Available online at www.sciencedirect.com

ScienceDirect

International Journal of Project Management 35 (2017) 1037–1051

International Journal of Project Management

www.elsevier.com/locate/ijproman

A review of stakeholder management performance attributes in construction projects

Goodenough D. Oppong [a,*], Albert P.C. Chan [a], Ayirebi Dansoh [b]

[a] The Hong Kong Polytechnic University, Department of Building and Real Estate, 11 Yuk Choi Road, Hung Hom, Kowloon, Hong Kong
[b] Kwame Nkrumah University of Science and Technology, The Department of Building Technology, Kumasi, Ghana

Received 3 September 2016; received in revised form 1 March 2017; accepted 26 April 2017
Available online 24 May 2017

Abstract

Construction stakeholder management (SM) engages a lot of attention in project management research domain and industry. This is because construction SM has attained poor industrial feat in the past decades. Hitherto, there is lack of an elaborative tool to manage SM performance in construction projects. Hence, this review fills the gap by presenting a conceptual model of SM performance attributes comprising performance objectives (POs), success factors (SFs) and performance indicators (PIs) that could be engaged to manage (i.e. benchmark, enhance, monitor, and measure) the performance of construction SM. The outcome will benefit professionals and researchers due to the flexibility of selecting a number of attributes that fit the nature, type and stage of projects in order to ensure effective management. It therefore provides a better means of measuring project success in the industry by objectively and subjectively evaluating the level of stakeholder and organisational satisfaction in construction project delivery.

Keywords: Stakeholders; Stakeholder management performance; Stakeholder and organisational satisfaction; Performance attributes; Construction projects; Review

1. Introduction

The essence of stakeholders in construction project planning and implementation has been immensely acknowledged in research (e.g. Olander and Landin, 2005; Yang and Shen, 2015). The stakeholders are referred to as entities, having stakes in a project, or who can affect or be affected by project that the focal organisation implements in the fulfilment of its objectives (Freeman, 1984; Olander, 2007). As a result of the diversity in terms of profession, culture, educational level, gender, and spatial distance from project, these stakeholders often present a wide range of interests which are to be met through project delivery. These stakeholders can therefore have substantial influence on projects outcomes. Project SM is expected to provide the project managers (PMs) with enough support to aid the selection of realistic options that will maximize the ultimate value of the project to the stakeholders (Cleland, 1999).

SM has attained great success in other sectors such as manufacturing, but on the contrary, the construction sector has a poor record (Loosemore, 2006). Specifically, there is lack of well-functioning strategies, plans, methods, or process that PMs can engage. The outcome of this is the use of random SM approach in the construction sector (Yang and Shen, 2015). This eventually ends up in project failure, which is a common phenomenon in the construction industry.

Diverse models have been developed for the measurement of the overall success of construction projects (e.g. Mladenovic et al., 2013). On the contrary, there is lack of a comprehensive system for managing the performance of construction SM. Considerably, Yang et al. (2010) developed a set of 15 critical success factors (CSFs) to be applied by PMs to ensure that

* Corresponding author.
E-mail addresses: goodenough.de.oppong@connect.polyu.hk (G.D. Oppong), albert.chan@polyu.edu.hk (A.P.C. Chan), adansoh@consultant.com (A. Dansoh).

http://dx.doi.org/10.1016/j.ijproman.2017.04.015
0263-7863/00/

stakeholders are effectively managed. However, these variables are inadequate for enhancing and measuring performance. For instance, CSFs only represent *what should be done* by PMs, but not *what set targets to meet* or *how indicators should be used to measure performance*. Thus, there will be the need to also use indicators to realize if the level of CSFs engaged is producing the desired results. This review is therefore focused on developing a conceptual model of SM performance attributes comprising performance objectives (POs), success factors (SFs) and performance indicators (PIs) that could be engaged to manage (i.e. benchmark, enhance, monitor, and measure) the performance of construction SM.

In the next section, discussions on stakeholder theory and the concept of stakeholder satisfaction in construction projects are presented. After the methodology, the POs, SFs and PIs of construction SM are also discussed. Then, discussion on the performance model is presented. Finally, conclusions are drawn on the results, and the practical implications are also described.

2. Stakeholder theory in brief

Freeman (1984) acknowledged that the concept of stakeholders emerged through an international memorandum in 1963 at the Stanford Research Institute. In a SM literature map, Elias et al. (2002) revealed that the stakeholder notion has since then been presented in four main domains: corporate planning, systems theory, corporate social responsibility and organisational theory. In his landmark strategic management book, Freeman (1984) defined stakeholders as "*those groups who can affect or is affected by the achievement of the firm's objectives*" (p. 49). This book is widely acknowledged for its groundbreaking effort in SM research and globally cited by many. Afterwards, new perspectives came to popularity where SM theory is discussed under descriptive, instrumental and normative approaches (Jones, 1995), stakeholder environment is viewed as dynamic rather than static (Freeman, 1984), and also stakeholder salience and typology has been explored (Mitchell et al., 1997). Subsequently, more empirical investigations in the construction field have been conducted based on the underlying theory and models (e.g. Olander and Landin, 2005, 2008; Yang et al., 2010, 2011).

3. Stakeholder satisfaction in construction projects

Stakeholder satisfaction can be described as the fulfilment of stakeholders' pre-project expectations in the actual performance which are measurable at different project stages (Li et al., 2013). In construction projects, stakeholder satisfaction has gained prominence in success measurement as a complement to the traditional determinants of cost, quality and time (Davis, 2016). This is important because most stakeholder groups occasionally attempt to influence the implementation of construction projects in line with their expectations (Olander and Landin, 2008). Leung et al. (2004) suggested that stakeholder satisfaction can be evaluated by setting an index system which comprises different critical satisfaction factors. They further stated that stakeholder satisfaction in construction projects is contingent on management mechanisms such as communication, participation and commitment, instead of fulfilling specific goals (e.g. time, cost and quality). Generally, SM performance is reflected in the satisfaction that both the organisations and their stakeholders derive from project delivery.

Hitherto, diverse perspectives of what should be regarded as "construction project success" exist. In a considerable number of cases, the users become so satisfied with the project outcome to the extent that the inadequacies of the completion criterion are of little concern (Lim and Mohamed, 1999). For instance, the Sydney Opera House and Thames Barrier were considered successful by a section of stakeholders despite exceeding time and cost requirements. Contrarily, some stakeholders were dissatisfied because of operational deficiencies of the Heathrow Terminal 5 project even though time, cost and quality requirements were met (Morris and Hough, 1987; Davis, 2016). These examples amongst many indicate the extent of disagreeing perceptions of different stakeholder groups regarding success in construction project delivery. However, mutual stakeholder satisfaction has been shown to be a crucial indicator of construction project success.

4. Methodology

4.1. Retrieval of articles

The methodology of Yang et al. (2009) is similarly adopted in searching and selecting appropriate research outputs for this review. The research process is shown in the Fig. 1. The search was conducted initially in 8 top-tier journals that focus on publishing construction related papers. Seven of them have been empirically ranked by Chau (1997) to be amongst the top quality construction journals, and are therefore used as basis in many construction and engineering management research (e.g. Chan et al., 2004). These journals are; Construction Management and Economics, Journal of Construction Engineering and Management, Engineering Construction and Architectural Management, Journal of Management in Engineering, International Journal of Project Management, Automation in Construction, and Building Research and Information. In addition, the Project Management Journal was selected because of the high number of construction related papers that are published in it. Asides the journals, popular search engines were also selected to complement the search process. The search engines selected were Google Scholar, ABI/INFORM Complete via ProQuest, Scopus, and Web of Science. These selected domains have been widely applied in similar reviews (e.g. Yang et al., 2009). This ensured that adequate research outputs were captured for the review given that the individual databases have imposed limitations in returning publications from search.

4.2. Selection of appropriate articles

Even though there are other numerous interchangeable search terms identified in literature including *major participants* and *key players* (Littau et al., 2010), the basic search terms adopted to retrieve the research publications were *"stakeholder", "project participants", and "project environment"* (Yang et al., 2009). Some publications such as Leung et al. (2004) dealt extensively on

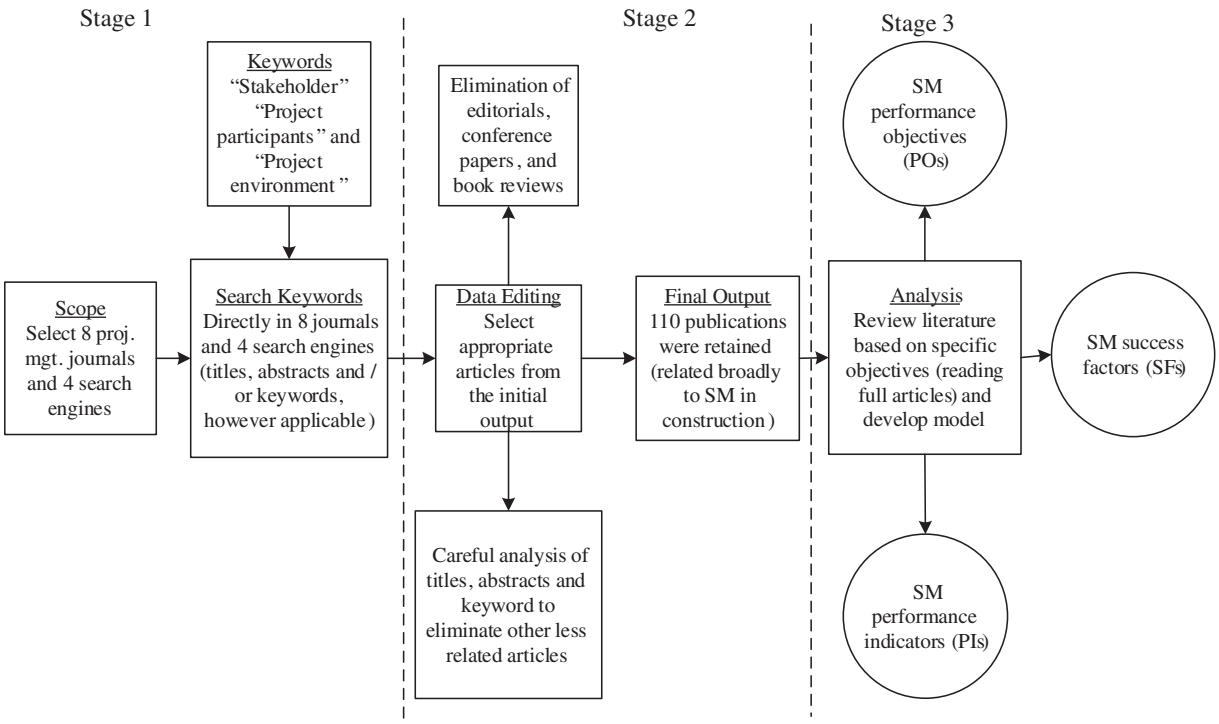

Fig. 1. Research process.

stakeholder theory (i.e. measuring project participant satisfaction) without mentioning *stakeholder* in the article. Thus, searching only *stakeholder* would not possibly draw such important articles. Youker (1992) also defined *project environment* in line with the Random House Dictionary to be "the aggregate of surrounding things, conditions or influences". Thus, *project environment* also sums up SM issues related to construction projects. For these reasons, the three basic search terms, which are broad in nature, were similarly adopted for the retrieval of publications in this study. Inexhaustible narrow search terms such as performance, indicators, objectives, success factors etc. were avoided in the search. For instance, Yang et al. (2009) also used factors that are considered "important" as CSF for SM in construction projects. The broad approach, which to a large extent could also cover the outcome of the narrow approach, is regarded important for this study since three different sets of performance attributes are reviewed. The ideas were to start from the broader perspective and then narrow it down to the specific research objectives.

The basic terms were searched in the 8 journals and Google Scholar database to retrieve publications. The titles and previews of the outcome of Google Scholar were briefly reviewed before making decision on their inclusion. Moreover, the adopted search terms are generic in nature and could return documents from other fields, hence, further restriction was applied in the flexible and larger databases. Specifically, the search in Scopus, Web of Science, and ABI/INFORM Complete via ProQuest was further confined to "construction projects", "infrastructure projects", or "civil engineering projects", and returned 367, 79 and 43 documents respectively. The time frame selected for the search is 1984 to March ending of 2016 due to the major milestone evolution that Freeman's 1984 landmark book brought to SM research (Mok et al., 2015). The adopted search approach allowed for a broader coverage on general stakeholder theory in construction projects (Yang et al., 2009). Since the study focuses on the performance attributes of construction SM, the review of general SM literature is also very vital in identifying the attributes of SM performance (Yew Wong and Aspinwall, 2005).

Some returned publications were duplications, irrelevant or less relevant for the purpose of this study, and called for a filtering process. Upon initially eliminating the duplications, a total of 508 documents were retained as a starting point. At the next stage, editorials, conference papers and book reviews were not considered to be useful for this study even though they contained some valuable information (Littau et al., 2010), and were thus eliminated. After this process, a total of 355 documents remained. Finally, the titles, abstracts and keywords of the remaining publications were reviewed briefly. Also, full documents were scanned where the decisions could not be made on the titles, abstracts and keywords. The reasons for scanning some full documents are that: (1) some of the selected journals such as the Project Management Journal only introduced the abstracts and keywords in 1997 even though numerous publications preceded this time (Littau et al., 2010); and (2) some of the publications were also books (chapters) and theses, which called for extensive scanning. The objective for the selection of specific publication is the substantial contribution to stakeholder knowledge development in the construction research. After the whole elimination process, a total of 110 documents were retained for the review. The retained publications comprise journal papers, books (chapters) and doctoral theses, and span diverse topics including

success factors, stakeholder engagement, stakeholder analysis, stakeholder satisfaction, public participation etc. The distribution of the publications is indicated in the Table 1.

4.3. Getting the results

In order to identify the lists of performance attributes, content analysis was conducted on the literature by using the open coding method (Cavanagh, 1997). Portions of literature that related to the performance attributes context were first extracted, and the factors identified and regrouped based on similarities of themes/meaning. Thus, the factors were established from general SM literature or "the work of those who have addressed a particular factor in detail" (Yew Wong and Aspinwall, 2005, p. 66). Despite the different terminologies used by different researchers to represent these factors, and the mixed extent of emphasis and coverage in literature, they could be denoted by generic themes (Yew Wong and Aspinwall, 2005). This can be demonstrated in a factor such as "Build robust, trustworthy and communicative project relationship with stakeholders". Whiles the various publications were separately concerned about the robustness, trustworthiness, or level of communication in the stakeholders' relationships, the baseline is the relationship existing amongst them. Hence, it makes sense to regroup such factors into a single theme as captioned. This method ensures the simplicity, clarity and easy application of the identified factors.

The review focused on extracting three main variable-sets i.e. POs, SFs and PIs in construction SM. These variable-sets are very useful because they are considered performance attributes of SM in typical construction project delivery. The POs are the purposes, reasons, aims or targets for managing construction stakeholders. Nineteen POs were therefore identified from literature. The PMs are also expected to establish the required strategies to enhance or produce SM performance in construction projects through the SFs. From literature, the 25 identified SFs have been categorized into 6 groups i.e. management support, information input, stakeholder assessment, decision making, action and evaluation, and sustainable support. This classification is supported by the themes established in previous works (e.g. Yang et al., 2009; Yang and Shen, 2015; El-Sawalhi and Hammad, 2015). Finally, the outcome of the SM process (i.e. organisational and stakeholder satisfaction) is to be measured with the PIs. The PIs have been reviewed from the benefits, results, outputs or outcomes of SM process. The identified PIs were consolidated into 22 quantifiable "signs and symptoms" to realize if the focal organisation and stakeholders are satisfied with the SM process. These variables were then used to develop the performance model.

Table 1
Distribution of selected publications.

Publication source/type	No. of publications
Construction Management and Economics	26
International Journal of Project Management	25
Journal of Construction Engineering and Management	9
Project Management Journal	9
Journal of Management in Engineering	7
Habitat International	5
Built Environment Project and Asset Management	2
Engineering Construction and Architectural Management	2
Facilities	2
Proceedings of the Institution of Civil Engineers: Municipal Engineer	2
Architectural Engineering and Design Management	1
Asia Pacific Viewpoint	1
Automation in Construction	1
Baltic Journal of Management	1
Building Research and Information	1
International Journal of Civil Engineering	1
International Journal of Construction Management	1
Journal of Civil Engineering and Management	1
Journal of Facilities Management	1
Journal of Planning Education and Research	1
Management decision	1
Modern Applied Science	1
Research Policy	1
Scandinavian Journal of Management	1
Sustainability	1
Books (chapters)	3
Theses	3
Total	110

5. Stakeholder management performance objectives

The SM POs are shown in the Table 2. From the organisational perspective, SM begins with setting objectives to direct actions and responses to stakeholder demands. PMs endeavour to involve stakeholders because it's an opportunity to clarify and incorporate their concerns into the plans to achieve collaborative integrated solutions (El-Gohary et al., 2006). This further enhances local decision making, given that different project settings present quite different challenges to PMs (Mathur et al., 2008). Empathically, the stakeholders are considered the ultimate recipient and end-users of the deliverables. It is therefore important for SM process to be focused on involving the stakeholders so that the feeling of ownership and belongingness is enhanced (Mahato and Ogunlana, 2011; Mathur et al., 2008). Also, the diverse needs, interests and objectives of stakeholders are expected to be fulfilled in project to contribute to satisfaction (Freeman, 1984). When stakeholder demands are met in project implementation, the stakeholders obviously feel satisfied and the focal organisation also become generally satisfied.

Effective SM incorporates a lot of entities who may bring on board diverse ideas and alternative project solutions. PMs therefore manage stakeholders properly in order to encourage innovation in project development (Mathur et al., 2008). SM is a continuous operation that influences thinking and learning process. Through effective dialogue and two-way communication, PMs intend to increase awareness, change attitudes, and affect the behaviours of stakeholders (Mathur et al., 2008). Thus, adversarial stakeholders could become supportive if they are aware of substantial project information such as benefits, impacts and constraints within which the projects are to be delivered. Bresnen et al. (2005, p. 235) explained social capital to be "the network of social relationships in which people are embedded, has increasingly been seen as a resource that firms can use and which enables them to tap into and exploit their intellectual capital and, thus, release the firm's innovative potential".

Table 2
Performance objectives of construction SM.

S/N	SM performance objectives	Source
1	Achieve collaborative and integrated project solution	El-Gohary et al. (2006); Mathur et al. (2008); Vos and Achterkamp (2006); Garmendia and Stagl (2010); Li et al. (2013); Bourne and Walker (2005); Mitchell et al. (1997); Yang and Shen (2015); Irvin and Stansbury (2004)
2	Enhance local decision making	Mathur et al. (2008)
3	Increase stakeholders' sense of belongingness and ownership of project	Mahato and Ogunlana (2011); Mathur et al. (2008); Varol et al. (2011)
4	Satisfy the needs, interests and objectives of stakeholders	Garmendia and Stagl (2010); Irvin and Stansbury (2004); Freeman (1984); Manowong and Ogunlana (2010)
5	Encourage innovation in project development	Mathur et al. (2008)
6	Increase awareness, change attitude and affect behaviour of stakeholders	Mathur et al. (2008); PMI (2004)
7	Build social capital, and promote social learning and cohesion	Mathur et al. (2008); Williams (2003)
8	Facilitate projects to move forward in a timely and effective manner	Yang and Shen (2015); Olander and Landin (2008)
9	Ensure openness, transparency, and accountability of the decision making process	Li et al. (2012)
10	Curtail stakeholder activities that might adversely affect project	Cleland (1988)
11	Resolve and minimize conflict and controversy between diverse stakeholder interests	Mathur et al. (2008); Garmendia and Stagl (2010); Li et al. (2013), Olander and Landin (2008)
12	Maximize mutual benefits and minimize negative impacts of project	Olander and Landin (2008); Li et al. (2013); Yang and Shen (2015); Li et al. (2012)
13	Obtain good stakeholder perception, acceptance and support of project purpose	Cleland (1988); El-Sawalhi and Hammad (2015); Jergeas et al. (2000); Mahato and Ogunlana (2011), Manowong and Ogunlana (2010)
14	Build robust, trustworthy and communicative project relationship with stakeholders	Olander and Landin (2008); Garmendia and Stagl (2010); Aaltonen et al. (2008); Bourne and Walker (2005); El-Gohary et al. (2006); Freeman (1984); Mitchell et al. (1997); PMI (2004); Manowong and Ogunlana (2010)
15	Facilitate spin-off partnerships with stakeholders	Mathur et al. (2008)
16	Enhance corporate social responsibility towards stakeholders	Greenwood (2007); Mahato and Ogunlana (2011)
17	Improve the long term viability of project towards stakeholders	Li et al. (2012)
18	Promote equity amongst stakeholders	Mathur et al. (2008)
19	Systematically identify and analyse stakeholders	Manowong and Ogunlana (2010); PMI (2004)

Through social capital building, social learning and social cohesion are likely to be achieved (Mathur et al., 2008; Williams, 2003).

Persistent stakeholder opposition contributes to delays and project failures. Therefore, SM is to ensure the facilitation of projects to move forward in a timely and effective manner (Yang and Shen, 2015). In public projects especially, stakeholders are more concerned about how the projects are procured and implemented in the most honest manner. As such, effective SM is to ensure openness, transparency, and accountability of the decision making process (Li et al., 2012). Cleland (1999) stated that SM is designed to curtail stakeholder activities that might adversely affect the project. This can be achieved if the PMs are proactive and sensitive to the local conditions. Due to the multiplicity of stakeholder objectives, SM is intended to resolve and minimize conflict and controversy between diverse stakeholder interests in projects (Mathur et al., 2008; Li et al., 2013). Moreover, it helps to maximize mutual benefits and minimize negative impacts of projects (Olander and Landin, 2008).

From the onset, it is important to brand the project with good reputation and media image (Olander and Landin, 2008). This helps to induce stakeholder acceptance as SM is designed to encourage stakeholders to support project purpose (Cleland, 1988; El-Sawalhi and Hammad, 2015). SM is also meant to build robust, trustworthy and communicative project relationship with stakeholders (Aaltonen et al., 2008; Bourne and Walker, 2005). Through effective public engagement, and acquaintance with and incorporation of local knowledge into project implementation, PMs are likely to gain trust in project-stakeholder relationship, hence, results in smooth project implementation (Mahato and Ogunlana, 2011). Effective communication in such a relationship improves its robustness. Eventually, the good relationship provides an opportunity to ensure long-term spin-off partnerships with stakeholders (Mathur et al., 2008).

Corporate social responsibility has been highly promoted in the construction industry. This requires that every business unit operating should fulfil some (economic, legal, environmental, ethical, and cultural) responsibilities towards stakeholders and the community in which it undertakes its endeavours. Hence, construction SM is operational on the objective of enhancing corporate social responsibility towards stakeholders (Mahato and Ogunlana, 2011; Yang and Shen, 2015). Also, Li et al. (2012) stated that improving the long term viability of project to the recipient community and the general public is a crucial objective to be achieved through effective SM. The reason is that the project is implemented with the economic, environmental and social sustainability principles, which are intended to continually perform and meet needs in the long term. SM is further intended to promote equity amongst the different stakeholders (Mathur et al., 2008). Equity implies that stakeholders receive fair and considerable solution depending on their needs. Meanwhile, the PMs would as much be able to prioritise interests through formal identification and analysis of stakeholders and their needs. This is to aid the selection of realistic options that will maximize the ultimate value of the project to its stakeholders (Manowong and Ogunlana, 2010; Cleland, 1999).

6. Success factors of stakeholder management

Researchers such as Yang et al. (2009) have used the most important factors that can affect SM as performance improvement mechanism of the management process. SFs can be defined as "areas, in which results, if they are satisfactory, will ensure successful competitive performance for the organisation" (Rockart, 1979, p. 85). Also, Saraph et al. (1989) explained SFs to be the critical management planning and actions that are to be fulfilled in order to reach effective results. Moreover, it is necessary for PMs to know if project stakeholders are being managed successfully (Cleland and Ireland, 2002). In line with this study, SFs are defined as *management activities, practices and functions that must be put in place to ensure or produce high performing SM process*. Therefore, 25 SFs have been identified and are expected to produce SM success when applied appropriately. These SFs are indicated in Table 3.

6.1. Management support SFs (MSSFs)

1) Managing stakeholders with social responsibilities
2) Allocating sufficient resources to stakeholder management activities.

In line with normative stakeholder theory (Donaldson and Preston, 1995), organisations fulfilling corporate social (economic, legal, environmental, ethical and cultural) responsibilities is very crucial to SM success (Yang and Shen, 2015). It is also essential for project organisations to make contribution of adequate resources towards SM activities (Senaratne and Ruwanpura, 2016). PMs committing such resources to the management process is crucial for SM success (El-Sawalhi and Hammad, 2015).

6.2. Information input SFs (IISFs)

3) Clearly defining project mission and objectives
4) Identifying stakeholders properly;
5) Collecting information about stakeholders
6) Exploring stakeholders' needs and constraints to projects;
7) Acquaintance with indigenous knowledge;

It is important for project organisations to clarify project mission and objectives early so that stakeholders' concerns could be aligned appropriately (Karlsen, 2002; Yang et al., 2009). Identifying and gathering information about the stakeholders is important and indispensable to SM success (Freeman et al., 2007). The information should cover the areas of stakeholder interests and their needs and constraints about project (Freeman et al., 2007; Yang et al., 2009). It is important for PMs to answer the question "who are stakeholders" before classifying and managing stakeholders (Frooman, 1999; Yang et al., 2009). The commitments, interests and power of project stakeholders should be fully accessed so that the PMs are enabled to tackle the key problems in the SM process as well as potential impact on project success (El-Sawalhi and Hammad, 2015). Aaltonen and Kujala (2010) emphasized on the importance of PMs getting acquainted with local knowledge in SM. This is because different project settings present distinct challenges to PMs in handling stakeholders and their needs.

6.3. Stakeholder assessment SFs (SASFs)

8) Assessing attributes (power, urgency and proximity) of stakeholders;
9) Assessing stakeholders' behaviours;
10) Analysing conflicts and coalitions amongst stakeholders;
11) Understanding areas of stakeholders' interests
12) Predicting the influence of stakeholders accurately;
13) Determining the strengths and weaknesses of stakeholders;

The capacity and readiness of project stakeholders to threaten or cooperate with project ought to be assessed during the SM process (Savage et al., 1991; Yang et al., 2009). The behaviour of stakeholders is either observed behaviour, cooperative potential, or competitive threat (Freeman, 1984). The assessment of the power, urgency and legitimacy attributes of stakeholders (Mitchell et al., 1997) enhances the capacity of PMs to understand the characteristics of stakeholders, which is essential for effective SM (Yang et al., 2009). PMs also have the responsibility of comprehending the areas of stakeholder interests. Cleland (1988) revealed that an assessment of stakeholders' strengths and weaknesses is prerequisite for PMs to understand stakeholders' strategies. Their strengths include resource availability and public support, whiles the weaknesses encompass lack of political support and incoherent strategies (Cleland, 1988). Stakeholder groups that share common objectives, concerns or interests have higher potential of forming coalitions (Freeman, 1984). It is therefore important for PMs to search out the possible stakeholder conflicts and coalitions in order to devise appropriate strategies (Freeman, 1984; Frooman, 1999). PMs should take the occasion to predict the influence of stakeholders accurately because it is important to "plan and execute a sufficiently rigorous stakeholder management process" (Olander and Landin, 2005, p. 278).

6.4. Decision making SFs (DMSFs)

14) Comprehensive and transparent analysis of all alternative project solutions;
15) Compromising stakeholder conflicts through consensus building;
16) Involvement of stakeholders in decision making;
17) Formulating appropriate strategies to handle stakeholders;
18) Predicting stakeholders' potential reactions for implementing the strategies;

Ng et al. (2014) found out that it is important for PMs to generate options and list all possible project solutions that will allow stakeholders to have an elaborative picture of the costs and benefits trade-offs of the proposed scheme. Conflicts may persist if stakeholders find out that the PMs have deliberately or inadvertently left out some alternative solutions that are more advantageous and less destructive (e.g. Olander and Landin, 2005). It is also important for PMs to compromise the disagreeing interests of stakeholders through continuous consensus building process in order to make the right decisions (Freeman, 1984). El-Sawalhi and Hammad (2015) stated that deciding on the appropriate level of stakeholder involvement in decision making is

Table 3
Success factors of construction SM.

Success factor groups	MSSFs		IISFs					SASFs						DMSFs					AESFs		SSSFs				
Success factors	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Cleland (1988)				X	X							X	X				X	X							
Savage et al. (1991)				X					X								X								
Mitchell et al. (1997)				X		X		X			X														
Rowley (1997)										X		X													
Svendsen (1998)	X																X					X			
Cleland (1999)			X	X		X		X	X	X	X	X			X		X					X			
Frooman (1999)				X				X	X	X							X								
Landin (2000)																					X				
Jergeas et al. (2000)			X														X								
Friedman and Miles (2002)				X				X		X	X				X						X				
Elias et al. (2002)				X				X			X														X
Karlsen (2002)			X	X													X	X			X				X
Winch (2002)	X			X																					
Phillips (2003)	X																								
Leung et al. (2004)			X												X						X				
Olander and Landin (2005)						X								X							X				
Bakens et al. (2005)																					X				
Bourne (2005)	X			X				X		X					X		X				X				X
Olander (2006)				X				X		X	X	X			X						X	X			
Bourne and Walker (2006)				X				X		X							X				X	X			X
Cova and Salle (2006)				X																	X	X			
El-Gohary et al. (2006)	X																				X				
Loosemore (2006)						X					X														X
Young (2006)				X		X		X	X		X	X									X				X
Freeman et al. (2007)			X	X					X	X					X		X	X							
Aaltonen et al. (2008)									X		X											X			
Olander and Landin (2008)						X								X			X				X	X			
Walker et al. (2008)	X			X				X				X									X	X			
Jepsen and Eskerod (2009)				X				X			X						X								
Yang et al. (2009)	X		X	X		X		X	X	X	X	X			X		X	X			X	X			X
Nguyen et al. (2009)				X							X	X													
Takim (2009)	X		X							X	X				X		X				X	X			
Aaltonen and Kujala (2010)							X														X				
Yang et al. (2011)	X		X	X		X		X	X	X	X	X			X		X	X			X	X			X
Ng et al. (2014)			X			X				X				X							X				
Heravi et al. (2015)				X		X																			
El-Sawalhi and Hammad (2015)	X	X	X	X		X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X
Yang and Shen (2015)	X		X	X	X	X		X	X	X	X	X			X		X	X	X	X	X	X		X	X
Yu and Shen (2015)				X		X		X			X				X							X			X
Senaratne and Ruwanpura (2016)				X											X						X		X		

Source: Updated from Yang et al. (2010).

important to ensure effective two-way communication. Other important SFs are the formulation of appropriate strategies to manage stakeholders and predicting how stakeholders will react to them (Yang and Shen, 2015; El-Sawalhi and Hammad, 2015). The types of strategy may include the holding, defense, compromise and concession strategies (Yang and Shen, 2015).

6.5. Action and evaluation SFs (AESFs)

19) Implementing the formulated strategies on stakeholders;
20) Continuous evaluation of stakeholder satisfactions with implemented strategies.

At the action stage, the PMs should implement the devised strategies accordingly to keep project moving forward (Yang and Shen, 2015). The implemented strategies should be reviewed by continually evaluating the associated stakeholder satisfaction (El-Sawalhi and Hammad, 2015). Such evaluations will reveal the present performance of the strategies, which will inform on whether sustenance or improvement is required.

6.6. Sustainable support SFs (SSSFs)

21) Ensuring effective communication with stakeholders;
22) Promoting and sustaining a good relationship with and amongst stakeholders;
23) Ensuring mutual trust and respect with and amongst stakeholders;
24) Obtaining support and assistance from higher authorities;
25) Analysing the changes in stakeholder environment e.g. information, influence, relationships and behaviours.

During the SM process, the PMs may face challenges in handling stakeholders with extreme power and also excessive conflicts, which will therefore require support from higher authorities. Obtaining such support is important for PMs to overcome objections and increase the ability to enforce required decisions (Takim, 2009). Formal and clear communication channels are required to ensure efficient information transfer between PMs and stakeholders (Takim, 2009). Also, effective communication with stakeholders e.g. the costs and benefits of project, increases the chances of project acceptance and satisfaction of stakeholders (Ng et al., 2014). Success in relationship management is important for successful project delivery and fulfilment of stakeholder expectations (Savage et al., 1991; Jergeas et al., 2000). Mutual trust, respect and commitment amongst the stakeholders can be enhanced through effective relationship management (Karlsen et al., 2008; El-Sawalhi and Hammad, 2015). In real-time, stakeholders and the level of their influences, relationships, and behaviours are temporal and subject to the strategic issues under consideration (Freeman, 1984; Cleland, 1988). As such, management processes, methods and activities should be contrasted with historic records to reveal changes so that necessary adjustments could be made (Yang and Shen, 2015).

7. Performance indicators of stakeholder management

Key performance indicators (KPIs) are designed to enable the evaluation of project and organisational performance in the construction industry. The set of KPIs developed are then used for benchmarking purposes, and will be important for focal organisations that aim at high performance in practice (The KPI Working Group, 2002). In developing effective KPIs, Collin (2002) advocates that KPIs should represent critical aspects of outputs or outcomes, limited and manageable for maintainable regular use, consistently used to realize value, and accepted and understood across the organisation.

In this study, 22 performance indicators have been identified in literature. However, some of these factors have not been used on actual projects, but have been shown to be critical outcomes or outputs of SM in literature (Collin, 2002). Therefore, they should be considered in measuring SM performance in projects. Since stakeholder and organisational satisfaction is subjective measure in nature (e.g. Chan and Chan, 2004), most of the performance indicators of SM are equally subjective in nature. Therefore, in line with Chan and Chan (2004), a seven-point scale scoring system could be adopted to measure such performance indicators e.g. public image creation. This scale is defined as: *1 = very dissatisfied; 2 = dissatisfied; 3 = slightly dissatisfied; 4 = neither dissatisfied nor satisfied; 5 = slightly satisfied; 6 = satisfied; and 7 = very satisfied*. Hence, the SM performance will be measured by the extent to which stakeholders and focal organisation are satisfied/dissatisfied with the subjective indicators. The potential objective means of quantifying some of the PIs are also shown. The PIs are explained below (and also summarized in Table 4):

7.1. Stakeholder empowerment

Empowerment is regarded a vital outcome of an effective relationship management process that transforms the diverse needs of stakeholders into tangible outcomes, and also enhances power in project implementation (Rowlinson and Cheung, 2008). Rowlinson and Cheung (2008) asserted that SM performance could be determined by observing the nature and extent of empowerment perception amongst stakeholders. Hence, the subjective seven-point scale could be used to measure this indicator.

7.2. Management monitoring and response

Allowing the public to consistently participate in the project ensure that the needs and expectations of stakeholders are well understood and effectively monitored (Wang, 2001; Bal et al., 2013). This enables decision makers to respond promptly with solutions that will culminate in mutual satisfaction without sacrificing the goals of the projects (Woltjer, 2009). Also, a seven-point scale could be adopted, or the average time taken by management to respond and reach agreement with stakeholders upon concerns are raised. As such, the response could be behind, on, or ahead of expected time.

Table 4
Performance indicators of construction SM.

No.	Performance indicators	References
1	Stakeholder empowerment	Rowlinson and Cheung (2008)
2	Management monitoring and response	Wang (2001); Woltjer (2009); Bal et al. (2013); Rashvand and Majid (2014)
3	Stakeholder relational benefits	Clarkson (1995); Smith and Love (2004)
4	Better service delivery	Wheeler and Sillanpää (1997); Carroll and Buchholtz (2006); Rashvand and Majid (2014)
5	Stakeholder rights protection	Plummer and Taylor (2004)
6	Innovation enhancement	Innes and Booher (1999)
7	Mutual learning	Innes and Booher (1999); Manowong and Ogunlana (2008); Varol et al. (2011); Rashvand and Majid (2014)
8	Public image creation	Innes and Booher (1999); Bal et al. (2013)
9	Human capital building	Innes and Booher (1999); Varol et al. (2011)
10	Smooth project facilitation	Mahato and Ogunlana (2011); Wheeler and Sillanpää (1997); Carroll and Buchholtz (2006); Smith and Love (2004); Olander and Landin (2008)
11	Sustainable lifecycle performance	Varol et al. (2011); Olander and Landin (2008)
12	Enhanced organisational motivation	Wheeler and Sillanpää (1997); Carroll and Buchholtz (2006)
13	Uncertainty and risk mitigation	Manowong and Ogunlana (2006); Bal et al. (2013)
14	Conflict mitigation	Innes and Booher (1999); Rashvand and Majid (2014); Leung et al. (2004)
15	Improved organisational foresight	Wheeler and Sillanpää (1997); Carroll and Buchholtz (2006)
16	Stakeholder support of project	Olander and Landin (2008); Manowong and Ogunlana (2006); Rashvand and Majid (2014); Leung et al. (2004)
17	Trust and respect in relationship	Mahato and Ogunlana (2011); Bal et al. (2013)
18	Implementing collective agreements	Innes and Booher (1999); Enserink and Koppenjan (2007); Leung et al. (2004)
19	Partnerships and collaborations	Innes and Booher (1999); Bal et al. (2013)
20	Cost performance	Orr and Scott (2008); Wheeler and Sillanpää (1997); Carroll and Buchholtz (2006); Rashvand and Majid (2014)
21	Potential for marketplace success	Mellahi and Wood (2003); Bal et al. (2013); Wheeler and Sillanpää (1997); Carroll and Buchholtz (2006)
22	Effective communication	Ahmed and Kangari (1995); Rashvand and Majid (2014)

7.3. Stakeholder relational benefits

According to Smith and Love (2004), effectively engaging stakeholders and managing their needs and interrelationships increases the relational wealth and commitment of the stakeholders. Moreover, the survival and continuing success of firms and their endeavours is contingent on managing stakeholder concerns to create wealth, value and satisfaction for same stakeholders (Clarkson, 1995). The seven-point scale could similarly be adopted to measure this indicator.

7.4. Better service delivery

The stakeholders are able to enjoy better services that meet their requirements if needs are incorporated into project delivery (Carroll and Buchholtz, 2006). Hence, the level of service improvement could indicate the extent to which stakeholder needs have been managed in project implementation. The seven-point scale would be useful in measuring this indicator.

7.5. Stakeholder rights protection

Plummer and Taylor (2004) opined that a good SM process should end up protecting the rights of affected individuals and minorities. Stakeholders should enjoy equal opportunity and fairness in articulating their needs and expectations, and influencing project decisions without suppression by higher powers (Manowong and Ogunlana, 2006). The level of stakeholder right protection is measurable on a seven-point scale.

7.6. Innovation enhancement

Innovative strategies and solutions to developmental problems could be generated with the addition of the opinions and "collective wisdom" of stakeholders (Innes and Booher, 1999). This could be measured on a seven-point scale, or by counting the number of new initiatives for improvement based on stakeholder discourses e.g. new construction techniques (Yeung et al., 2007).

7.7. Mutual learning

Participation process ensures that new ideas and opinions erupt in the project and extends to the whole community in an atmosphere of learning (Manowong and Ogunlana, 2008). Innes and Booher (1999) further asserted that consensus building results in changes in practices e.g. new norms and heuristics, and positive change in stakeholder perception about project which leads to new discourses. A seven-point scale could be adopted to evaluate the extent of mutual learning.

7.8. Public image creation

Bal et al. (2013) opined that the effective engagement of stakeholders in construction project implementation results in the creation of first-class public and local community image. A project that incorporates the expectations of stakeholders in the best way will most likely receive a good reputation in the community and public at large through the media. This indicator is measureable by the seven-point scale.

7.9. Human capital building

Collaborative SM approach successfully results in social capital building through trust and relationship (Innes and Booher, 1999). This produces networks of social relationships that are sustained by trust and two-way communication (Bresnen et al., 2005). Also, intellectual and political capital may be built amongst stakeholders (Innes and Booher, 1999). A seven-point scoring system will be applicable to this indicator.

7.10. Smooth project facilitation

Many projects that faced SM challenges have been severally interrupted and negatively affected (e.g. Olander and Landin, 2008). Unsatisfied stakeholders may interrupt projects through petitions, protests, picketing or vandalism. Hence, a successful SM process results in process efficiency i.e. reduction in waste of effort, time and resources (Smith and Love, 2004). This indicator could be measured by either using the seven-point scale or by counting the number of times that stakeholders interrupt projects over a period of time e.g. quarterly, annually etc.

7.11. Sustainable lifecycle performance

Participatory mechanisms generate project solutions that are viable and beneficial to stakeholders in the long-term (Varol et al., 2011). As such, there is minimized probability of long-term negative project impacts on stakeholders e.g. environmental disturbance (Olander and Landin, 2008). The ISO14000, the EIA score and the number of complaints received can measure how well stakeholders' environmental concerns have been managed (Chan and Chan, 2004). Moreover, the seven-point subjective scale could be used to evaluate this indicator.

7.12. Enhanced organisational motivation

Organisations have the drive to implement projects especially when stakeholder buy-in is gained (Wheeler and Sillanpää, 1997). Proper SM motivates PMs to focus more on delivering project requirements given that the opinions of stakeholders are embraced, and less disruptions are expected and encountered. The extent of organisational motivation can be measured on the seven-point scoring system.

7.13. Uncertainty and risk mitigation

Giving required attention to stakeholders especially at the planning stage helps in understanding and curtailing potential uncertainty-related risks and threats (Bal et al., 2013). Also, there is reduction in opportunity losses due to stakeholder opposition and disruption (Manowong and Ogunlana, 2006). Mitigation of risks and uncertainties provides a sign of how well stakeholders have been managed. The seven-point scale is applicable in this context too.

7.14. Conflict mitigation

Conflicts are reflected in the number and magnitude of disputes and litigations. The reduction in destructive conflict of interests and objectives through effective consensus building is indicative of SM performance (Innes and Booher, 1999). The seven-point scale could be useful in measuring this indicator.

7.15. Improved organisational foresight

Effective SM ensures that conflicts and uncertainties that cloud projects and stakeholder environment are extensively curtailed (Bal et al., 2013). As a result, organisations are proactive and have greater foresight on upcoming issues that could benefit or distract project progress (Carroll and Buchholtz, 2006). This therefore ensures that more accurate project decisions are made. The seven-point scoring system could be engaged here as well.

7.16. Stakeholder support of project

If stakeholders' requirements are successfully integrated into plans and managed, they often accept and support project implementation (Olander and Landin, 2008). Manowong and Ogunlana (2006) further asserts that positive attitude towards stakeholder participation opens the gateway for successful project management which leads to project acceptance. This could be evaluated using the seven-point measurement scale.

7.17. Trust and respect in relationship

Mahato and Ogunlana (2011) asserts that good SM brings about increasing trust and respect in project relationships. Bal et al. (2013) also admitted that involving stakeholders in an effective management system creates a positive and trustworthy relationship amongst them. The seven-point scoring system could be adopted to measure this indicator.

7.18. Implementing collective agreements

According to Innes and Booher (1999), high quality collective agreements are reached where there is an improved coordination and joint action of project stakeholders. Moreover, the agreed decisions are easily implemented, leading to the collaborative governance of projects (Innes and Booher, 1999; Enserink and Koppenjan, 2007). The collective agreements reached can be measured objectively by counting, or subjectively by the seven-point scoring system.

7.19. Partnerships and collaborations

From the long-term perspective, efficiently managing the interrelationships between the project and stakeholder environment could trigger spin-off partnerships and collaborations (Innes and Booher, 1999; Bal et al., 2013). This is very important especially if mega projects are designed to be carried out in different phases over a long period of time. This shows the bond

generated between the project and stakeholder environment. It could be evaluated by using the seven-point scale.

7.20. Cost performance

Orr and Scott (2008) found out that effective SM brings about a reduction in the direct operational cost related to stakeholder exceptions. Asides, the transaction costs and insurance premiums related to projects are minimized because effective SM lessens project-related risks, uncertainties, conflicts and litigations (Wheeler and Sillanpää, 1997; Carroll and Buchholtz, 2006). This can be measured by computing the amount of savings on these costs, expressed as a percentage of total project cost. The subjective scoring system could also be engaged on this indicator.

7.21. Potential for marketplace success

Given that stakeholders possess substantial wealth of local knowledge (Bal et al., 2013), successful management of these stakeholders results in increased understanding of, and potential for, marketplace success. This results in stronger market positioning of focal organisation (Mellahi and Wood, 2003). The organisation also better identifies new business opportunities (Wheeler and Sillanpää, 1997; Carroll and Buchholtz, 2006). This indicator is measurable on the seven-point scoring system.

7.22. Effective communication

In Rashvand and Majid (2014), communication has been revealed to be a major criterion of customer and client satisfaction because it is believed to improve relationship with the community and also influence attitudes and behaviors in the broader stakeholder environment. According to Zhao (2002), communication can be measured by counting the type and frequency, and computing the amount of data exchange between stakeholders. Also, the subjective scale could be used in this case.

The framework indicated in the Fig. 2 presents the measures of SM performance. The outcome of an effective SM process in construction project delivery is the satisfaction that accrues to both the stakeholders and focal organisation. This satisfaction is reflected in, and measurable by, the 22 PIs. This therefore will inform organisations on how well the needs and expectations of the stakeholders are being managed so that measures could be put in place to increase satisfaction where necessary.

8. Model of stakeholder management performance attributes

In developing the conceptual SM performance attributes model, reference was made to the work of Toor and Ogunlana (2008). They proposed the input, process and outcome model for entire project management. This model ascertains that project management

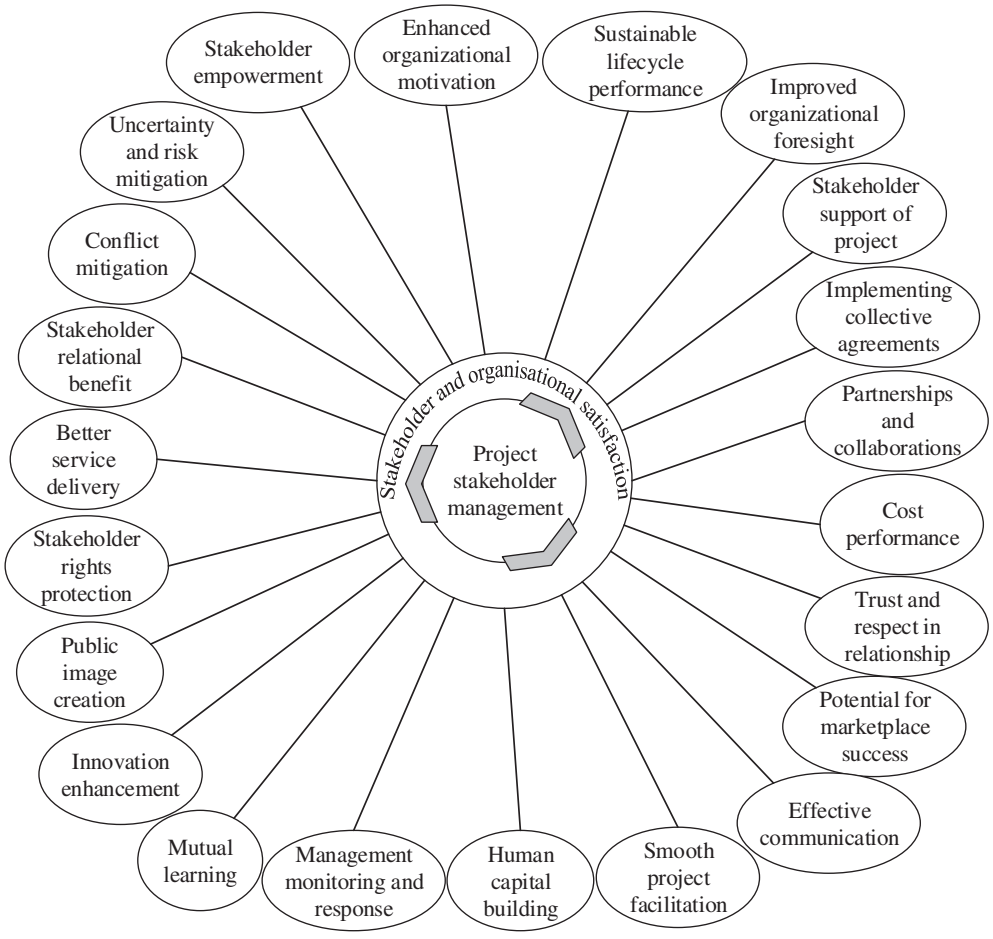

Fig. 2. Framework of performance measures for construction SM.

consists of both process domain and performance domain. The process domain entails defining project objectives at the input stage, and devising relevant project management system to help accomplish the objectives, which culminate in a product (constructed facility). On the other hand, the performance domain involves delineating performance goals at the input stage, establishing performance enhancement strategies through the CSFs, and then evaluating the actual performance using the KPIs. They further stated that even though the other variables are important in the system, the performance enhancement CSFs have crucial influence on performance outcomes (Toor and Ogunlana, 2008).

Based on Toor and Ogunlana's (2008) work, this review is focused on developing a conceptual model for SM performance management. Hence, POs, SFs and PIs were considered relevant and adequate for this purpose. It is important to initially set POs that will serve as benchmark for the SM process engaged. The SFs will then be used to translate the POs into the desired outcome that is measurable by the PIs. The SM objectives, strategies and outcomes are as such defined in the model as the POs, SFs and PIs respectively.

The proposed model for the SM performance attributes is shown in Fig. 3. The expected outcome of the SM process is the satisfaction that accrues to the stakeholder groups and the project organisation. Initially, the organisation sets the POs to be met in the course of effectively managing the stakeholders. These POs may vary from one organisation to another, and also depend on the nature and type of project. The POs serve as benchmarks against which comparison may be drawn with the outcome of the SM process. The organisation will therefore be informed on how to enhance the process to achieve desired results.

Afterwards, strategies are devised to enhance the level of stakeholder and organisational satisfaction in the project delivery. For instance, if stakeholders are not cooperating in project development, the organisation might consider improving the communication process, and ensuring trust and respect in stakeholder relationships. These have the potential to increase stakeholders' readiness to cooperate and thus, increase mutual satisfaction. Finally, the PIs may be engaged to inform on how well the SM process has performed over time. The PIs provide a means to evaluate the level of satisfaction that stakeholders and the organisation mutually derive from the project.

Subsequently, adjustments may be made in the attributes until the desired level of mutual satisfaction is attained. Appraising the enhancement strategies has far reaching implication and helps in accomplishing the POs (Toor and Ogunlana, 2008). Based on the enhancement strategies, performance outcomes could be easily juxtaposed with the initially set objectives. If there is any form of mismatch between the objectives and outcomes, the enhancement strategies need to be modified to arrive at the desired performance level (Toor and Ogunlana, 2008). Thus, the SFs may be used to enhance mutual satisfaction until balance is achieved between the POs and the PIs.

It is important to realize from the model and the attributes that not all the POs, SFs and PIs may be applicable for each project, depending on its nature, type and even project stage. Public and private projects could vary in the type of POs being pursued. For instance, unlike private projects, public projects may focus more on ensuring openness, transparency, and accountability of the decision making process. This is because such projects are funded by public monies and the developers (governments) are answerable to the public. Organizations therefore have to select the POs that are suitable for each project context. The application of SFs should also be based on the POs being pursued. In the case above, the strategies may include in-depth and transparent analysis of all alternative project solutions, and involvement of stakeholders in decision making process. Some of the PIs that are applicable in this case also could include public image creation and stakeholder support of project.

It should further be noted that there may be the possibility of complex interrelationships between the attributes. Thus, the same set of SFs could be engaged to achieve different POs, and also, the same set of PIs could be used to evaluate different POs. The implication of the model is that PMs should only apply a selected set of attributes based on the project, given that the complex

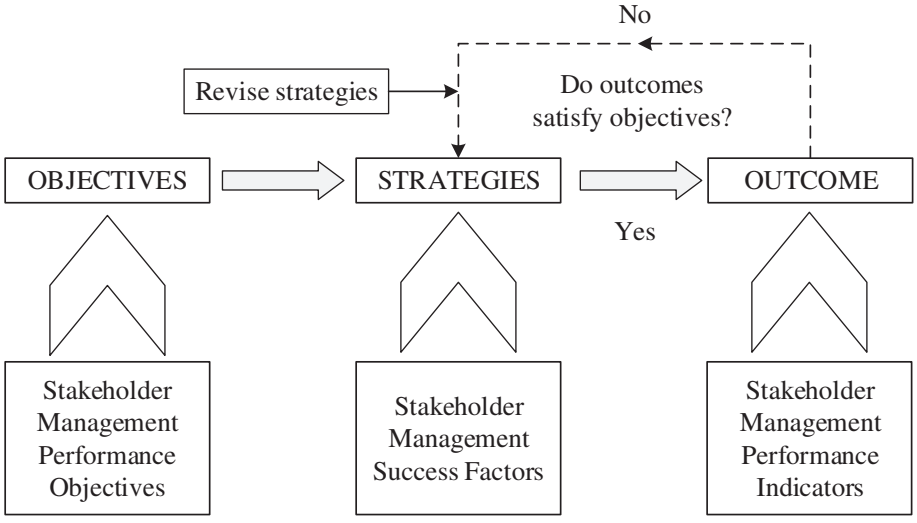

Fig. 3. A model of SM performance attributes.

interrelationships between them are clarified. These complex interrelationships are however not the focus of this study and should therefore be considered in future empirical investigations.

9. Conclusion and implication

Hitherto, studies on SM performance are scattered throughout literature, hence, the need for this review and the resultant model. Practically, scholars and PMs should get acquainted with the structure and the general relationships in the proposed model. This can be achieved by following the explanatory notes in the paper or engaging the experience of other external professionals to understand the underlying concepts in the model. The PMs should clarify the interests of both the organization and stakeholders in order to set concise objectives based on the nature and type of project. The PMs should also engage the enhancement strategies that are applicable to the set objectives. Finally, the performance should be reviewed by confirming if the stakeholders and organisation are mutually satisfied with the whole process based on the applicable indicators. The whole process could go back and forth until the desired outcome of mutual satisfaction is fully achieved. It is to be noted that different attributes may be useful at different stages of the construction project. Also, the nature and type of project may dictate the attributes to engage. As such, it will be important for PMs to engage the attributes that are applicable to each context. Thus, the flexibility portrayed by the model enables project organisations to select a few, concise and manageable attributes to ensure effective management.

In line with Gan and Li (2012), the reasonable establishment of comprehensive performance index is the core content and essential factor that forms the basis and drives SM performance management in the industry. Such an index incorporating the performance attributes could help the PMs benchmark, evaluate, monitor and improve SM performance at the successive stages of construction projects. However, stakeholder and organizational satisfaction is inherently fuzzy and subjective in nature, which makes measurement very unreliable and inconsistent despite its usage in judging project success over the years. Consequently, the measurement approaches of some of the PIs are still dependent on the subjective judgement of the PMs. In order to solve such a problem and make the performance attributes more applicable across different projects in a consistent, reliable and practical manner, there is the need to further develop an objective approach to quantify the subjective PIs, like public image creation (Yeung et al., 2012). Incorporating the outcome into project management process will help offer a better and more objective definition to "what constitutes project success" in the construction industry.

Both internal and external stakeholders have become acknowledged as important considerations in construction project development. The prime goal of the PMs is to strike a balance between the needs and expectations that these stakeholders pursue in projects. Often times, the PMs may attend to the stakeholders that are more powerful and control a lot of project resources whiles the others may be neglected or paid scanty attention to. For instance, in the development of social projects, the real beneficiaries who are the end-users may not have substantial power and control over resources like the politicians or other powerful institutions. Hence, PMs devoting much attention to the needs and expectations of such powerful stakeholders at the expense of the end-users could lead to social rejection and even project failure. The performance model could serve as a lifecycle dynamic management tool to help PMs continuously analyze and monitor the disparities amongst the true satisfaction levels of the diverse stakeholder groups with the project development. On this premise, the PMs could make more balanced and inclusive decisions so that the projects will deliver commensurate costs and benefits to the multi-stakeholder groups across the entire project lifecycle. Such a project delivery mechanism is useful in contemporary projects that are surrounded by a lot of stakeholders, complexities and uncertainties. Eventually, its application is expected to aid PMs and researchers in improving SM process and project outcomes in the construction industry.

10. Limitations

1) The sampling approach used puts a limitation on the selection of publications for this review. Therefore, the outcome is subject to the sampling approach, but expected to generally reflect the performance attributes in construction SM.
2) The derived factors have not been empirically tested. Future research should therefore focus on validating the model, and empirically testing the variables on real-time construction projects.
3) This review focused only on producing the checklist of performance attributes related to construction SM, and the general relationships are indicated by the model. Future studies should therefore consider investigating the complex interrelationships between these attributes. Thus, specific PIs should inform which POs have been fulfilled, and SFs should relate directly to certain POs.

Declaration

This paper is free from any conflict of interests.

Acknowledgement

The authors would like to thank the Department of Building and Real Estate of the Hong Kong Polytechnic University for funding this study. This review paper is part of a PhD study where other research outputs varying in scope and objectives have been produced. Some of these papers therefore share common background and/or methodology. However, the distinct results are believed to contribute to construction SM research domain.

Appendix A. Supplementary data

Supplementary data to this article can be found online at http://dx.doi.org/10.1016/j.ijproman.2017.04.015.

References

Aaltonen, K., Kujala, J., 2010. A project lifecycle perspective on stakeholder influence strategies in global projects. Scand. J. Manag. 26 (4), 381–397.

Aaltonen, K., Jaakko, K., Tuomas, O., 2008. Stakeholder salience in global projects. Int. J. Proj. Manag. 26 (5), 509–516.

Ahmed, S.M., Kangari, R., 1995. Analysis of client-satisfaction factors in construction industry. J. Manag. Eng. 11 (2), 36–44.

Bakens, W., Foliente, G., Jasuja, M., 2005. Engaging stakeholders in performance-based building: lessons from the Performance-Based Building (PeBBu) Network. Build. Res. Inf. 33 (2), 149–158.

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

Bourne, L., 2005. *Project Relationship Management and the Stakeholder Circle ™*. (PhD thesis). RMIT University, Australia.

Bourne, L., Walker, D.H., 2005. Visualising and mapping stakeholder influence. Manag. Decis. 43 (5), 649–660.

Bourne, L., Walker, D.H.T., 2006. Visualizing stakeholder influence- two Australian examples. Proj. Manag. J. 37 (1), 5–22.

Bresnen, M., Edelman, L., Newell, S., Scarbrough, H., Swan, J., 2005. Exploring social capital in the construction firm. Build. Res. Inf. 33 (3), 235–244.

Carroll, A.B., Buchholtz, A.K., 2006. Business & Society: Ethics and Stakeholder Management. sixth ed. Thomson South-western, Mason, OH.

Cavanagh, S., 1997. Content analysis: concepts, methods and applications. Nurse Res. 4 (3), 5–13.

Chan, A.P.C., Chan, A.P.L., 2004. Key performance indicators for measuring construction success. Benchmarking 11 (2), 203–221.

Chan, A.P.C., Scott, D., Chan, A.P.L., 2004. Factors affecting the success of a construction project. J. Constr. Eng. Manag. 130 (1), 153–155.

Chau, W.K., 1997. The ranking of construction management journals. Constr. Manag. Econ. 15 (4), 387–398.

Clarkson, M.E., 1995. A stakeholder framework for analyzing and evaluating corporate social performance. Acad. Manag. Rev. 20 (1), 92–117.

Cleland, D.I., 1988. Project stakeholder management. In: Cleland, D.I., King, W.R. (Eds.), Project Management Handbook. vol. 2. Van Nostrand Reinhold, New York, pp. 275–301.

Cleland, D.I., 1999. Project Management Strategic Design and Implementation. third ed. McGraw-Hill, New York, US.

Cleland, D.I., Ireland, R.L., 2002. Project Management: Strategic Design and Implementation. MaGraw-Hill, New York.

Collin, J., 2002. Measuring the success of building projects–improved project delivery initiatives. Report for the Queensland Department of Public Works, Australia, July 2002.

Cova, B., Salle, R., 2006. Communications and stakeholders. In: Pryke, S., Smyth, H. (Eds.), The Management of Complex Projects: A Relationship Approach. Blackwell Sciences, Oxford, UK.

Davis, K., 2016. A method to measure success dimensions relating to individual stakeholder groups. Int. J. Proj. Manag. 34 (3), 480–493.

Donaldson, T., Preston, L.E., 1995. The stakeholder theory of the corporation: concepts, evidence, and implications. Acad. Manag. Rev. 20 (1), 65–91.

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.

Elias, A.A., Cavana, R.Y., Jackson, L.S., 2002. Stakeholder analysis for R&D project management. R&D Manag. 32 (4), 301–310.

El-Sawalhi, N.I., Hammad, S., 2015. Factors affecting stakeholder management in construction projects in the Gaza Strip. Int. J. Constr. Manag. 15 (2), 157–169.

Enserink, B., Koppenjan, J., 2007. Public participation in China: sustainable urbanization and governance. Manag. Environ. Qual. Int. J. 18 (4), 459–474.

Freeman, R., 1984. Strategic Management: a Stakeholder Approach. Pitman, Boston, Massachusetts, US.

Freeman, R.E., Harrison, J.S., Wicks, A.C., 2007. Managing for Stakeholders: Survival, Reputation, and Success. Yale University Press, New Heaven, CT, US.

Friedman, A.L., Miles, S., 2002. Developing stakeholder theory. J. Manag. Stud. 39 (1), 1–21.

Frooman, J., 1999. Stakeholder influence strategies. Acad. Manag. Rev. 24 (2), 191–205.

Gan, X., Li, S., 2012. The study of dynamic stakeholder management in sustainable construction project. Manag. Des. Eng. 8, 156–158.

Garmendia, E., Stagl, S., 2010. Public participation for sustainability and social learning: concepts and lessons from three case studies in Europe. Ecol. Econ. 69 (8), 1712–1722.

Greenwood, M., 2007. Stakeholder engagement: Beyond the myth of corporate responsibility. J. Bus. Ethics 74 (4), 315–327.

Heravi, A., Coffey, V., Trigunarsyah, B., 2015. Evaluating the level of stakeholder involvement during the project planning processes of building projects. Int. J. Proj. Manag. 33 (5), 985–997.

Innes, J.E., Booher, D.E., 1999. Consensus building and complex adaptive systems: a framework for evaluating collaborative planning. J. Am. Plan. Assoc. 65 (4), 412–423.

Irvin, R.A., Stansbury, J., 2004. Citizen participation in decision making: is it worth the effort? Public Adm. Rev. 64 (1), 55–65.

Jepsen, A.L., Eskerod, P., 2009. Stakeholder analysis in projects: challenges in using current guidelines in the real world. Int. J. Proj. Manag. 27 (4), 335–343.

Jergeas, G.F., Williamson, E., Skulmoski, G.J., Thomas, J.L., 2000. Stakeholder management on construction projects. AACE International Transactions, PM.12. AACE International, Morgantown, WV, pp. 12.1–12.6.

Jones, T.M., 1995. Instrumental stakeholder theory: a synthesis of ethics and economics. Acad. Manag. Rev. 20 (2), 404–437.

Karlsen, J.T., 2002. Project stakeholder management. Eng. Manag. J. 14 (4), 19–24.

Karlsen, J.T., Græe, K., Massaoud, J.M., 2008. Building trust in project-stakeholder relationships. Balt. J. Manag. 3 (1), 7–22.

Landin, A., 2000. Impact of Quality Management in the Swedish Construction Process. (PhD thesis). Dept. of Construction Management, Lund University, Lund, Sweden.

Leung, M.Y., Ng, S.T., Cheung, S.O., 2004. Measuring construction project participant satisfaction. Constr. Manag. Econ. 22 (3), 319–331.

Li, T.H., Ng, S.T., Skitmore, M., 2012. Public participation in infrastructure and construction projects in China: from an EIA-based to a whole-cycle process. Habitat Int. 36 (1), 47–56.

Li, T.H., Ng, S.T., Skitmore, M., 2013. Evaluating stakeholder satisfaction during public participation in major infrastructure and construction projects: a fuzzy approach. Autom. Constr. 29, 123–135.

Lim, C.S., Mohamed, M.Z., 1999. Criteria of project success: an exploratory re-examination. Int. J. Proj. Manag. 17 (4), 243–248.

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.

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

Mahato, B.K., Ogunlana, S.O., 2011. Conflict dynamics in a dam construction project: a case study. Built Environ. Proj. Asset Manag. 1 (2), 176–194.

Manowong, E., Ogunlana, S.O., 2006. Public hearings in Thailand's infrastructure projects: effective participations? Eng. Constr. Archit. Manag. 13 (4), 343–363.

Manowong, E., Ogunlana, S.O., 2008. Critical factors for successful public hearing in infrastructure development projects: a case study of the On Nuch waste disposal plant project. Int. J. Constr. Manag. 8 (1), 37–51.

Manowong, E., Ogunlana, S.O., 2010. Strategies and tactics for managing construction stakeholders. In: Chinyio, E., Olomolaiye, P. (Eds.), Construction Stakeholder Management. Wiley-Blackwell, Oxford, UK, pp. 121–137.

Mathur, V.N., Price, A.D., Austin, S., 2008. Conceptualizing stakeholder engagement in the context of sustainability and its assessment. Constr. Manag. Econ. 26 (6), 601–609.

Mellahi, K., Wood, G., 2003. The role and potential of stakeholders in "hollow participation": conventional stakeholder theory and institutionalist alternatives. Bus. Soc. Rev. 108 (2), 183–202.

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.

Mladenovic, G., Vajdic, N., Wündsch, B., Temeljotov-Salaj, A., 2013. Use of key performance indicators for PPP transport projects to meet stakeholders' performance objectives. Built Environ. Proj. Asset Manag. 3 (2), 228–249.

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.
Morris, P.W.G., Hough, G.H., 1987. The Anatomy of Major Projects: A Study of the Reality of Project Management. John Wiley and Sons, London, UK, p. 326.
Ng, S.T., Skitmore, M., Tam, K.Y., Li, T.H., 2014. Public engagement in major projects: the Hong Kong experience. Proc. Inst. Civ. Eng. 167 (1), 22–31.
Nguyen, N.H., Skitmore, M., Wong, J.K.W., 2009. Stakeholder impact analysis of infrastructure project management in developing countries: a study of perception of project managers in state-owned engineering firms in Vietnam. Constr. Manag. Econ. 27 (11), 1129–1140.
Olander, S., 2006. External Stakeholder Analysis in Construction Project Management. (PhD thesis). Lund University, Lund, Sweden.
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.
Olander, S., Landin, A., 2008. A comparative study of factors affecting the external stakeholder management process. Constr. Manag. Econ. 26 (6), 553–561.
Orr, R.J., Scott, W.R., 2008. Institutional exceptions on global projects: a process model. J. Int. Bus. Stud. 39 (4), 562–588.
Phillips, R., 2003. Stakeholder Theory and Organizational Ethics. Berrett-Koehler Publishers, San Fransisco, UK.
Plummer, J., Taylor, J.G., 2004. Community Participation in China: Issues and Processes for Capacity Building. Earthscan, London, UK.
Project Management Institute [PMI], 2004. A Guide to the Project Management Body to Knowledge (4th Version). Project Management Institute, Newton Square, PA.
Rashvand, P., Majid, M.Z.A., 2014. Critical criteria on client and customer satisfaction for the issue of performance measurement. J. Manag. Eng. 30 (1), 10–18.
Rockart, J.F., 1979. Chief executives define their own data needs. Harv. Bus. Rev. 57 (2), 81–93.
Rowley, T.J., 1997. Moving beyond dyadic ties: a network theory of stakeholder influences. Acad. Manag. Rev. 22 (4), 887–910.
Rowlinson, S., Cheung, Y.K.F., 2008. Stakeholder management through empowerment: modelling project success. Constr. Manag. Econ. 26 (6), 611–623.
Saraph, J.V., Benson, P.G., Schroeder, R.G., 1989. An instrument for measuring the critical factors of quality management. Decis. Sci. 20 (4), 810–829.
Savage, G.T., Nix, T.W., Whitehead, C.J., Blair, J.D., 1991. Strategies for assessing and managing organizational stakeholders. Executive 5 (2), 61–75.
Senaratne, S., Ruwanpura, M., 2016. Communication in construction: a management perspective through case studies in Sri Lanka. Archit. Eng. Des. Manag. 12 (1), 3–18.
Smith, J., Love, P.E., 2004. Stakeholder management during project inception: strategic needs analysis. J. Archit. Eng. 10 (1), 22–33.
Svendsen, A., 1998. The Stakeholder Strategy: Profiting from Collaborative Business Relationships. Berrett-Koehler Publishers, San Fransisco, US.
Takim, R., 2009. The management of stakeholders' needs and expectations in the development of construction project in Malaysia. Mod. Appl. Sci. 3 (5), 167–175.
The KPI Working Group, 2002. KPI Report for the Minister for Construction. Department of the Environment, Transport and the Regions, London (January 2002).
Toor, S.-u.-R., Ogunlana, S.O., 2008. Critical COMs of success in large-scale construction projects: evidence from Thailand construction industry. Int. J. Proj. Manag. 26 (4), 420–430.
Varol, C., Ercoskun, O.Y., Gurer, N., 2011. Local participatory mechanisms and collective actions for sustainable urban development in Turkey. Habitat Int. 35 (1), 9–16.
Vos, J.F., Achterkamp, M.C., 2006. Stakeholder identification in innovation projects: going beyond classification. Eur. J. Innov. Manag. 9 (2), 161–178.
Walker, D.H.T., Bourne, L.M., Rowlinson, S., 2008. Stakeholders and the supply chain. In: Walker, D.H.T., Rowlinson, S. (Eds.), Procurement Systems: A Cross-industry Project Management Perspective. Taylor and Francis, London, UK.
Wang, X., 2001. Assessing public participation in US cities. Public Perform. Manag. Rev. 24 (4), 322–336.
Wheeler, D., Sillanpää, M., 1997. The Stakeholder Corporation: A Blueprint for Maximizing Stakeholder Value. Pitman Publishing, London, UK.
Williams, C., 2003. Developing community involvement: contrasting local and regional participatory cultures in Britain and their implications for policy. Reg. Stud. 37 (5), 531–541.
Winch, G., 2002. Managing Construction Projects: an Information Processing Approach. Blackwell Science, Oxford, UK.
Woltjer, J., 2009. Concepts of participatory decision-making in Dutch infrastructure planning. In: Woltjer, J. (Ed.), Public Participation and Better Environmental Decisions. Springer, London, pp. 153–163.
Yang, R.J., Shen, G.Q., 2015. Framework for stakeholder management in construction projects. J. Manag. Eng. 31 (4), 04014064.
Yang, J., Shen, G.Q., Ho, M., Drew, D.S., Chan, A.P., 2009. Exploring critical success factors for stakeholder management in construction projects. J. Civ. Eng. Manag. 15 (4), 337–348.
Yang, J., Shen, G.Q., Drew, D.S., Ho, M., 2010. Critical success factors for stakeholder management: construction practitioners' perspectives. J. Constr. Eng. Manag. 136 (7), 778–786.
Yang, J., Shen, G.Q., Ho, M., Drew, D.S., Xue, X., 2011. Stakeholder management in construction: an empirical study to address research gaps in previous studies. Int. J. Proj. Manag. 29 (7), 900–910.
Yeung, J.F., Chan, A.P., Chan, D.W., Li, L.K., 2007. Development of a partnering performance index (PPI) for construction projects in Hong Kong: a Delphi study. Constr. Manag. Econ. 25 (12), 1219–1237.
Yeung, J.F., Chan, A.P., Chan, D.W., 2012. Fuzzy set theory approach for measuring the performance of relationship-based construction projects in Australia. J. Manag. Eng. 28 (2), 181–192.
Yew Wong, K., Aspinwall, E., 2005. An empirical study of the important factors for knowledge-management adoption in the SME sector. J. Knowl. Manag. 9 (3), 64–82.
Youker, R., 1992. Managing the international project environment. Int. J. Proj. Manag. 10 (4), 219–226.
Young, T.L., 2006. Successful Project Management. second ed. Kogan Page, London, UK.
Yu, A.T., Shen, G.Q., 2015. Critical success factors of the briefing process for construction projects. J. Manag. Eng. 31 (3), 04014045.
Zhao, F., 2002. Measuring inter-organizational partnership: the challenge of cultural discrepancy. Proceedings of the 3rd International Conference on Theory & Practice in Performance Measurement, The World Trade Centre, Boston, MA, July, 2002.