

Stakeholder management in construction projects: a study of the relationship between stakeholder type, value and performance indicators

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RESUMO

Objetivo: O objetivo deste estudo é investigar as questões-chave da gestão de stakeholders em projetos de construção, estudando a relação entre tipo de stakeholder, valor e indicadores de desempenho.

Metodologia: O método de pesquisa adotado foi a revisão de literatura, utilizando técnicas de bibliometria e análise de conteúdo. Para análise dos dados, após codificação e tabulação para análise de cocitação e palavras-chave, os dados foram inseridos no VOS Viewer, sendo os dados estatísticos e gráficos.

Constatações: Os resultados enfatizam o papel dos empreiteiros gerais e subempreiteiros como principais partes interessadas. A análise mostra que a literatura enfatiza o papel dos empreiteiros gerais (GC) e subempreiteiros (SC), com ênfase em temas relacionados aos processos de gestão de stakeholders. O foco está no valor econômico (EC) e indicadores associados aos benefícios relacionais das partes interessadas (SRB), suporte das partes interessadas ao projeto (SSP) e fatores de sucesso (SF).

Valor: O trabalho contribui para a literatura fornecendo e comparando os diferentes conceitos de aplicação da gestão de stakeholders em projetos de construção; medir o impacto das publicações e seus autores mais influentes; identificar historicamente uma tendência crescente de interesse pelo assunto e, como consequência, listar temas de pesquisa emergentes nas áreas de aplicação estudadas. A partir da análise bibliométrica, os autores contribuíram com novos insights para a gestão de stakeholders na gestão de projetos em construção para futuras pesquisas. São destacados os temas relacionados aos processos de gestão de stakeholders, com foco no valor econômico e indicadores associados aos benefícios relacionais dos stakeholders, o apoio dos stakeholders ao projeto e os fatores de sucesso.

Palavras-chave: Gestão de Projetos; Análise Bibliométrica; Partes Interessadas; Construção; Indicadores.

ABSTRACT

Purpose: The purpose of this study is to investigate the key issues of stakeholder management in construction projects, studying the relationship between stakeholder type, value and performance indicators.

Methodology: The research method adopted was a literature review, using bibliometrics and content analysis techniques. For data analysis, after coding and tabulation for an analysis of co-citation and keywords, the data were entered into the VOS Viewer, and statistical data and graphics.

Findings: The results emphasize the role of general contractors and subcontractors as key stakeholders. The analysis shows that the literature emphasizes the role of general contractors (GC) and subcontractors (SC), with an emphasis on themes related to stakeholder management processes. The focus is on economic value (EC) and indicators associated with (SRB), stakeholder support for the project (SSP) and success factors (SF).

Value: The study contributes to the literature by providing and comparing the different concepts of how stakeholder management is applied in construction projects; the impact of publications is measured along with the most influential authors; a growing trend of interest is identified in the subject historically, and as a consequence, emerging research subjects are listed in the areas of its application studied. From a bibliometric analysis, the authors contributed new insights for stakeholder management in project management under construction for future research. The themes related to stakeholder management processes are highlighted, focusing on the economic value and indicators associated with the relational stakeholder benefits, the support of stakeholders to the project and the success factors.

Keywords: Project Management, Bibliometric Analysis, Stakeholders, Construction, Indicators.

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1. INTRODUCTION

Stakeholder Management (SM) in construction projects requires a significant attention to detail and industry domain experience. A project management perspective is especially important, due to construction projects complex and uncertain nature. Many authors substantiate its importance in the construction industry (NEWCOMBE, 2003; OLANDER; LANDIN, 2005; CHINYIO; AKINTOYE, 2008; YUAN *et al.* 2010, MOK *et. al* 2015, LI *et al.*, 2016, XIA *et. al*, 2017), as it requires an effective and objective approach to manage conflicting stakeholder interests.

Construction projects stakeholders represent numerous risks and can directly interfere with its success (WANG *et al.*, 2016; YANG; ZOU, 2014). The construction industry still has some gaps in SM (LOOSEMORE, 2006), lacking a systematic framework to integrate strategies, plans, methods or routine operating processes (KARLSEN, 2002).

To narrow these gaps, the objective of this article is to investigate the primary issues within stakeholder management during construction projects, seeking to answer the following research questions: (1) What are the central themes of stakeholder management in construction projects? (2) What is the relationship between stakeholder type, value, and project performance indicators? Through qualitative analysis, this article will highlight the relationship between the factors that affect and are affected by these concepts. The research method that best facilitates the discussion of tis research question is a systematic literature review, performed with content analysis, complemented by bibliometric analysis.

The work contributes to the literature by providing and comparing the different concepts of application of stakeholder management in construction projects; scale the impact of publications and their most influential authors; to identify a growing trend of interest in the subject historically, and as a consequence to list emerging research subjects in the application areas studied. From the bibliometric analysis, the authors contributed new insights for stakeholder management in managing projects under construction for future research.

The article is divided into five sections. Section 2 presents the main concepts underlying the theme. The research method used in the development of the article is presented in section 3. In section 4 the results are presented and in section 5 their discussion. Finally, section 6 presents the conclusions and limitations of the research.

2. THEORETICAL FOUNDATION

Freeman (1984) recognized that the concept of stakeholders emerged through an international memorandum in 1963 at the Stanford Research Institute. Through a literature review, Elias *et al.* (2002) revealed that stakeholder science has since been presented in four main domains: corporate planning, systems theory, corporate social responsibility and organizational theory. And relating the three aspects (descriptive, instrumental and normative) of categorizing stakeholders (JONES, 1999).

“Stakeholders” or “stakeholders” include individuals, groups, and other organizations that have an interest in a company’s actions and that have the ability to influence it (SAVAGE; NIX; WHITEHEAD; BLAIR, 1991; PMI, 2017).

In Clarkson's conception (1995, p.106), “stakeholders are people or groups that own, or claim, properties, rights, or interests in a company, in the past, present or future”. According to Bourne (2005), stakeholders can be defined as individuals or groups that have some kind of right in the project, can contribute with knowledge or support, or can affect and be affected by the project. For Turner (2009, p.77) a stakeholder can be defined as “any person who has some kind of interest in the project, work, outputs, results or final objectives”.

Stakeholders are “those groups that can affect or are affected by the achievement of the company's objectives” (FREEMAN, 1984). Subsequently, according to Oppong *et al.* (2017), new perspectives have come to popularity where stakeholder management (SG) theory is discussed in the form of descriptive, instrumental and normative approaches (JONES, 1999), the stakeholder environment is seen as dynamic rather than static (FREEMAN, 1984). Subsequently, more empirical investigations in the field of construction have been conducted based on the underlying theory and models (EG; OLANDER; LANDIN, 2005, 2008; YANG *et al.*, 2010, 2011a, 2011b).

According to Newcombe (2003) in the theory and practice of contemporary management, the increase and the role of stakeholders as the main actors of organizational dynamics are widely recognized and recorded in the literature. According to the author, this pluralistic vision of the identity of those who have an investment and an interest in an organization extends far beyond from the traditional concept of shareholders to include employees, suppliers, customers, unions, communities, etc., the concept should be extended to the context of construction projects, although it is accepted that the traditional view of the customer as a single entity does not reflect reality. of stakeholder settings for most projects.

In the same line of thought, Newcombe (2003) stated that stakeholders have different levels and types of investment and interest in construction projects and can be seen as multiple clients or clients for the project in which they are involved. For the author, the concept of customer, which prevailed throughout the 20th century, is now obsolete and is being replaced by the reality of project stakeholders. Thus, the mapping of stakeholders in construction projects demonstrates the importance for project managers to carry out the analysis of their power, predictability and interest in the scope of the project.

In this way, “construction projects attract interest from different stakeholders and express multiple needs and expectations about the project” (OLANDER, 2007). These are often in conflict making it unlikely that all of them can be met, as the stakeholder management process involves assessing stakeholder needs and expectations for the main project objectives.

In their study, Yang *et al.* (2009) identified how the three main critical factors for the success of a project in stakeholder management were: "managing stakeholders with social responsibilities", "assessing stakeholder needs and constraints for the project" and "communicating with stakeholders in an appropriate and frequent manner".

For Olander (2007) it is important to carry out a stakeholder assessment and analysis, that is, an analysis of stakeholder management knowledge to determine the nature and impact of stakeholder influence, the likelihood of stakeholders exerting their influence, and the position in Regarding the project, this would lead to project improvements, especially in helping project managers to formalize a project management process.

The stakeholder theory has been used in the organizational and business environment to assist in the actions of managers, although some aspects of the theory, proposed in the last decades, need to be deepened. After the emergence of the theory and over time, they began to occupy a more relevant position in organizational activities (MAINARDES *et al.*, 2011).

The identification of stakeholders and the understanding of their degree of influence, needs and the balance of their requirements are essential for a successful project and this identification process is constant throughout the project life cycle (PMI, 2017).

The challenges in GS can be attributed to the great uncertainty and complexity in the project environment (BURTON; OBEL, 2003). In addition to professional knowledge and experience, the accuracy of project managers' assessment and judgment often decreases as the

project grows in size and complexity. The foundation for stakeholder identification and prioritization is also not strong due to the limited cognition of project managers.

Currently, all construction projects take place in a context where stakeholders play an important role in carrying out the tasks. Often, the project is sensitive to actions and decisions taken by the project. Where project stakeholders may include customers, end users, contractors, consultants, unions, line organization, public authorities, financial institutions, insurance companies, controlling organizations, media, third parties and competitors.

Within this context, in the last decades several studies were carried out with the objective of analyzing the role of stakeholders in project management, it is a theme under constant evaluation in the areas of engineering, civil construction and architecture, Table 1 shows the synthesis of the articles that based the cross-analysis, detailed in chapter 5.

Table 1 - Cross content analysis of the most cited publications in the literature

Approach	Author	Article summary
Value for stakeholder	Chen Y. <i>et al.</i> (2010)	It demonstrates the US industry's emphasis on building method selection and identifies sustainable performance criteria that aid in the selection of construction methods based on a "triple bottom line" and include "hard" and "soft" factors that can best capture the performance potential of construction methods, as opposed to the traditional iron triangle (cost, time and quality). The criteria identify that the ideal construction method should benefit all project stakeholders and require little information, usually available in the early stages of design, thus allowing for quick and easy data collection. It lays the groundwork for automated tools to help with design-level decisions regarding prefabrication strategies facilitating the realization of a healthy built environment and therefore a greater likelihood of sustainable construction.
Value for stakeholder	Qi G.Y. <i>et al.</i> (2010)	It studies the influence of managerial, environmental and governmental concerns through regulations and stakeholder pressures on the adoption of ecological construction practices from the perspective of contractors. Management concerns and governmental regulatory pressures are the two most important driving forces for its adoption. However, pressures from project stakeholders do not have a very significant effect on green building practices. The results highlight the importance of the manager's personal value and belief to how they consider environmental issues. The greater importance given to environmental problems by managers, the more environmentally friendly the building practices that companies tend to adopt. Thus, managerial concerns and government regulatory pressures should be used as two essential and complementary elements in the effective promotion and decision-making on the adoption of environmental innovation practices primarily for implementation at all levels.
Value for stakeholder	Shen L. <i>et al.</i> (2010)	Discusses the main challenges of carrying out the feasibility study project for the practice of sustainable construction with reference to the construction industry. The main results indicate that the economic factors are considered more than the social ones and that the environmental attributes. For the most part, some social and environmental factors are limited or not considered among the projects surveyed. There is a need to change the traditional approach of the project feasibility study to a new approach encompassing the principles of sustainable development, which includes, in addition to economic, social factors and

		environmental performance attributes. The performance of these attributes must be evaluated when carrying out the project's feasibility, considering the principles of sustainable development. In recommendation, implementing the new approach calls for the actions and participation of all project stakeholders, including government, customers, architects, engineering consultants, contractors, and suppliers.
stakeholder indicator	Rashvand, P. <i>et al.</i> (2014)	The importance of identifying successful criteria for measuring performance cannot be limited to meeting traditional criteria alone. Satisfaction is a subjective and critical measure of stakeholder performance, but it is rarely used as a criterion for measuring project performance. Expectation and perception are the two common critical customer satisfaction criteria that must be considered.
stakeholder indicator	Nguyen L. <i>et al.</i> (2004)	It identifies the success factors for large construction projects grouped into categories: comfort, competence, commitment and communication. Among 20 success factors surveyed, they were identified as: (1) competent project manager; (2) adequate funding through project completion; (3) multidisciplinary project team; (4) commitment to the project; and (5) availability of resources, demonstrating that people play a decisive role in the success or failure of a project.
stakeholder indicator	Olander S. (2007)	The analysis consists of a stakeholder impact index to determine the nature and impact of their influence, the likelihood that they will exert their influence, and the position of each stakeholder in relation to the project - are they proponents or adversaries? Stakeholder Impact Indices can help project managers formalize a management process, as a planning tool, and can be used proactively in structuring stakeholders and their potential impact on the project. And, as an evaluation tool, to evaluate the management process during the project and after its conclusion. It is important to accompany each stakeholder during the management process, because its impact is dynamic and changes over time.
stakeholder indicator	Eadie R. (2013)	Substantial impacts were observed through the implementation of BIM and can be achieved at all stages of the construction process, key performance indicators currently used for BIM were presented, and the results illustrate the lack of experience and training in its use.
stakeholder indicator	Yuan J. (2009)	Research shows that the objectives of quality, cost, time and services provided by PPPs have evident differences in the objectives of public sector budget constraints, risks, revenues and guarantees. A conceptual framework of indicators (KPIs) is established to assess the performance of PPP projects.
stakeholder indicator	Shen Q. (2003)	Identifies and ranks critical success factors in value management studies according to their importance, as measured by experts. The results reveal that the team, customer, and other related departments have a significant influence on success, and that they require a concerted effort from all parties involved. The results of the factor analysis indicate that the adequate preparation of team members is a prerequisite for carrying out a value study, and when assembling a team, the professional's level of experience must be considered and the team must be sufficiently multidisciplinary.

Source: From the authors.

3. METHODOLOGICAL PROCEDURES

3.1 Study object

To accomplish the objective proposed for this work, a research was structured that includes bibliometric and network techniques, as well as content analysis of the main publications.

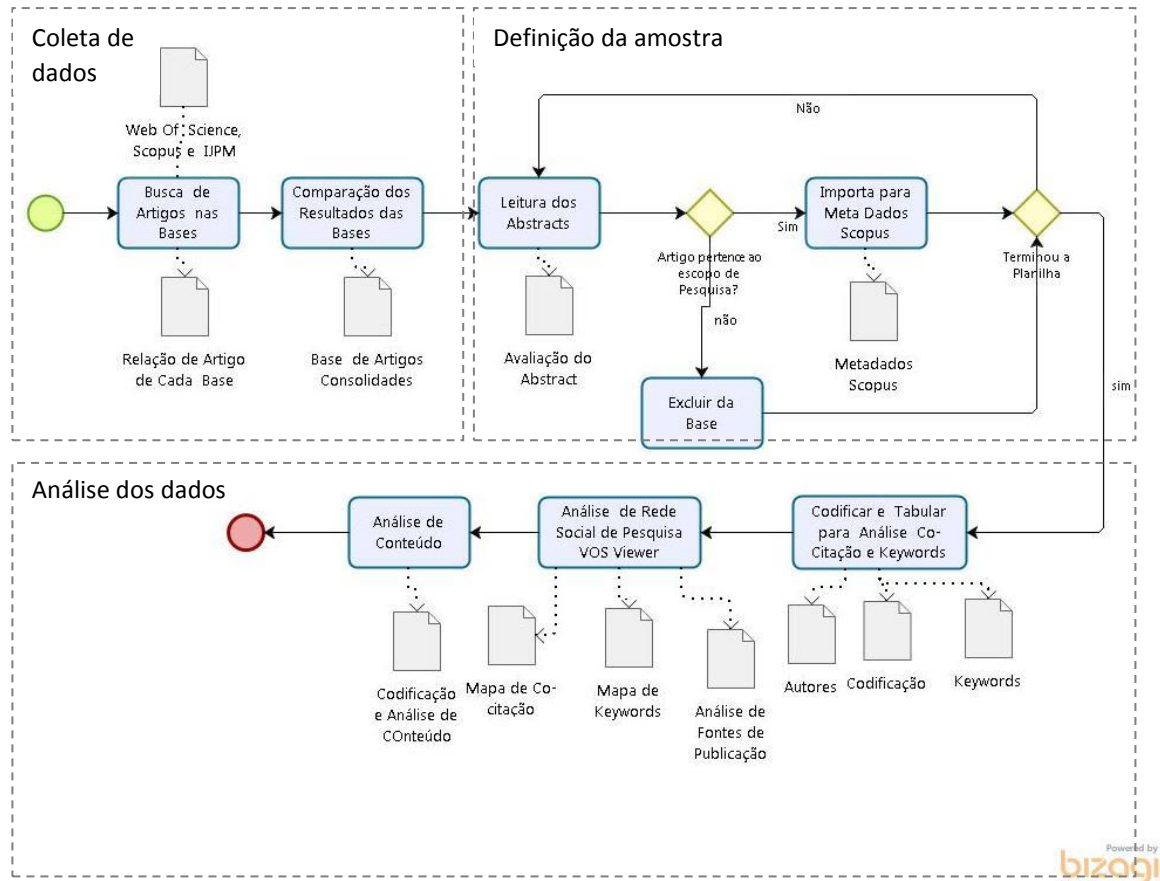
Bibliometrics is a quantitative study of scientific publications for statistical purposes, whose methods allow the description, evaluation and monitoring of scientific and technological research in a given area (GAUTHIER, 1998). From citation and co-citation analyzes used as a proxy of impact in the academic community, it is possible to establish trends in terms of the number of publications and citations over time, the main authors and works (DIODATO, 1994; NEELY, 2005).

In the content analysis technique (BARBIN, 2000) the coding and analysis of the main research themes was used. The VOS Viewer software was used for data processing and analysis.

In order to guide the research, and to raise and discuss which processes, methodologies, methods, techniques and tools of stakeholder management in construction projects have been used, the research questions (QP) were formulated: (QP1) What are the central themes of stakeholder management in construction projects? (QP2) What is the relationship between the type of stakeholder with value and with project performance indicators? The analysis script that guides the development of bibliometrics is represented in Figure 1, data analysis was performed in three stages.

The methodology utilized was bibliometric and network research, as well as content analysis of the key publications, as represented in Figure 1.

Figure 1 - Bibliometric analysis method.



Source: Prepared by the Authors.

3.2 Data collection procedures

After defining the research question, the next step was to establish the terms to compose the search to be carried out on the basis of the ISI Web of Science, SCOPUS and IJPM.

In the first step, the primary data of the sample were treated and grouped by year of publication, name of the publication source, number of citations, among others. Since the database itself provides the information necessary for such analyzes in a reasonable way, its execution was possible through processing in electronic spreadsheets.

The search terms were selected from the research questions to efficiently filter the works that were able to answer the research questions, which are: “Project Management”, “Stakeholder”, “Construction”. In the search strings, the AND operator was used between the

keywords “Project Management”, “Stakeholder”, “Construction” and the areas of civil engineering (civil engineering), construction or technology were used as selection criteria for publications in Scopus. construction (Construction Building Technology) and architecture (Architecture) and in WOS the engineering area (Engineering), being for both only works published in English. And the filters used in the search in relation to the types of documents were “Article” and “Reviews” and the OR operator was used in the composition of the terms.

In the sample definition step, a master spreadsheet was generated with all the search bases where 333 articles were found, from which the 6 duplicate publications between the bases were excluded. From this consolidated base, the analysis and selection of publications that are related to the purpose of this research was carried out, evaluating the abstracts to confirm the adherence of the publications with the purpose of the work.

In this way, it was verified that the publications that dealt with the theme referring to the research question were added to the metadata in the Scopus format. As a result of this treatment work, the resulting sample for analysis now had 318 articles in the final sample to perform the analyses.

3.3 Data analysis procedures

The bibliometric analysis includes the year of publications, main sources of publications, impact factor, citation and citation networks and keywords Next, the content analysis of the 10 articles identified as the most cited is carried out.

After coding and tabulation for co-citation analysis and keywords, the data were entered into the VOS Viewer, in order to generate statistical data and graphs for analysis. In this way, it was possible to identify possible clusters of related areas and draw conclusions from the results. Through these results, the connection graphs between the sample units where it is possible to identify the most relevant publications and how they interrelate. For that, citation networks, co-citations and keywords were used. The centrality and intermediation indices were calculated to support the interpretation of the resulting networks.

The last stage of data processing is based on the content analysis of the 10 articles in the sample, identified as the most cited. It is evident that these subjects are significantly intertwined, but an effort was made to identify the predominant pillar of each article. Thus, conceptual constructs and diagrams presented in the articles are discussed.

Also at this stage, the variable coding scheme was defined for the bibliometric analysis, for this a variable coding scheme was defined that would contribute to the answer to the research question presented in Table 2.

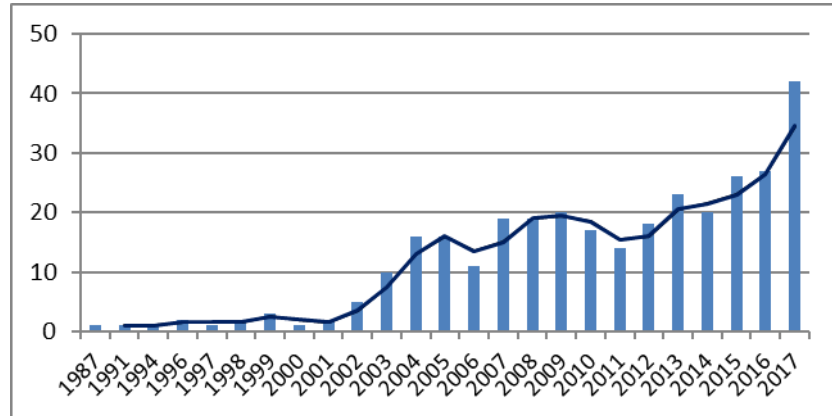
The coding scheme that was used to classify the articles for analysis purposes was: research method (T1) according to (FRANCO *et al.*, 2017); project type (T2) as per (YANG *et al.* 2015) (ZHANG *et al.*, 2016); stakeholder classification (T3) according to (ZHANG *et al.*, 2016); values (T4) as per (ZHANG *et al.*, 2016) and (RASHVAND *et al.*, 2014); project management themes (T5) according to (MOK *et al.*, 2015); types of key stakeholders (T6), according to (XIA *et al.*, 2017); and, according to stakeholder management indicators (OPPONG *et al.*, 2017).

4. RESULTS

4.1 Evolution of publications and main publication sources

The first publication, which addresses the topic studied, was in 1987, this article deals with the definitions of quality that are reviewed and their perception of the point of view of the stakeholders in a project, demonstrating the need for a cooperative effort between all team members (SANDBERG, 1987), it appears, therefore, that the topic has been worked on for some decades, and that the number of publications gradually increased in the following years (1991 to 2005). And, soon after, there was a decrease in 2006, the theme gains strength again in 2007, as shown in Figure 2. Showing a significant increase from 2016 to 2017 (from 27 to 42 published articles), this result illustrates that the theme “stakeholders” is on the rise in terms of research.

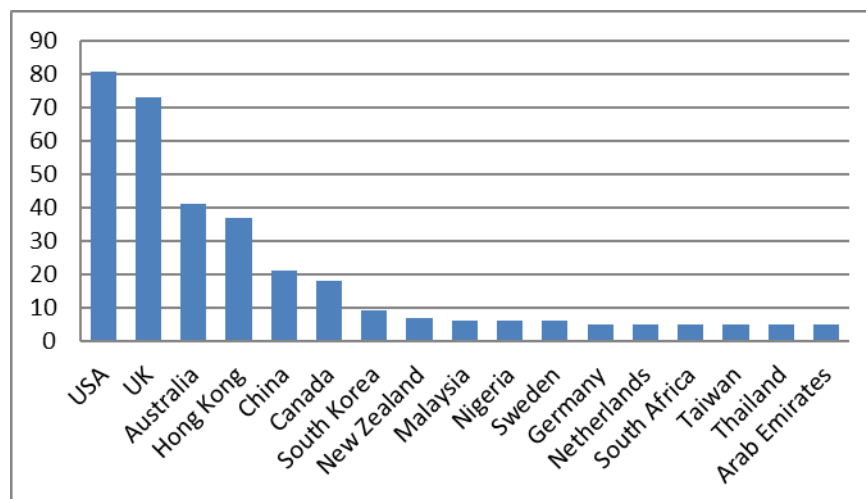
Figure 2 - Evolution of Publications.



Source: Prepared by the Authors.

As for the number of publications per country, the USA has the largest number of publications (81 publications, that is, 25.47% of the total), followed by the United Kingdom with 73 publications (22.95% of the total publications). Followed by Australia, Hong Kong, China and Canada (41, 37, 21 and 18 publications respectively), as shown in Figure 3. Brazil, on the other hand, appears with only 1 publication found, demonstrating that the country has contributed little in publications on the subject internationally. And in Figure 4 it is possible to observe the citation network by country of origin of the affiliation, where the USA, United Kingdom, Australia and Hong Kong appear again in prominence, it is also possible to observe that their respective “clusters” are identified by different colors.

Figure 3 - Distribution of Publications by Country Graph.



Source: Prepared by the Authors.

Figure 4 - Citation network by country of affiliation origin



Source: Prepared by the Authors.

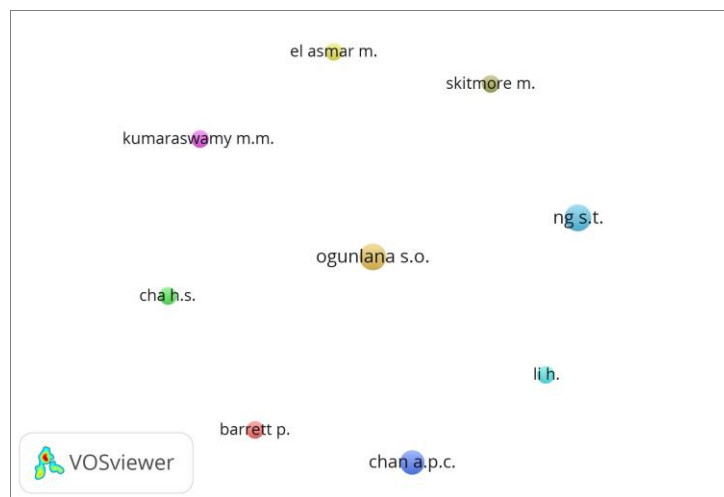
As for the main sources of publications, the main one is Construction Management and Economics with 52 documents, followed by Engineering, Construction and Architectural with 25 documents and the Journal of Management in Engineering with 23 related to the researched topic.

The most cited papers are: From client to project stakeholders: A stakeholder mapping approach. (NEWCOMBE R.; 2003) in Construction Management and Economics, with 130 citations, which deals with contemporary management theory and practice, the increase and role of stakeholders as the main actors of organizational dynamics are widely recognized and recorded. This article argues that the concept of customer that prevailed throughout the 20th century is now obsolete and is being replaced by the reality of project stakeholders. And, Critical criteria on client and customer satisfaction for the issue of performance measurement (RASHVAND; POORIA; ABD MAJID; MUHD ZAIMI, 2014) in the Journal of Management in Engineering, with 123 citations, which establishes customer satisfaction criteria as the main stakeholder in the construction project to the issue of performance measurement based on the analyzed data. From the metric analysis performed by the authors, the common factors of customer satisfaction that should be considered.

4.2 Citation, co-citation and keyword networks.

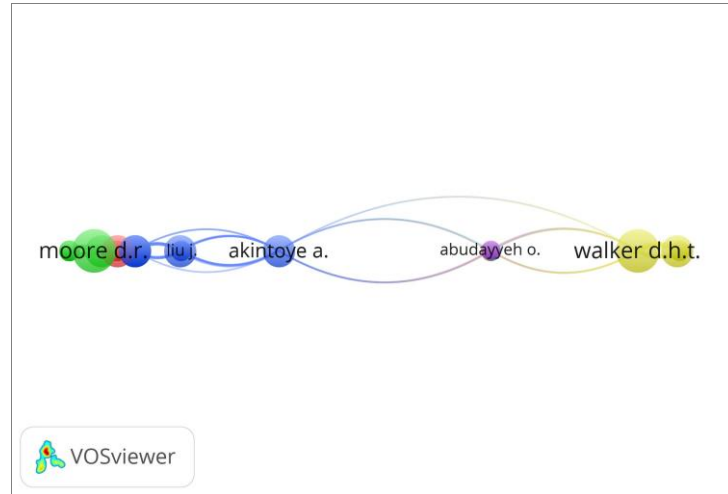
Figure 5 shows the authors who published the most articles of at least 4 cited per author: Ng S.T. (7 articles and 199 citations), Ogunlana S.O. (7 articles and 191 citations), Chan A.P.C. (6 articles and 174 citations), Kumaraswamy M.M. (4 articles and 169 citations), El Asmar M. (4 articles and 78 citations), Li H. (4 articles and 68 citations), Barrett P. (4 articles and 62 citations), Cha H.S. (4 articles and 57 citations), Skitmore M. (4 articles and 42 citations). And Figure 6 illustrates the co-citation network for the authors and it is also possible to identify the clusters through the colors.

Figure 5 - Author citation network



Source: Prepared by the Authors.

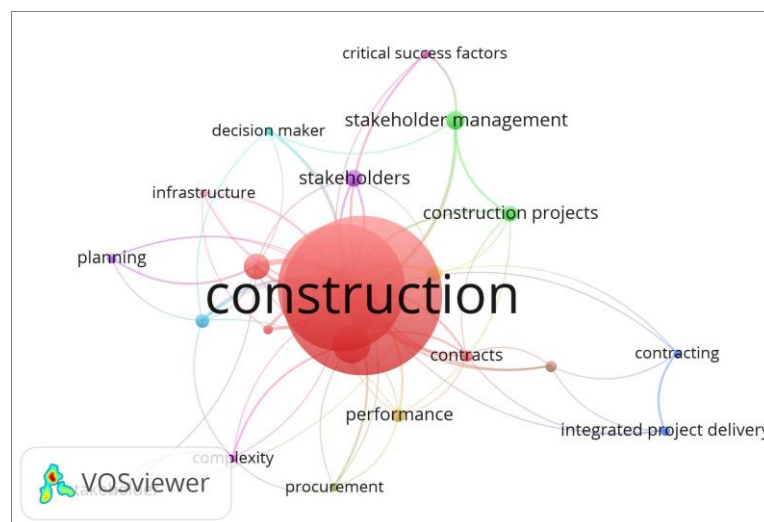
Figure 6 - Rede de co-citação por autor.



Source: Prepared by the Authors.

Figure 7 presents the result of the analysis of co-occurrence of keywords indexed by the authors, where 10 main clusters can be observed, with the one in red being the largest with 217 occurrences and involving searches related to: “ construction”, “project management”, “risk”, “sustainability”, “stakeholder management” and “stakeholders”, having a connection with “management communication”, “contracts”, “projects” and “performance”.

Figure 7 - Keyword citation network.



Source: Prepared by the Authors.

Table 2 presents the summary of the content analysis according to the coding scheme used. It is possible to observe that as for the research method (T1), although quite distributed, there was a predominance of survey (SU), while for the types of projects (T2), there was a salience of private projects (PR), and key stakeholders (T6) (Xia et al., 2017) the general contractors (GC) and subcontractors (SC) stood out.

The main themes (T5) dealt with, according to Mok *et al.* (2015), the mapping of stakeholder management processes (SMP) stands out. As for the value for Stakeholders (T4), as suggested by Zhang *et al.* (2016) and Rashvand *et al.* (2014), in the studied sample, the economic value (EV) predominated. Translated into stakeholder management indicators (T7) (OPPONG *et al.*, 2017) associated with stakeholder relational benefits (SRB), stakeholder support for the project (SSP) and success factors (SF). Table 2 presents the summary of content analysis according to the coding scheme used.

Table 2 - Results of the content analysis of the most cited publications.

T1	Research type	QTY	%
SU	Survey	4	40%
RL	Literature revision	3	30%
TC	Conceptual and theorist	2	20%
EM	Interviews	2	20%
EC	Case study	2	20%

T2	Project type (Yang et al., 2015) (Zhang et al., 2016)	QTY	%
PR	Privat	4	40%
BP	Building project	3	30%
PU	Public	3	30%
UP	Urban renewal project	2	20%
RB	Residential building	2	20%
IP	Infrastructure project	1	10%
CB	Commercial building	1	10%

T3	Identification e Classification Stakeholders (Zhang et al., 2016)	QTY	%
IS	Impacted	4	40%
RS	Responsible	0	0%

T4	Values Stakeholders (Zhang et al., 2016) (Rashvand et al., 2014)	QTY	%
EV	Economic value	3	30%
EV	Environmental value	2	20%
SV	Social value	2	20%
CS	Customer-satisfaction criteria	1	10%

T5	SM themes (Mok et al., 2015)	QTY	%
SMP	Stakeholder management process	8	80%
SII	Stakeholder interests and influences	4	40%
SAM	Stakeholder analysis methods	2	20%

T6	Key Stakeholders in General Construction Projects (Xia et al., 2017)	QTY	%
GC	General contractors	6	60%
SC	Subcontractors	6	60%
GV	Governments at all levels	3	30%
CL	Client	3	30%
OW	Owners	2	20%
CU	Consultative units (except for supervisory units)	2	20%
MES	Materials/equipment suppliers	1	10%
PA	Project/ designer architect	1	10%

T7	Stakeholder Management (SM) Indicators (Oppong et al., 2017)	QTY	%
SRB	Stakeholder relational benefits	4	40%
SSP	Stakeholder support of project	4	40%
SF	Success factors	4	40%
SLP	Sustainable lifecycle performance	2	20%
CM	Conflict mitigation	2	20%
TRR	Trust and respect in relationship	2	20%
CP	Cost performance	2	20%
PMS	Potential for marketplace success	2	20%
EC	Effective communication	2	20%
SE	Stakeholder empowerment	1	10%
MMR	Management monitoring and response	1	10%
BSD	Better service delivery	1	10%
URM	Uncertainty and risk mitigation	1	10%
ICA	Implementing collective agreements	1	10%
PC	Partnerships and collaborations	1	10%

Source: Prepared by the Authors.

5. DISCUSSION

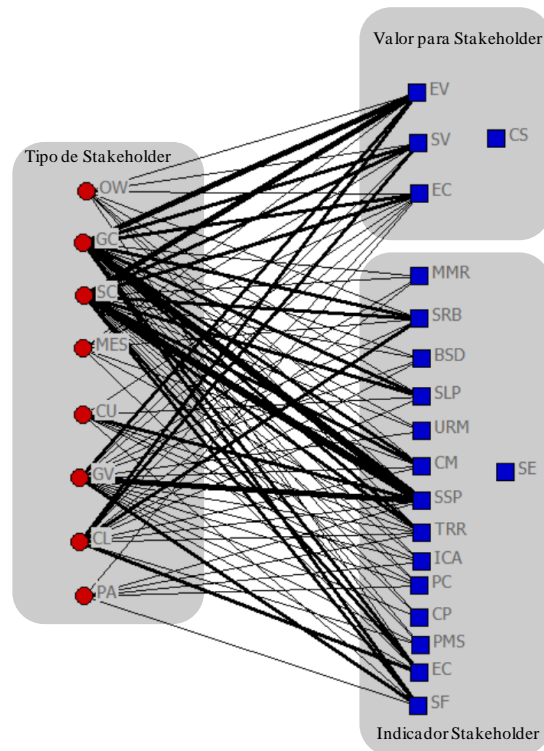
The development of this work was guided by two research questions (QPs). The answer to QP1 (What are the central themes of stakeholder management in construction projects?) which begins to take shape from the analysis of the evolution of publications, where the theme has been addressed for some time (since 1990) , and that the number of publications gradually increased, with a significant jump from 2016 to 2017 (from 27 to 42 articles published annually), this result shows that the topic stakeholders is on the rise with regard to published academic research.

The results also suggest that the topic stakeholders in the areas of engineering, civil construction and architecture has aroused increasing interest, as the curve of publications in relation to time still has an exponential average behavior. The citation network points to the United States and the United Kingdom as the centers that exert the greatest influence on the subject, and Brazil shows little to have contributed to publications on the subject internationally.

Through the results of the co-occurrence analysis of keywords indexed by the authors, it is clear that research related to stakeholder management in construction projects is closely linked to project management as a whole, sustainability, mitigation risks inherent to the sector, effective communication between all parties involved in the projects and especially the criteria for analyzing the performance and success of the project.

The content analysis carried out shows that the literature emphasizes the role of general contractors (GC) and subcontractors (SC), with emphasis on topics related to stakeholder management processes. The focus is on economic value (EC) and indicators associated with stakeholder relational benefits (SRB), stakeholder support for the project (SSP) and success factors (SF). Regarding QP2 (What is the relationship between stakeholder type, value and performance indicators?), the cross analysis of the codes revealed the most frequent relationships in the literature, as illustrated in Figure 8.

Figure 8 – Analysis: stakeholder type x value x indicators.



Source: Prepared by the Authors.

It is observed that the types of stakeholders most often related to environmental (EV) as well as social (SV) value, showing a “triple bottom line” (TBL) view related to general contractors (GC) and subcontractors (SC).), while the customer (CL) is more linked to social value (SV). As identified by Chen Y. *et al.* (2010) and Shen L. *et al.* (2010), who found construction methods based on a sustainable “triple bottom line” that can result in better performance potential, as opposed to the traditional iron triangle, and identified that in practice, economic factors are more considered than social and environmental factors. than the environmental ones. As for the indicator most related to stakeholder support for the project (SSP), in addition to GC and SC, governments at all levels (GV) stand out. Qi G.Y. *et al.* (2010) evidenced that managerial concerns and governmental regulatory pressures are the most important driving forces for the adoption of ecological construction practices from the perspective of contractors. And Olander S. (2007) did an index analysis for stakeholders seeking to determine the nature and impact of their influence.

6. CONCLUSION

This work contributes by providing an overview of the literature on stakeholder management in construction projects, with an in-depth analysis of the articles identified in the sample, and brings implications for the theory by demonstrating the central themes addressed in the literature, with emphasis mainly on works related to the economic value (EC), and it was possible to verify gaps in research that focus on a sustainable vision that incorporates social and environmental issues.

Through a systematic literature review (RSL), the research questions were answered, dimensioning the impact of the publications and their most influential authors, identifying trends of growth of interest in the subject historically, and as a consequence, listing the emerging research subjects in the application areas studied.

In addition, it has implications for practice, as the cross-analysis demonstrates the salience of general contractors (GC) and subcontractors (SC) as key stakeholders, deserving studies that give greater attention to project managers and sector organizations.

It becomes evident the need for further research so that they are able to explore the impacts on stakeholder management in construction projects and the relationship analysis of this study brings insights for future research. It is suggested that, in particular, the relationships between the types of stakeholders and the value attributed should be investigated in greater depth in new studies. In addition, the indicators also seem to be contingent upon the types of stakeholders, such as the indicator of stakeholder support for the project (SSP), which stands out for governments at all levels (GV), which could also serve as an analysis. of a new theme, relating indicators with the types of stakeholders.

Finally, it is worth highlighting the limitations of this research. First, the limited sample due to methodological choices, such as search terms and criteria for inclusion and exclusion of articles, as well as the subjectivity of the content analysis process.

References

BAI, L. et al. A Fuzzy Comprehensive Evaluation Model for Sustainability Risk Evaluation of PPP Projects. **Sustainability**, v. 9, n. 10, p. 1890, 2017.

BARBIN, L. **Análise de conteúdo**. Lisboa: Edições 70, 2000.

BOURNE, L. 2005. **Project relationship management and the stakeholder circle tm**. RMIT University, 2005. Disponível em: <http://www.stakeholdermanagement.com/Papers/P021_L_Bourne_Thesis.pdf>. Acesso em: 11 mar. 2016.

BURTON, R.; OBEL, B. **Strategic Organizational Diagnosis and Design: Developing Theory for Application**. Kluwer Academic Publisher, Boston, 2003.

CHEN, Y.; OKUDAN, G.E.; RILEY, D.R. Sustainable performance criteria for construction method selection in concrete buildings. **Automation in Construction**, v. 19, p. 235–244, 2010.

CHINYIO, E. A.; AKINTOYE, A. Practical approaches for engaging stakeholders: findings from the UK.” **Construction Management and Economics**, v.26, n.6, p. 591-599, 2008.

CLARKSON, M.B.E. A Stakeholder Framework for Analyzing and Evaluating Corporate Social Performance. **Academy of Management Review**, v.20, n.1, p. 92- 117, 1995. Disponível em: <http://www.jstor.org/stable/pdf/258888.pdf?_=1462241632476>. Acesso em: 05 nov. 2015.

DIODATO, V.P. **Dictionary of Bibliometrics**. Binghamton, NY: Haworth Press, 1994.

EADIE, R.; BROWNE, M.; ODEYINKA, H.; MCKEOWN, C.; MCNIFF, S. BIM Implementation throughout the UK Construction Project Lifecycle: An Analysis. **Automation in Construction**, v.36, p.145-151, 2013.

ELIAS, A.A.; CAVANA, R.Y.; JACKSON, L.S. Stakeholder analysis for R&D project management. **R&D Management**, v.32, p.301–310, 2002.

FREEMAN, R. E. **Strategic management: a stakeholder approach**. Boston: Pitman, 1984.

GAUTHIER, E. Bibliometric analysis of scientific and technological research: a user's guide to the methodology. Canada: **Science and Technology Redesign Project**, 1998.

JONES, T.; WICKS, A. Convergent stakeholder theory, **Academy of Management Review**, v. 24, n. 2, p. 206-21, 1999.

KARLSEN, J.T. 2002. Project stakeholder management. **Engineering Management Journal**, v.14, n. 4, p. 19–24, 2002.

LI, T. H.; NG, S. T.; SKITMORE, M. Modeling multistakeholder multi-objective decisions during public participation in major infrastructure and construction projects: A decision rule approach. **Journal of Construction Engineering and Management**, v. 142, n. 3, 2016.

LOOSEMORE, M. Managing project risks. In: Pryke, S., Smyth, H. (Eds.). **The Management of Complex Projects: A Relationship Approach**. Wiley-Blackwell, UK, p. 187–204, 2006.

MAINARDES, E. W.; ALVES, H.; RAPOSO, M.; DOMINGUES, M. J. C. DE S. 2011. Um novo modelo de classificação de stakeholders. In: ENCONTRO DE ESTUDOS EM ESTRATÉGIA, 5. **Anais ...** Porto Alegre. Mapa Estratégico da Educação Superior. Disponível em: < <http://www.sigmees.com/files/evento-2011-13.PDF>>. Acesso em: 05 nov. 2015.

MOK, KA YAN; SHEN, GEOFFREY QIPING; YANG, JING. Stakeholder management studies in mega construction projects: A review and future directions. **International Journal of Project Management**, v.33, n.2, p. 446-457, 2015.

NEELY, A. The evolution of performance measurement research: developments in the last decade and a research agenda for the next. **International Journal of Operations & Production Management**, v.25, n.12, p. 1264-1277, 2005.

NEWCOMBE, R. From client to project stakeholders: A stakeholder mapping approach. **Construction Management and Economics**, v. 21, n. 8, p. 841 – 848, 2003.

NGUYEN, L.; OGUNLANA, S.; THI XUAN LAN, D. A study on project success factors in large construction projects in Vietnam. Engineering, **Construction and Architectural Management**, v.11, p. 404-413, 2004.

OLANDER, S. Stakeholder impact analysis in construction project management. **Construction Management and Economics**, v. 25, p. 277–287, 2007.

OLANDER, S.; LANDIN, A. Evaluation of stakeholder influence in the implementation of construction projects. **International Journal of Project Management**, v. 23, n.4, p. 321 – 328, 2005.

OLANDER, S.; LANDIN, A. A comparative study of factors affecting the external stakeholder management process. **Construction management and economics**, v. 26, n. 6, p. 553-561, 2008.

OPPONG, G. D.; CHAN, ALBERT P. C.; DANSOH, AYIREBI. A review of stakeholder management performance attributes in construction projects. **International Journal of Project Management**, v. 35, n. 6, p. 1037-1051, 2017.

PMBOK, G. 2017. A Guide to the Project Management Body of Knowledge (PMBOK® Guide) (6th ed.). **Project Management Institute**, Pennsylvania: Project Management Institute.

QI, G.Y.; SHEN, L.Y.; ZENG, S.X.; JORGE, O.J. The drivers for contractors green innovation: an industry perspective. **Journal Cleaning Production**, v. 18, n.14, p. 1358–1365, 2010.

RASHVAND, P.; MAJID, M.Z.A.; MUHD ZAIMI. Critical criteria on client and customer satisfaction for the issue of performance measurement. **Journal Management Engineering**, v.30, n.1, p. 10–18, 2014.

RASHVAND, P., MAJID, M. Z. A., PINTO, J. K. Contractor management performance evaluation model at prequalification stage. **Expert Systems with Applications**, v. 42, n.12, p. 5087-5101, 2015.

SANDBERG, H.R. Quality-missing ingredient of engineering engagements. **Journal of Professional Issues in Engineering**, v.113, n. 3, 1987.

SAVAGE, G. T.; NIX, T. W.; WHITEHEAD, C. J.; BLAIR, J. D. 1991. Strategies for assessing and managing organizational stakeholders. **Academy of Management Executive**, v. 5, n.2, p. 61-75. Disponível em: < https://www.jstor.org/stable/4165008?seq=1#page_scan_tab_contents>. Acesso em: 04 out. 2015.

SHEN, L.Y.; TAM, V.W.; TAM, L., JI, Y.B. Project feasibility study: The key to successful implementation of sustainable and socially responsible construction management practice. **Journal of Cleaner Production**, v. 18, n.3, p. 254-259, 2010.

SHEN, Q.; LIU, G. Critical success factors for value management studies in construction. **Journal of Construction Engineering and Management**, v. 129, n.5, 2003.

TURNER, J. R. **The handbook of project-based management: Leading strategic change in organizations** (3rd ed.). London, UK: McGraw-Hill. 2009.

VARGAS, R. **Manual Prático do Plano de Projeto – Utilizando o PMBOK Guide – 4th Ed.** – Brasport – 4ª Edição, 2009.

WANG, X; HUANG, J. The relationships between key stakeholders project performance and project success: Performance of Chinese construction supervising engineers. **International Journal Project Management**, v. 24, n.3, p. 253–260, 2006.

XIA, NINI; ZHONG, RUI; WU, CHUNLIN; et al. Assessment of Stakeholder-Related Risks in Construction Projects: Integrated Analyses of Risk Attributes and Stakeholder Influences. 2017. **Journal of Construction Engineering and Management**, v. 143, n. 8, 2017.

YANG, J., SHEN, G.Q., BOURNE, L., HO, C.M.F., XUE, X. A typology of operational approaches for stakeholder analysis and engagement. **Construction Management Economy**, v. 29, p.145–162, 2011a.

YANG, J.; SHEN, G.Q.; DREW, D.S.; HO, M.F. Critical success factors for stakeholder management: construction practitioners' perspectives. **J. Construction Management Economy**, v. 136, p.778–786, 2010.

YANG, J., SHEN, G.Q., HO, M., DREW, D.S., XUE, X. Stakeholder management in construction: an empirical study to address research gaps in previous studies. **International Journal Project Management**, v. 29, p. 900–910, 2011b.

YANG, J., SHEN, Q., HO, M. An overview of previous studies in stakeholder management and its implications for the construction industry. **Journal of Facilities Management**, v. 7, p. 159 – 175, 2009.

YANG, J.; SHEN, G. Q.; HO, M.; DREW, D. S.; CHAN, A. P. C. Exploring critical success factors for stakeholder management in construction projects. **Journal of Civil Engineering and Management**, v. 15, n. 4, p. 337–348, 2009. Disponível em: <<http://web.nchu.edu.tw/pweb/users/arborfish/lesson/8497.pdf>>. Acesso em: 25 set. 2015.

YANG, R. J., SHEN, G. Q. P. Framework for stakeholder management in construction projects. **Journal Management Engineering**, v.31, n. 4, p. 04014064, 2014.

YANG, R.J., ZOU, P.X. Stakeholder-associated risks and their interactions in complex green building projects: a social network model. **Building and Environment**, v. 73, p.208–222, 2014.

YANG, R. J.; SHEN, G. Q. P. Framework for Stakeholder Management in Construction Projects. 2015. **Journal of Management in Engineering**, v. 31, n. 4, 2015.

YUAN, J.; ZENG, A.Y.; SKIBNIEWSKI, M.J.; LI, Q. Selection of performance objectives and key performance indicators in public–private partnership projects to achieve value for money. **Construction Management and Economics**, v.27, n. 03, 2009

YUAN Y, WANG ZL, LIU JN, TAN ZX, CHEN H, WANG S. Experimental research on runoff-induced sediment discharge processes of rill on loess hill slope. **Soil and Water Conservation**, v. 24, n. 5, p. 88-91, 2010.

ZHANG, LU; EL-GOHARY, NORA M. Discovering Stakeholder Values for Axiology-Based Value Analysis of Building Projects. **Journal of Construction Engineering and Management**, v. 142, n. 4, 2016.

Appendix A – Content analysis of the most cited articles

Código	Referência	T1	T2	T3	T4	T5	T6	T7
S1	Newcombe (2003)	TC, RL				SMP		
S2	Rashvand et al. (2014)	TC, RL			CS	SII, SMP		SE, SRB
S3	Nguyen et al. (2004)	EM	UP, IP, BP, PU, PR			SMP	OW, GC, SC, CU	SF
S4	Chen et al. (2010)	SU	BP		EV, SV, EC	SAM	OW, GC, SC, MÊS, CL	SLP, SSP
S5	Olander (2007)	EC	UP, RB	IS		SII, SMP	GC, SC, CL	SRB, CM, TRR, EC
S6	Qi et al. (2010)	EM	PR	IS	EV	SMP	GC, SC, GV	SLP
S7	Shen et al. (2010)	EC	RB, CB, PU, PR	IS	EV, SV, EC	SII, SMP	GC, SC, GV, CL	URM, CM, SSP, CP, SF
S8	Eadie et al. (2013)	SU	BP			SII	GC, SC, GV, CU, PA	MMR, SRB, BSD, SSP, PMS
S9	Yuan et al. (2009)	RL, SU	PU, PR		EC	SMP		SSP, TRR, ICA, PC, EC, SF
S10	Shen e Liu (2003)	SU		IS	EC	SMP, SAM		SRB, CP, PMS, SF