those who are outside of the activities within the project and passively affected by the project outcome. Typically, an external stakeholder lacks any formal project authority (Aaltonen, 2011; Walker et al., 2008). The red bars in Fig. 8 represent the external group, indicating that less attention was given to the stakeholders external the project compared to internal ones. Furthermore, only two external groups were involved, namely, the project-affected community and general public and governmental departments.

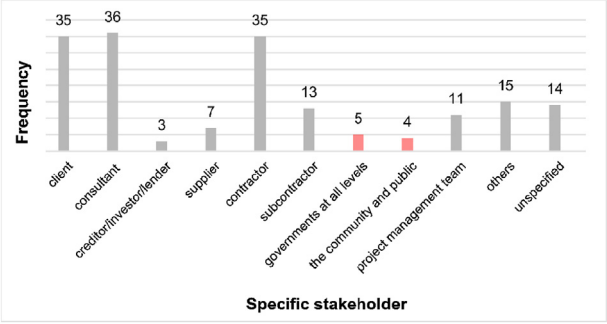

Fig. 8. Frequency of stakeholders mentioned in the literature in internal and external groups. Note: The "project management team" refers to project managers, professions, technologists, and supervisors who carry out management onsite. The "others" group includes such as workers, the industry, and the private and public sector in PPPs.

To summarize, contrary to the broad stakeholder definition which applies to the construction context, the examined publications tend to adopt a narrow stakeholder perspective by emphasizing the internal stakeholder groups, suggesting opportunities for risk–stakeholder integrated management by including both internal and external stakeholders.

5. Thematic analyses of current risk–stakeholder connections

Content analysis of the selected publications identified four linking modes between risk and stakeholder management. The modes were (1) management of risk based on stakeholder identification, (2) internal stakeholders' responsibility and ability in the RM process, (3) management of stakeholder differences concerning risk, and (4) interrelatedness between RM and SM and effect on project performance. These themes indicate different ways that risk and stakeholder management were connected. Within each linkage mode, we also discuss how the linkage can be leveraged for promoting management effectiveness in risk and/or stakeholder fields. This evidence supports our general hypothesis: integrated management of construction risk and stakeholder is feasible and that integrated management can promote the effectiveness of both RM and SM.

5.1. Management of risk based on stakeholder identification

This theme bridges risk and stakeholder management by describing how management of project stakeholders, particularly identifying relevant stakeholders and their potential threats, can help formulate risk response strategies. The literature focused on both internal and external stakeholders to the project. Threats posed by internal stakeholders include inefficient processing of clients and delay of clients' payment (T. Wang et al., 2016), and change orders from the client, the contractor, or the designer (Ashuri and Mostaan, 2015). Threats arising from external groups involve such as opposition from project affected communities (Shi et al., 2015), which often address the social objectives or responsibilities of business activities (Zhao et al., 2012). Poor implementation of these responsibilities expected by the society can pose threats to project outcomes, the magnitude of which seems to be growing but are often overlooked by project management teams (Aaltonen, 2011; Zavadskas et al., 2010). Authors have noted criticisms of the construction industry for its poor implementation of social responsibilities (Loosemore and Lim, 2017).

The above studies associated with this theme were concerned with the behavior of an individual stakeholder and its potential for producing threats. Another group, which also considered stakeholders as a source of risks suggest that interfaces among (internal) stakeholders can constitute threats. Such risk can be termed as "*project network risk*", referring to a specific set of risk conditions or events that result from work linkages, interfaces among two or more stakeholders (Lehtiranta, 2011; Lowe and Leiringer, 2006; Shokri et al., 2016). Stakeholder interface threats lead to negative consequences such as project schedule delays (Shokri et al., 2016). A survey conducted in the

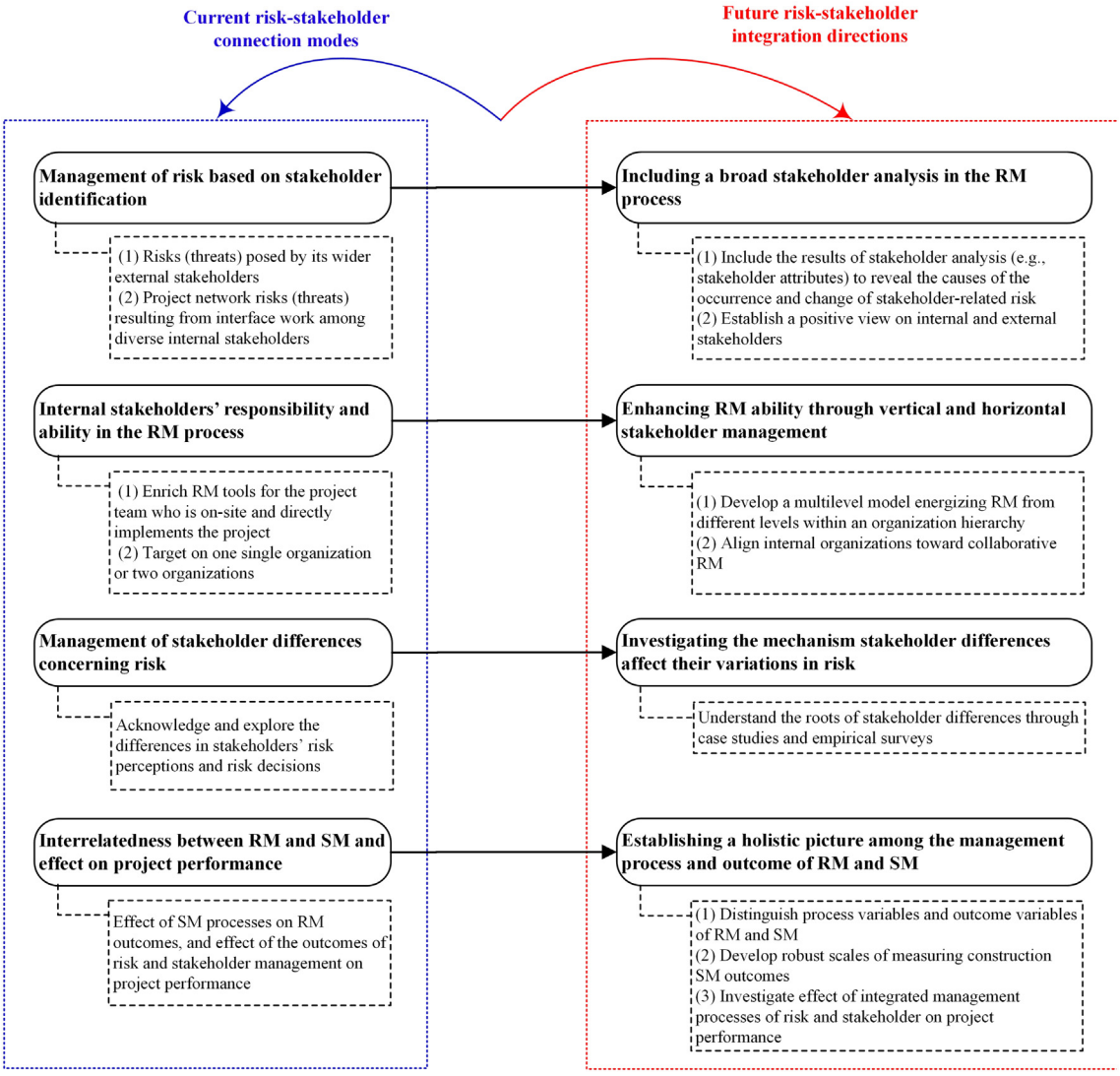

Fig. 9. Current status and future directions of research on risk–stakeholder integrated management. Note: RM = risk management, SM = stakeholder management.

Singapore construction industry revealed that most of the respondents were unaware of network management and none of the participating companies implemented network management practices in their construction projects (Hwang and Ng, 2016). Construction projects, especially mega ones, have witnessed a booming number of stakeholders (Mok et al., 2015). Thus, there is likely to be an increase in the number of interfaces either in production or in management, with the number and complexity of project network risks growing simultaneously. As such, efforts should be devoted to ascertaining the most critical network risks in particular contexts, and to developing practical measures to manage them. As network risks are at least related to two parties and are largely context dependent, managerial strategies for them may be different from the tactics developed for handling the risks resulting from a single stakeholder.

To conclude, the underlying premise of the above two areas of this identified theme was that the effectiveness of RM in terms of risk response strategies would be enhanced by identifying stakeholders and their risks (mostly threats). Under this theme, two major research trends in the literature were proposing risk response strategies for (1) risks (threats) posed by its wider external stakeholders and (2) project network risks (threats) resulting from interface work among diverse internal stakeholders.

5.2. Internal stakeholders' responsibility and ability in the RM process

The second theme in the existing risk–stakeholder literature pertains to the ability and resources of internal stakeholders to manage risks. Literature in this theme suggests ways that internal stakeholders might use to manage risks. This theme was described 59 times among the 79 selected papers: risk identification and classification was mentioned 13 times, risk analysis and assessment 21, risk response 10, and the entire process 15 times. Studies raised concerns about construction practitioners' incompetence in the process of managing risks and hence imperative calls for efficient and effective RM approaches. Two variants were found within this theme. One focused on risks in a specific occasion such as in PPPs by identifying, prioritizing, and/or suggesting particular responses to those risks

for responsible parties (e.g., Ashuri and Mostaan, 2015). The other was set in a general context developing generic frameworks for the entire RM process and/or techniques for specific RM stages like risk analysis (e.g., Shahata and Zayed, 2016).

The studies falling into this theme emphasized internal stakeholders as the source of mitigating risks, and thus mainly focused on developing tools and approaches for certain RM stage(s) or the entire process. First, either focusing on the entire RM process or certain stage(s) in it, in essence, those articles were aimed to strengthen RM capability of the project team who is on-site and directly implements the project, improving RM from the process level. Another trend was that risks were treated within one single organization or two organizations (e.g., risk allocation between the private and public sectors in PPPs). That is, an emphasis was placed on RM capability enhancement of the project team within one or two organizations.

5.3. Management of stakeholder differences concerning risk

One key issue within this theme concerns the differences among stakeholders in terms of risk-related issues, such as risk perception and risk-based decisions. This theme reflects one type of conflict among stakeholders, and thus a better understanding of risk-related conflict can benefit both stakeholder and risk management. First, variation can exist in internal stakeholders' perceptions of the set of risks related to a specific activity and the relative criticality of those risks. One example is Tymvios and Gambatese (2016), which surveyed stakeholders' perceptions of the obstacles and enablers for safety-risk prevention through design, finding that architects and engineers identified the existence of economic, legal, and contractual obstacles, whereas contractors only considered economic obstacles. Discrepancies also existed between internal and external stakeholders concerning their perceptions of risks in the project (Shi et al., 2015). Notwithstanding the differences in how stakeholders perceive risks, the subjectivity and discordance of stakeholders also concerns handling of risk. Specifically, risk-based decisions such as the decision on the concession period between the public and private sector in a PPP arrangement can vary (Xu and Moon, 2014) can vary among stakeholders (e.g., Shealy et al., 2016; Van Os et al., 2015; Wang and Yuan, 2011; J. Wang et al., 2016). Han et al. (2005) found that when facing the same uncertainty in the market, contractors' bid decision behavior in the selection of international projects was different.

By definition, risk perception refers to individuals' subjective judgment of the risk (Aven and Renn, 2009), which is influenced by an individual's social structures, including interests, roles, and power differentials (Archer, 1995). Social structures together with cultural systems (sets of ideas about what is true or false) shape people's perceptions, actions, and attempts to influence others (Friedman and Miles, 2002). Thus, with diverse background, stakeholder groups in a construction project are likely to have different views on risk structure and criticality and make different decisions about how to deal with risk. Humans together with their subjective judgment are indispensable to perceive, assess, and deal with risks in the construction industry (Taroun, 2014; Wang and Yuan, 2011; C. M. Wang et al., 2016), therefore, the abovementioned risk-related differences among stakeholders cannot be neglected. Recent studies have called for focuses on the subjective aspect of risk related to stakeholders. For example, it has been contended that less is known about how risks are perceived by individuals (Xia et al., 2017) despite the prevailing Probability–Impact (P − I) risk model evaluating risk quantitatively and rationally (Taroun, 2014). Loosemore (2011) also argued that although construction companies seem to be well-equipped with the capability of managing technical risks, their ability to manage the human subjective perception of risk is limited. In accord with these emerging concerns, the literature examined has realized and explored the subjectivity and differences in risk-related issues among stakeholders.

5.4. Interrelatedness between RM and SM and effect on project performance

As shown in Fig. 1, both RM and SM comprise a process domain and an outcome domain. The final theme is concerned with the effects of SM processes on RM outcomes, the effects of RM processes on SM outcomes, and the combined processes of SM and RM on project performance. The first subset examined the effects of SM processes (e.g., stakeholder communication) on RM outcomes (e.g., the number or criticality of threats). Activities involved in SM process include making plans and allocating resources for SM, considering relevant stakeholders, paying attention to their demands, information sharing and communication, and analysis of stakeholder attributes/interests (Oppong et al., 2017; PMI, 2013). Defective SM processes such as inadequate attention to the demands of certain stakeholder at the planning stage will increase potential threats at later stages (Bal et al., 2013). Effective information sharing and communication, for example, can allow organizations external to the project team to frequently provide valuable insights regarding the functioning of RM and thus the performance of RM can be improved (COSO, 2004; Du et al., 2016).

Compared to the research on the effects of SM processes on RM outcomes, the reviewed literature has paid less attention to the effects of RM processes (e.g., risk allocation) on SM outcomes (e.g., stakeholder satisfaction). As mentioned above, usage of the stakeholder concept seems to remain limited and narrow in the included risk–stakeholder literature as well as in the current project management literature. In addition, the construction industry seems to lack a well-established scale for measuring SM outcomes (Oppong et al., 2017). Thus, it can be understandable that limited attention has been paid to how the RM processes will influence the outcomes of SM. Among the selected papers, two described this issue. One study interviewing 29 construction practitioners from eight civil infrastructure projects revealed that a risk/reward model can influence stakeholders' behavior (Love et al., 2011). Another study is a survey on public buildings, finding that equitable contract risk allocation between the government client and private contractor can motivate the contractors to engage in high performance (Rose and Manley,

2010). Essentially, it is plausible that SM process variables can influence RM outcomes and vice versa. But investigation of the mechanisms through which RM process elements such as risk allocation would influence SM outcomes has been rare (Zhang et al., 2016).

The third subset pertains to the effects of combined processes of SM and RM on project performance. First, some studies suggest the outcomes of both RM and SM as an indicator of project success. As mentioned before, in the construction context, risk was mostly demonstrated to be adverse. Accordingly, positive outcomes of RM refers to mitigated adverse conditions or events that can threaten project objectives, indicating good project performance (De Bakker et al., 2011; PMI, 2013). Likewise, the outcomes of SM have also considered as one indicator of project success (Davis, 2016). Numerous studies have suggested coordination, cooperation, integration among stakeholders as indicators of project success (e.g., Cleland, 1988; Francom et al., 2016; Meng, 2012). Second, there is research pointing out the positive effects of both RM and SM processes on certain aspects of project performance such as transaction costs, or the entire success of project. Li et al. (2014) contended that fair risk allocation and good relationships with project stakeholders can be effective at reducing transaction costs in construction projects. By focusing on PPP projects, it was found that management-related factors of risk (e.g., commencement of risk register) and stakeholder (e.g., open and effective stakeholder communication) in the briefing stage are both important to PPP success (Tang et al., 2013). Despite the articulation of the separate effects of RM and SM processes on project success, few research studies their combined effects on project outcomes. Two exceptions in the reviewed papers are Du et al. (2016) and T. Wang et al. (2016), which empirically test conceptual models describing the relationships of partnering (process-related variable of SM), risk management capability (process-related variable of RM), and project performance in Engineering-Procurement-Construction projects.

6. Future research agendas for enhancing the effectiveness of RM and SM through integrated management

We next outline future avenues for integrating risk and stakeholder management, so as to enhance the effectiveness of managing risk, stakeholder, involving the aspects of management processes and/or management outcomes. The future directions within each linkage mode (see Fig. 9) were derived in relation to what has been done and especially, what remains to be undertaken against the state-of-art research concerning the concept, management of risks and stakeholders and their similarities (as summarized in Fig. 1).

6.1. Including a broad stakeholder analysis in the RM process

For the first current linkage "management of risk based on stakeholder identification", we first suggest that future research should move beyond the identification of stakeholders and formulation of measures to cope with threats from those stakeholders, toward including a broad stakeholder analysis. This broad stakeholder analysis will benefit not the risk response stage examined in the current literature, but also other RM stages. Stakeholder analysis following stakeholder identification includes a description and assessment of stakeholders' interests/attributes and their relationship. This analysis can help to detect deep sources of those threat events posed by stakeholders, as well as the underlying interdependences among those threats (i.e., benefiting risk analysis and assessment stages).

In addition, the formation of stakeholders and the attributes of the same stakeholder can vary in different situations (e.g., Freeman, 1984; Mitchell et al., 1997; Olander, 2007) such as at different project stages. Thus, integrating a dynamic perspective into stakeholder analysis may help us understand why certain stakeholder-related threats occur and change, thereby formulating dynamic risk managerial actions. Recent research in the generic risk field also calls for enhancing risk assessment and management by focusing on the background knowledge and the dynamic dimensions (Aven, 2016). Our suggestions of including the analysis of stakeholders and focusing on the dynamics in stakeholders in the construction RM process correspond to the knowledge and the dynamics, respectively, and thus is consistent with the generic trend of enhancing RM.

Second, by focusing on threats, the publications tend to only see the negative aspect of stakeholders. This singular focus indicates a lack of a positive view on stakeholders and a lack of practical approaches to managing opportunities that may be posed by them. We, thus, suggest that risk–stakeholder researchers and practitioners should adopt a broad view of stakeholders by including both threats and opportunities into stakeholder analysis, which may modify risk analysis and assessment and risk response measures. It is possible that internal stakeholders' positive and cooperative behavior can be induced by appropriate project governance structures (e.g., an alliance structure) (Guo et al., 2014). External stakeholders can also bring benefits to the projects, for example, they may provide useful suggestions with their "local" knowledge (Gullino, 2009). Collaboration between the internal and external groups may also be possible (Cuppen et al., 2016). Thus, it requires project organizations and their managers to shift from a hostile, negative view on both internal and external stakeholders toward a more inclusive, positive perspective, and to sense and utilize advantages of them to pursue the best value for projects. Major strategic shifts in the business environment require conceptual shifts in the minds of managers (McCaskey, 1982). Academia should make efforts to advance such a fundamental and likely difficult transformation, because the construction practice has a lasting negative view on the risk and the stakeholder (Wang et al., 2017; Yang et al., 2016; Zou et al., 2007).

6.2. Enhancing RM ability through vertical and horizontal stakeholder management

For the second current linkage "management of internal stakeholders for enhancing their ability in managing risk", and consistent with the studies in them, we suggest that stakeholders are the sources for managing risks and their RM ability should be enhanced. However, we additionally propose enhancing

RM ability through the improvement in the management of stakeholders (corresponding to stakeholder response in the SM process), but not in the development of specific RM tools. First, we argue that a project's ability in the RM process is not only determined by the project management team on site, but also employees occupying different positions in a project and the organization the project belongs to. Thus, we suggest that a project-based organization should establish a multilevel RM model. RM attitudes from upper leaders and RM culture among team members across different levels are indispensable in determining a construction stakeholder's overall RM capability (Loosemore et al., 2006; Zou et al., 2010). However, this aspect has been disregarded in the existing literature. Empirical investigations on RM practices also show that RM attitudes or systems at the upper organization can be poor, notwithstanding the relatively mature techniques specific for analyzing project risk (Choudhry and Iqbal, 2013; Mu et al., 2014). Taking safety risk management as an example, a meta-analysis found management commitment to safety was the most critical safety climate for mitigating workplace injuries and accidents (Beus et al., 2010). Furthermore, even when senior managers in a larger organization or project put high priority to risk, RM practices may vary across work subunits/groups (Zohar, 2010). Thus, to foster an organization's overall RM capability in a project, it is necessary to develop a robust multilevel RM model within the organization, advancing RM awareness and ability from upper leaders in organizations to team leaders to individual team members, where key RM dimensions for each level are likely to vary (e.g., RM commitment from the upper management versus RM skills from the direct manager versus risky activities avoidance from the frontline workers).

Second, the literature within this linkage indicated lacked theoretical foundations or practical advices for unifying multiple organizations to manage risks in a collaborative way. This phenomenon was also reported in a review of RM research in temporary multi-organizations (Lehtiranta, 2014). Among the included literature, empirical surveys in various countries or regions also reveal that although practitioners desire joint RM, in reality, the mechanism for such a joint effort is lacking (Choudhry and Iqbal, 2013; Nguyen and Chileshe, 2015; Tang et al., 2007). Thus, further efforts are needed to develop practical measures for aligning diverse project players for concerted capability in managing project risks to achieve the best value for the project. To summarize, in addition to the traditional way of developing RM tools and approaches, internal stakeholders' RM capability in a project can be enhanced through improved vertical stakeholder management within an organization itself and horizontal multiple stakeholder management around the project. Specifically, we suggest that future research should energize risk awareness and involvement of members across different levels at the organization, and establish strategies for collaborative RM across diverse internal organizations within a project.

6.3. Investigating the mechanism stakeholder differences affect their variations in risk

For the third current linkage "management of stakeholder differences concerning risk", the literature acknowledges the differences among stakeholders and among their perceptions and decisions regarding risk. However, we still know little about how those differences occur and how to manage those differences effectively. Addressing these questions will benefit the analysis and management of conflict among stakeholders and among risks (corresponding to stakeholder (risk) analysis and response in the SM (RM) process).

We suggest, at the outset, it may be effective to conduct case studies for an understanding of how different stakeholders describe, perceive, and handle risk during actual conversations (Cuppen et al., 2016; Van Os et al., 2015). With case studies, we may find specific factors related to stakeholders and/or related to the construction project that contribute to stakeholders' variations in risk perceptions and decisions. Next, theoretically and empirically rigorous investigations of the underlying mechanisms explaining the occurrence of the variation in risk-related outcomes (e.g., risk perceptions, risk attitudes, risk decisions) among diverse stakeholders are warranted. For instance, the role of stakeholders' social structures (Archer, 1995; Friedman and Miles, 2002) warrants specific consideration. By doing so, stakeholders can have a better understanding of the differences with their partners and the roots of those differences. As such, effective strategies can be developed to resolve conflict among different stakeholders (benefiting stakeholder management) and among their perceptions and managerial actions concerning risk (benefiting risk management), whereby mutual benefits to the fields of risk and stakeholder management can be expected.

6.4. Establishing a holistic picture among the management process and outcome of RM and SM

As shown in Fig. 10, the fourth current risk–stakeholder linkage refers to the effects of SM processes on RM outcomes as a project performance indicator, the effects of RM processes on SM outcomes as a project performance indicator, and the combined effects of SM and RM processes on project performance. To

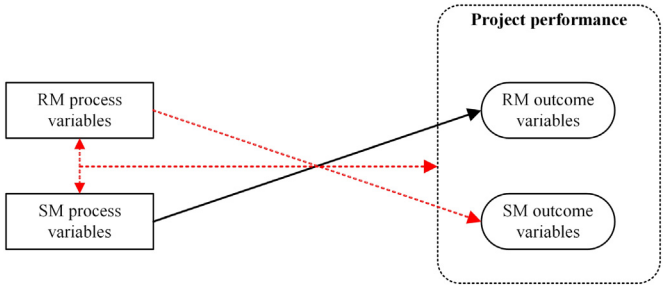

Fig. 10. A framework for research on interrelatedness between RM and SM and effect on project performance. Note: RM = risk management, SM = stakeholder management. The black solid arrows denote the current research theme; the red dashed arrows denote future directions. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

attain a clearer picture of this linkage mode, we first suggest it is essential to distinguish between process variables and outcome variables, the first set of variables should reflect management procedures, activities, and functions of risk (e.g., risk allocation) and stakeholder management (e.g., plans and resources for managing stakeholders), whereas the second set of variables should reflect the objectives and expectations of RM (e.g., reduced threats) and SM (e.g., increased cooperation among stakeholders). Both sets of variables together reflect the effectiveness of RM and SM.

In Fig. 10, the black solid lines represent the major focus in the existing literature, namely, the effects of SM process variables on the outcomes of RM. However, the red dashed lines indicate the areas that future research should address. The first direction is how RM process variables impact the outcomes of SM, which has received limited attention as shown by the literature review results. As a mature scale for measuring construction SM outcomes is currently lacking (Oppong et al., 2017), this first direction largely depends on the development of robust scales of construction SM outcomes. The second direction is to understand how elements associated with integrated management processes of risks and stakeholders will influence the project performance specifically related to risk and stakeholder outcomes, or a wide range of project performance. This direction requires comparing the benefits of RM and SM when implemented separately and when integrated, on the evidence from realistic cases.

To summarize, the literature review revealed that construction risk and stakeholder integrated management was feasible and can benefit the fields of risk and stakeholder management. That said, however, IMSs of construction risk and stakeholder is lacking. A few studies (e.g., Du et al., 2016; T. Wang et al., 2016) indicated that integration of management process elements concerning risk and stakeholder would enhance project performance. Research on IMSs in organizations has also demonstrated benefits of integration. For example, a literature review of quality and environment IMSs has found it to be of greater benefits than implementing quality and environment management separately, resulting in improvements such as cost savings and a more positive organizational image (Bernardo et al., 2015). Thus, we think IMSs of risks and stakeholders in construction projects are possible and promising to the field of project management. As we illustrate in Fig. 11, the establishment of IMSs for risk and stakeholder in construction projects relies on the advancement of the four risk–stakeholder linkage modes derived from the existing literature. The first three linkages concern integration in the management process of construction risk and stakeholder; the last linkage refers to the examination of the effects of combined RM and SM processes on project performance in terms of RM and SM outcomes or a wide definition of project performance. With both the theoretical advancement and lessons learned from accumulated practices of risk–stakeholder integration in those four modes, it is expected IMSs for construction risk and stakeholder management can be developed.

7. Discussion and conclusion

Traditional efforts for improving risk and stakeholder management are largely undertaken in isolation. Instead, we proposed that integrated thinking and management of risks and stakeholders is feasible and may illuminate alternatives and new ideas for improving risk and stakeholder management effectiveness. The hypothesis was conceptually validated by the current results obtained with the systematic literature review method, namely, the thematic analysis of the four risk–stakeholder linkage modes identified in the existing literature and the future research agendas, which were proposed against the current status and the state-of-art research concerning the concept, management of risks and stakeholders and their similarities. This study thus suggests both researchers and practitioners be aware and find approaches for the connection and integrated management of construction risk and stakeholder, rather than merely managing risk or stakeholder in isolation. Below, we summarize the main findings and point out their implications for theory and practice.

7.1. Major findings and implications

Using a systematic literature review of 79 construction relevant papers, we found four risk–stakeholder linkage modes: (1) management of risk based on stakeholder identification, (2) internal stakeholders' responsibility and ability in the RM process, (3) management of stakeholder differences concerning risk, and (4) interrelatedness between RM and SM and effect on project performance. In the construction sector, RM has been frequently integrated into the fields of quality, cost, schedule, and safety management (Loushine et al., 2006; Love et al., 2016; Luu et al., 2009; Pawan and Lorterapong, 2016). The practices in construction project management also suggest that risk and stakeholder issues can be interwoven (Ward and Chapman, 2008;

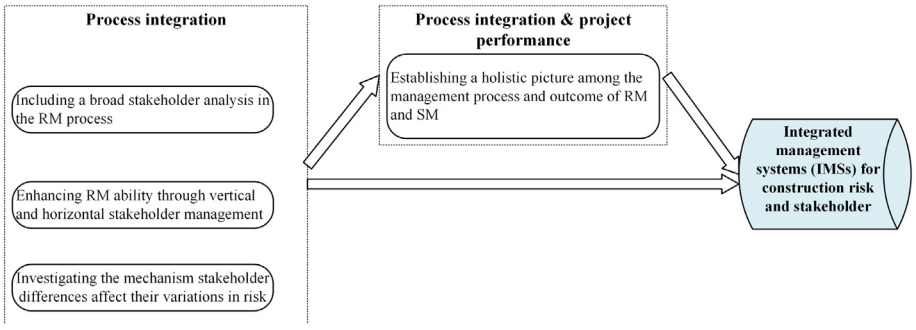

Fig. 11. A research roadmap linking the risk–stakeholder linkage modes with risk–stakeholder integrated management systems.

Zhang, 2011; Wang et al., 2017). However, these studies are scattered; a systematic clarification of how RM and SM connect to one another is lacking. The four linkages that were identified provide us a picture of how RM and SM can connect and will inspire future effort aiming to enhance the connection between construction risk and stakeholder management.

Based on the identified four linkage modes between RM and SM, we further justified that the effectiveness of RM and SM can be mutually enhanced from the perspective of integration. Specifically, we first clarified the process domain and the outcome domain concerning RM and SM and the concept of their effectiveness, and then demonstrated that certain stages of risk and stakeholder management process can be integrated for mutual effectiveness both in the process domain and the outcome domain. This clarification and demonstration adds knowledge to the existing literature, where specific descriptions of the benefits from RM to SM or vice versa are rare. The idea that RM can benefit from managing stakeholder is implied by studies such as Yang and Zou (2014), however, only one-way benefits from SM to RM were studied and the benefits are implicit. Other management areas can be boosted through management of risk. Luu et al. (2009) and Shokri et al. (2016), for example, identify risk factors to project schedule and analyze the effect of those factors using network theories, whereby schedule performance is improved through management of risks (related to schedule). However, whether SM can be enhanced through management of risk remains unclear. Research agendas for enhancing the effectiveness of RM and SM through integration strategies may serve as a basis for promoting theoretical and practical developments of risk–stakeholder integrated management in the pursuit of mutual benefits and overall project performance.

Taken together, the present study contributed to the current risk and stakeholder research in construction by proposing and demonstrating that management processes and management outcomes of risk and stakeholder management can be enhanced through new ways of thinking about, analyzing, and then managing risk and stakeholder issues in a holistic and integrated way. This is meaningful for both theory and practice as most previous management strategies for risk and stakeholder remain segregated, limiting our knowledge, understanding, and practice of risk-stakeholder integration management. The distinctness of the different project management areas (PMI, 2013) has evoked fruitful academic outcomes and practices in each area; it is useful to pay attention to IMSs that support collaboration among diverse project management areas for improving effectiveness and efficiency in resource allocation and improving overall performance within the entire project.

7.2. Limitations and future research

The authors acknowledge the defects of the literature review method, especially those concerning the literature sampling criteria and analysis (Denyer and Tranfield, 2009; Mostafa et al., 2016). Literature searching can never be exhaustive. Certain relevant publications may be not included; for example, they may use “contractor” to refer to the stakeholder notion but not the searched keywords “stakeholder” or “project participant”. Related studies may be also missing for the authors’ inability to relate the research topic to the connections between risk and stakeholder issues. Also, although rigorous content analysis processes were conducted by two coders, cognitive biases can never be eliminated, and thus there may be drawbacks in the analysis and induction of the research themes. The present study, a conceptual analysis, merely acts as an initial attempt to the demand for risk–stakeholder integration in construction projects. Denyer et al. (2008) argue that the output of systematic review should be heuristic, namely, providing clues/ideas but not detailed solutions for field problems. This research thus aims to inspire more successful trials and practices concerning integrated management of construction risk and stakeholder, testing empirically as to how to integrate RM and SM effectively for producing two-way benefits, ultimately fulling the goal of establishing IMSs of risks and stakeholders. Finally, owing to the large number of articles for reviewing, the review at times needed to stay at a general level, providing a broad overview rather than a meticulous account of very detailed findings. More specific research is required to carry out in-depth analyses of each identified theme.

Acknowledgements

The work of this research is fully supported by the National Natural Science Foundation of China (Grant Nos. 71231006, 71772736, 71722004). Furthermore, great appreciation especially goes to all the participants who have greatly devoted to the empirical surveys. The authors would also like to thank the editor and anonymous reviewers for their work and contributions.

References

Aaltonen, K., 2011. Project stakeholder analysis as an environmental interpretation process. Int. J. Proj. Manag. 29 (2), 165–183.

Aaltonen, K., Kujala, J., Havela, L., Savage, G., 2015. Stakeholder dynamics during the project front-end: the case of nuclear waste repository projects. Proj. Manag. J. 46 (6), 15–41.

Achterkamp, M.C., Vos, J.F., 2008. Investigating the use of the stakeholder notion in project management literature, a meta-analysis. Int. J. Proj. Manag. 26 (7), 749–757.

Alexander, C., Sarabia, J.M., 2012. Quantile uncertainty and value-at-risk model risk. Risk Anal. 32 (8), 1293–1308.

Arashpour, M., Abbasi, B., Arashpour, M., Hosseini, M.R., Yang, R., 2017. Integrated management of on-site, coordination and off-site uncertainty: theorizing risk analysis within a hybrid project setting. Int. J. Proj. Manag. 35 (4), 647–655.

Archer, M.S., 1995. Realist Social Theory: The Morphogenetic Approach. Cambridge University Press.

Ashuri, B., Mostaan, K., 2015. State of private financing in development of highway projects in the United States. J. Manag. Eng. 31 (6), 04015002.

Aven, T., 2016. Risk assessment and risk management: review of recent advances on their foundation. Eur. J. Oper. Res. 253 (1), 1–13.

Aven, T., Renn, O., 2009. On risk defined as an event where the outcome is uncertain. J. Risk Res. 12, 1–11.

Bal, M., Bryde, D., Fearon, D., Ochieng, E., 2013. Stakeholder engagement: achieving sustainability in the construction sector. Sustain. For. 5 (2), 695–710.

Bernardo, M., Simon, A., Tarí, J.J., Molina-Azorín, J.F., 2015. Benefits of management systems integration: a literature review. J. Clean. Prod. 94, 260–267.

Beus, J.M., Payne, S.C., Bergman, M.E., Arthur, W., 2010. Safety climate and injuries: an examination of theoretical and empirical relationships. J. Appl. Psychol. 95, 713–727.
Bourne, L., Walker, D.H.T., 2005. Visualising and mapping stakeholder influence. Manag. Decis. 43, 649–660.
Chapman, C.B., Ward, S., 2003. Project Risk Management: Processes, Techniques and Insights. John Wiley & Sons.
Chapman, C., Ward, S., 2004. Why risk efficiency is a key aspect of best practice projects. Int. J. Proj. Manag. 22 (8), 619–632.
Chau, K.W., 1997. The ranking of construction management journals. Constr. Manag. Econ. 15 (4), 387–398.
Choudhry, R.M., Iqbal, K., 2013. Identification of risk management system in construction industry in Pakistan. J. Manag. Eng. 29 (1), 42–49.
Clarkson, M.B.E., 1995. A stakeholder framework for analyzing and evaluating corporate social performance. Acad. Manag. Rev. 20 (1), 92–117.
Cleland, D.I., 1985. A strategy for ongoing project evaluation. Proj. Manag. J. 16 (3), 11–16.
Cleland, D., 1988. Project stakeholder management. In: Cleland, D., King, W. (Eds.), Project Management Handbook. Van Nostrand Reinhold, USA.
COSO (Committee of Sponsoring Organizations of the Treadway Commission), 2004. Enterprise Risk Management–Integrated Framework. COSO, New York.
Cuppen, E., Bosch-Rekveldt, M.G.C., Pikaar, E., Mehos, D.C., 2016. Stakeholder engagement in large-scale energy infrastructure projects: revealing perspectives using Q methodology. Int. J. Proj. Manag. 34 (7), 1347–1359.
Davis, K., 2016. A method to measure success dimensions relating to individual stakeholder groups. Int. J. Proj. Manag. 34 (3), 480–493.
De Bakker, K., Boonstra, A., Wortmann, H., 2011. Risk management affecting IS/IT project success through communicative action. Proj. Manag. J. 42, 75–90.
Denyer, D., Tranfield, D., 2009. Producing a systematic review. In: Buchanan, D.A., Bryman, A. (Eds.), The Sage Handbook of Organizational Research Methods. Sage Publications, Thousand Oaks, CA, pp. 671–689.
Denyer, D., Tranfield, D., Van Aken, J.E., 2008. Developing design propositions through research synthesis. Organ. Stud. 29 (3), 393–413.
Du, L., Tang, W., Liu, C., Wang, S., Wang, T., Shen, W., Huang, M., Zhou, Y., 2016. Enhancing engineer–procure–construct project performance by partnering in international markets: perspective from Chinese construction companies. Int. J. Proj. Manag. 34 (1), 30–43.
El-Gohary, N.M., Osman, H., El-Diraby, T.E., 2006. Stakeholder management for public private partnerships. Int. J. Proj. Manag. 24 (7), 595–604.
Elo, S., Kyngäs, H., 2008. The qualitative content analysis process. J. Adv. Nurs. 62, 107–115.
Firouzi, A., Yang, W., Li, C., 2016. Prediction of total cost of construction project with dependent cost items. J. Constr. Eng. Manag. 142 (12), 04016072.
Flyvbjerg, B., Holm, M.S., Buhl, S., 2002. Underestimating costs in public works projects: error or lie? J. Am. Plan. Assoc. 68 (3), 279–295.
Francom, T., ASMar, M.El, Ariaratnam, S., 2016. Performance analysis of construction manager at risk on pipeline engineering and construction projects. J. Manag. Eng. 32 (6), 04016016.
Freeman, R.E., 1984. Strategic Management: A Stakeholder Approach. Cambridge University Press, Cambridge, U.K.
Friedman, A.L., Miles, S., 2002. Developing stakeholder theory. J. Manag. Stud. 39, 1–21.
Gullino, S., 2009. Urban regeneration and democratization of information access: CitiStat experience in Baltimore. J. Environ. Manag. 90 (6), 2012–2019.
Guo, F., Chang-Richards, Y., Wilkinson, S., Li, T.C., 2014. Effects of project governance structures on the management of risks in major infrastructure projects: a comparative analysis. Int. J. Proj. Manag. 32 (5), 815–826.
Han, S.H., Diekmann, J.E., Ock, J.H., 2005. Contractor's risk attitudes in the selection of international construction projects. J. Constr. Eng. Manag. 131 (3), 283–292.
Hwang, B.G., Ng, H.B., 2016. Project network management: risks and contributors from the viewpoint of contractors and sub-contractors. Technol. Econ. Dev. Econ. 22 (4), 631–648.
Hwang, B.G., Zhao, X., Toh, L.P., 2014. Risk management in small construction projects in Singapore: status, barriers and impact. Int. J. Proj. Manag. 32 (1), 116–124.
Jeerangsuwan, T., Said, H., Kandil, A., Ukkusuri, S., 2014. Financial evaluation for toll road projects considering traffic volume and serviceability interactions. J. Infrastruct. Syst. 20 (3), 04014012.
Jergeas, G.F., Williamson, E., Skulmoski, G.J., Thomas, J.L., 2000. Stakeholder management on construction projects. AACE Int. Trans. 12, 12.11–12.16 (PM).
Karlsen, J.T., 2002. Project stakeholder management. Eng. Manag. J. 14 (4), 19–24.
Kerzner, H., 2001. Project Management: A Systems Approach to Planning Scheduling and Controlling. 7th ed. John Wiley & Sons, New York.
Krippendorff, K., 2004. Content Analysis: An Introduction to its Methodology. Sage, Thousand Oaks, CA.
Latham, M., 1994. Constructing the Team. HMSO, London.
Lehtiranta, L., 2011. Relational risk management in construction projects: modeling the complexity. Leadersh. Manag. Eng. 11 (2), 141–154.
Lehtiranta, L., 2014. Risk perceptions and approaches in multi-organizations: a research review 2000–2012. Int. J. Proj. Manag. 32 (4), 640–653.
Li, H., Arditi, D., Wang, Z., 2014. Transaction costs incurred by construction owners. Eng. Constr. Archit. Manag. 21 (4), 444–458.
Littau, P., Jujagiri, N.J., Adlbrecht, G., 2010. 25 years of stakeholder theory in project management literature (1984–2009). Proj. Manag. J. 41 (4), 17–29.
Lombard, M., Snyder-Duch, J., Bracken, C.C., 2002. Content analysis in mass communication: Assessment and reporting of intercoder reliability. Hum. Commun. Res. 28 (4), 587–604.
Loosemore, M., 2011. Managing stakeholder perceptions of risk and opportunity in social infrastructure projects using a multimedia approach. Int. J. Proj. Organ. Manag. 3 (3–4), 307–315.
Loosemore, M., Lim, B.T.H., 2017. Linking corporate social responsibility and organizational performance in the construction industry. Constr. Manag. Econ. 35 (3), 90–105.
Loosemore, M., Raftery, J., Reilly, C., Higgon, D., 2006. Risk management in projects. 2nd ed. Taylor and Francis, New York.
Loushine, T.W., Hoonakker, P.L.T., Carayon, P., Smith, M.J., 2006. Quality and safety management in construction. Total Qual. Manag. Bus. Excell. 17 (9), 1171–1212.
Love, P.E.D., Davis, P.R., Chevis, R., Edwards, D.J., 2011. Risk/reward compensation model for civil engineering infrastructure alliance projects. J. Constr. Eng. Manag. 137 (2), 127–136.
Love, P.E.D., Teo, P., Morrison, J., Grove, M., 2016. Quality and safety in construction: creating a no-harm environment. J. Constr. Eng. Manag. 142 (8), 05016006.
Lowe, D., Leiringer, R., 2006. Commercial Management of Projects: Defining the Discipline. Blackwell Publishing Ltd.
Luu, V.T., Kim, S., Tuan, Y.N.V., Ogunlana, S.O., 2009. Quantifying schedule risk in construction projects using Bayesian belief networks. Int. J. Proj. Manag. 27 (1), 39–50.
Lyons, T., Skitmore, M., 2004. Project risk management in the Queensland engineering construction industry: a survey. Int. J. Proj. Manag. 22 (1), 51–61 (Property and Construction 20 (3), 286–319).
McCaskey, M., 1982. The Executive Challenge. Pitman Publishing Inc., Marshfield.
McCord, J., McCord, M., Davis, P.T., Haran, M., Rodgers, W.J., 2015. Understanding delays in housing construction: evidence from Northern Ireland. J. Financ. Manag. Prop. Constr. 20 (3), 286–319.
McElroy, B., Mills, C., 2000. Managing stakeholders. Gower handbook of project management. Gower Publishing Limited, Burlington, VT, pp. 757–775.
Meng, X., 2012. The effect of relationship management on project performance in construction. Int. J. Proj. Manag. 30 (2), 188–198.
Mitchell, R.K., Agle, B.R., Wood, D.J., 1997. Toward a theory of stakeholder identification and salience: defining the principle of who and what really counts. Acad. Manag. Rev. 22 (4), 853–886.
Mok, K.Y., Shen, G.Q., Yang, J., 2015. Stakeholder management studies in mega construction projects: a review and future directions. Int. J. Proj. Manag. 33 (2), 446–457.
Mostafa, S., Chileshe, N., Abdelhamid, T., 2016. Lean and agile integration within offsite construction using discrete event simulation: a systematic literature review. Constr. Innov. 16 (4), 483–525.

Mu, S., Cheng, H., Chohr, M., Peng, W., 2014. Assessing risk management capability of contractors in subway projects in mainland China. Int. J. Proj. Manag. 32 (3), 452–460.
Nguyen, T.P., Chileshe, N., 2015. Revisiting the construction project failure factors in Vietnam. Built Environ. Proj. Asset Manag. 5 (4), 398–416.
Olander, S., 2007. Stakeholder impact analysis in construction project management. Constr. Manag. Econ. 25 (3), 277–287.
Olander, S., Landin, A., 2005. Evaluation of stakeholder influence in the implementation of construction projects. Int. J. Proj. Manag. 23 (4), 321–328.
Olsson, R., 2007. In search of opportunity management: is the risk management process enough? Int. J. Proj. Manag. 25 (8), 745–752.
Oppong, G.D., Chan, A.P., Dansoh, A., 2017. A review of stakeholder management performance attributes in construction projects. Int. J. Proj. Manag. 35 (6), 1037–1051.
Pawan, P., Lorterapong, P., 2016. A fuzzy-based integrated framework for assessing time contingency in construction projects. J. Constr. Eng. Manag. 142 (3), 04015083.
PMI (Project Management Institute), 2013. A Guide to the Project Management Body of Knowledge (PMBOK Guide) (Newton Square, PA).
Rebelo, M.F., Santos, G., Silva, R., 2016. Integration of management systems: towards a sustained success and development of organizations. J. Clean. Prod. 127, 96–111.
Rose, T., Manley, K., 2010. Client recommendations for financial incentives on construction projects. Eng. Constr. Archit. Manag. 17 (3), 252–267.
Shahata, K., Zayed, T., 2016. Integrated risk-assessment framework for municipal infrastructure. J. Constr. Eng. Manag. 142 (1), 04015052.
Shealy, T., Klotz, L., Weber, E.U., Johnson, E.J., Bell, R.G., 2016. Using framing effects to inform more sustainable infrastructure design decisions. J. Constr. Eng. Manag. 142 (9), 04016037.
Shi, Q., Liu, Y., Zuo, J., Pan, N., Ma, G., 2015. On the management of social risks of hydraulic infrastructure projects in China: a case study. Int. J. Proj. Manag. 33 (3), 483–496.
Shokri, S., Haas, C.T., Haas, R.C.G., Lee, S.H., 2016. Interface-management process for managing risks in complex capital projects. J. Constr. Eng. Manag. 142 (2), 04015069.
Tang, W., Qiang, M., Duffield, C.F., Young, D.M., Lu, Y., 2007. Risk management in the Chinese construction industry. J. Constr. Eng. Manag. 133 (12), 944–956.
Tang, L., Shen, Q., Skitmore, M., Cheng, E.W.L., 2013. Ranked critical factors in PPP briefings. J. Manag. Eng. 29 (2), 164–171.
Taroun, A., 2014. Towards a better modelling and assessment of construction risk: insights from a literature review. Int. J. Proj. Manag. 32 (1), 101–115.
Tranfield, D., Denyer, D., Smart, P., 2003. Towards a methodology for developing evidence-informed management knowledge by means of systematic review. Br. J. Manag. 14 (3), 207–222.
Tsai, C.C., Wen, M.C.L., 2005. Research and trends in science education from 1998 to 2002: a content analysis of publications in selected journals. Int. J. Sci. Educ. 27 (1), 3–14.
Tymvios, N., Gambatese, J.A., 2016. Perceptions about design for construction worker safety: viewpoints from contractors, designers, and university facility owners. J. Constr. Eng. Manag. 142 (2), 04015078.
Van Os, A., Van Berkel, F., De Gilder, D., Van Dyck, C., Groenewegen, P., 2015. Project risk as identity threat: explaining the development and consequences of risk discourse in an infrastructure project. Int. J. Proj. Manag. 33 (4), 877–888.
Walker, D.H.T., Bourne, L.M., Shelley, A., 2008. Influence, stakeholder mapping and visualization. Constr. Manag. Econ. 26 (6), 645–658.
Wallace, M., Wray, A., 2016. Critical Reading and Writing for Postgraduates. Sage Publications, London.
Wang, J., Yuan, H., 2011. Factors affecting contractors' risk attitudes in construction projects: case study from China. Int. J. Proj. Manag. 29 (2), 209–219.
Wang, J., Zou, P.X., Li, P.P., 2016a. Critical factors and paths influencing construction workers' safety risk tolerances. Accid. Anal. Prev. 93, 267–279.
Wang, C.M., Xu, B.B., Zhang, S.J., Chen, Y.Q., 2016b. Influence of personality and risk propensity on risk perception of Chinese construction project managers. Int. J. Proj. Manag. 34 (7), 1294–1304.
Wang, T., Tang, W., Du, L., Duffield, C.F., Wei, Y., 2016c. Relationships among risk management, partnering, and contractor capability in international EPC project delivery. J. Manag. Eng. 32 (6), 04016017.
Wang, X., Xia, N., Zhang, Z., Wu, C., Liu, B., 2017. Human safety risks and their interactions in China's subways: stakeholder perspectives. J. Manag. Eng. 33 (5), 05017004.
Ward, S., Chapman, C., 2008. Stakeholders and uncertainty management in projects. Constr. Manag. Econ. 26 (6), 563–577.
Xia, N., Zhong, R., Wu, C., Wang, X., Wang, S., 2017. Assessment of stakeholder-related risks in construction projects: integrated analyses of risk attributes and stakeholder influences. J. Constr. Eng. Manag. 143 (8), 04017030.
Xu, J.W., Moon, S., 2014. Stochastic revenue and cost model for determining a BOT concession period under multiple project constraints. J. Manag. Eng. 30 (3), 04014011.
Yang, R.J., Zou, P.X.W., 2014. Stakeholder-associated risks and their interactions in complex green building projects: a social network model. Build. Environ. 73, 208–222.
Yang, R.J., Wang, Y., Jin, X.-H., 2014. Stakeholders' attributes, behaviors, and decision–making strategies in construction projects: importance and correlations in practice. Proj. Manag. J. 45 (3), 74–90.
Yang, R.J., Zou, P.X.W., Wang, J., 2016. Modelling stakeholder-associated risk networks in green building projects. Int. J. Proj. Manag. 34 (1), 66–81.
Zavadskas, E.K., Turskis, Z., Tamošaitiene, J., 2010. Risk assessment of construction projects. J. Civ. Eng. Manag. 16 (1), 33–46.
Zhang, X., 2011. Social risks for international players in the construction market: a China study. Habitat Int. 35 (3), 514–519.
Zhang, S., Zhang, S., Gao, Y., Ding, X., 2016. Contractual governance: effects of risk allocation on contractors' cooperative behavior in construction projects. J. Constr. Eng. Manag. 142 (6), 04016005.
Zhao, Z.Y., Zhao, X.J., Davidson, K., Zuo, J., 2012. A corporate social responsibility indicator system for construction enterprises. J. Clean. Prod. 29, 277–289.
Zohar, D., 2010. Thirty years of safety climate research: reflections and future directions. Accid. Anal. Prev. 42 (5), 1517–1522.
Zou, P.X., Zhang, G., Wang, J., 2007. Understanding the key risks in construction projects in China. Int. J. Proj. Manag. 25 (6), 601–614.
Zou, P.X.W., Chen, Y., Chan, T., 2010. Understanding and improving your risk management capability: assessment model for construction organizations. J. Constr. Eng. Manag. 136 (8), 854–863.