Construction Practitioners' Perception of Key Drivers of Reputation in Mega-Construction Projects

Abstract

Purpose

The purpose of this study is to commence the discourse on the non-inclusiveness of the dynamics of reputation within the construction industry by identifying and examining the key product and process drivers of reputation in mega-construction projects.

Design/methodology/approach

Data was collected through an exploratory sequential mixed methods approach which commences with a qualitative study and culminates with a quantitative study in order to identify product and process drivers of reputation in mega-construction projects.

Findings

The findings suggest that "project quality", "robust social and environmental sustainability plan", "project team competence and interpersonal relationship" and "project process efficacy" are the four key drivers influencing the reputation of mega-construction projects.

Research limitations/implications

The findings of this study are solely based on the perception of UK construction practitioners; therefore, the results may only be considered valid in this context. The identification of these key drivers provides a pathway where stakeholders, professionals and organisations can identify and prioritise critical issues associated with enhancing and sustaining the reputation of mega-construction projects.

Originality/value

Findings of this research make a significant contribution to the discourse on the concept of reputation within the construction industry by identifying its specific drivers of reputation.

Keywords

Project Reputation; Megaproject; Construction Organisations; Mixed Methods Approach.

1 Introduction

In recent years, there has been an unprecedented interest in the concept of 'reputation' among academics particularly within business, marketing and more recently, the construction literature (Shamma, 2012; Balmer, Abratt and Kleyn, 2016; Blackburn et al., 2018). This growing interest has been attributed to the belief that reputation influences the actions and behaviours of individuals (i.e. customers, stakeholders, staffs) (Cornelissen and Thorpe, 2002). As a result, many business organisations and practitioners see reputation as an intangible asset, that can offer organisations competitive advantage (Walsh et al., 2009), attract high-quality employees (Vidaver-Cohen, 2007), increase brand loyalty (Hur, Kim and Woo, 2014), as well as improve future earnings and growth (Stuebs and Sun, 2010). However, despite these well-known positive impacts of reputation, it is imperative to also note that reputation is fluid, dynamic, and is based on stakeholder perception, which can change dramatically within a short time (Walker, 2010; Aula and Mantere, 2013). Due to this dynamic nature, effective management of reputation has become a critical organisational issue requiring robust strategy, especially in today's complex, highly competitive and volatile business environment.

1.1 Research background:

Within the UK construction sector, the fluid and volatile nature of reputation often present enormous challenges for practitioners (King, Lenox and Barnett, 2002). Evidences within the literature have shown that many construction organisations have suffered substantial reputational damage due to one or more of their projects failing to achieve project expectations, outcomes and objectives, i.e. time, cost and quality etc. (Ahsan and Gunawan, 2010; Doloi et al., 2012). For example, Aéroports de Paris/Architects and Engineers (ADPi), which was a renowned project organisation, suffered severe damage to its reputation when one of the terminals (terminal 2E) it constructed at Charles de Gaulle airport in France collapsed and led to the death of 6 people (Torres, 2004; Kaljas, 2017). Similarly, the London Grenfell tower fire which led to the death of 72 residents, including 70 injured, presents a classic scenario where the bad reputation associated with the event affected the fortunes of the contractors (Shildrick, 2018). Due to this intertwined nature of reputation in construction vis-à-vis the failure/success of projects, it is not surprising that new studies are beginning to link the concept of reputation in construction to project success factors (Barthorpe, 2010; Zou and Sunindijo, 2015; Love and Smith, 2016). However, despite the increasing body of knowledge within this domain, most studies have focused entirely on corporate social responsibility (Lai et al., 2010; Park, Lee and Kim, 2014), firm history and managerial styles

(Du et al., 2013; Men and Stacks, 2013), profit performance (Hall and Lee, 2014) and corporate governance (in terms of their impacts on reputation of construction firms) (Bhagat and Bolton, 2008). Additionally, extant literature on reputation in construction have also disproportionately concentrated on organisational reputation and its key drivers (i.e. Coenen, von Felten, and Schmid, 2010), thereby completely isolating the reputation of projects as standalone entities, particularly in the context of mega-projects.

This surprising neglect comes despite the popular parlance within the construction sector that, "the reputation of a project manager is as good as the reputation of his/her last project/s". The conceptual neglect and ambiguity regarding 'reputation' vis-à-vis organisational reputation of construction firms has been criticised by Barnett et al. (2006), who in an interesting article, disaggregated the study of reputation from more general organisational issues. According to Barnett et al. (2006), confusing reputation of projects with organisational reputation does not have credence when integrated within the study of mega-project management. This is because mega-projects have been noted to derive their own reputation from their large-scale, complex, multiple stakeholder, capital intensive nature (multibillion-dollar ventures) as well as high public scrutiny level. Based on the uniqueness of such large-scale projects, enormous reputation is often attributed the moment they are successfully completed (i.e. The Wembley Project, Sydney Opera Project, etc.). In another argument by Randeree (2014), given the scale of megaprojects, the idea that the reputation of such projects is linked to the reputation of the organisations involved in their delivery is completely misplaced. Since no single entity can lay claim to the reputation of mega-projects or even its success (due to the involvement of diverse stakeholders from governments to private sectors), projects therefore earn their own reputation through project performance (Randeree, 2014).

The idea behind linking project reputation to project performance has been emphasized in studies such as Mir and Pinnington (2014), Badewi (2016) and Irfan and Hassan (2017). According to these authors, reputation is intrinsically linked to project delivery, performance and quality. From Badewi's perspective, every successful project creates financial (tangible) and non-financial (intangible) benefits to project stakeholders, with reputation considered as one of the most important non-financial benefits of a project. As a key construct in project management, this study recognizes the challenges associated with defining project success and selecting critical success parameters for projects (see Figure 1). The multi-dimensional and ambiguous nature of project success as a construct, are also well documented within the project management literature (see Ika,

2009; McLeod et al., 2012; Mir and Pinnington, 2014). However, this study emerges and aligns with the project success framework of McLeod et al. (2012, pp.70). According to McLeod et al. (2012), project success is hinged on the success of project management; which comprises two success classifications namely; "process success" and "product success". Bacarrini (1999), Shenhar et al., (2001), McLeod et al. (2012) and PRINCE 2 all view projects as a set of specialist and management products that are delivered in line with stakeholders' specification and expectations.

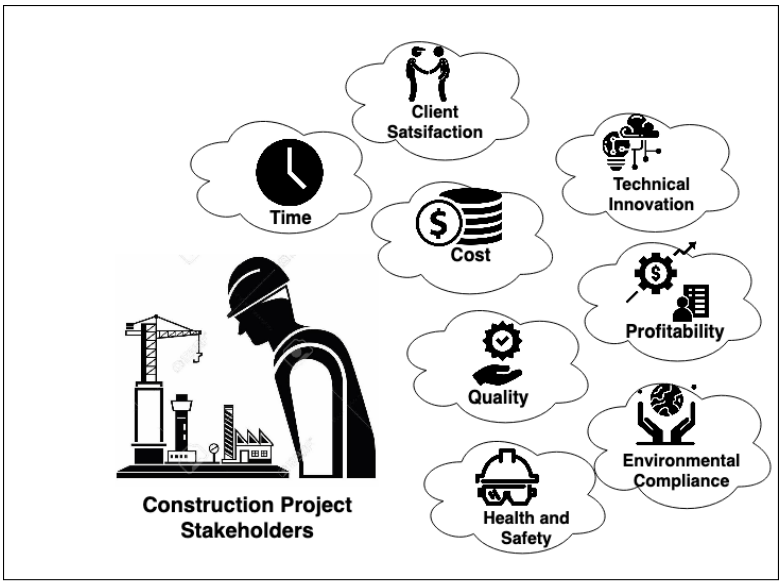

Figure 1: Possible Success Criteria from different stakeholder's perspective

On the other hand, authors such as Zwikael and Globerson (2006) and Ravid et al., (2013) have also consolidated McLeod's standpoint on project success by challenging the excessive focus on generic Critical Success Factors (CSFs) and calling for a shift towards Critical Success Processes/"process success". Hence, based on these new thinking, as earlier provoked by Cicmil and Hodgson (2006), Zwikael and Globerson (2006), McLeod et al. (2012) and Ravid et al., (2013); the critical role of stakeholders, as the important arbitrator for judging project success as well as reputation is brought to focus. According to Mir and Pinnington (2014), both constructs are conceptually intertwined and depend largely on the inter-subjective and subjective evaluation of stakeholders associated with the projects. Based on the above standpoints, this study argues that, in-line with McLeod et al. (2012), projects earn their reputation through the achievement of two-sub-success criteria namely: (1) successful project management in delivering the project output (process success) and (2) understanding as well as successful delivery of output in line with expectations and needs of stakeholders (product success) (see Figure 2 below for distinction). In addition, since construction professionals remain critical and central to most project delivery

(because they are the one responsible for delivering projects) and by extension - project success; examining project reputation from their perspectives will provide valuable insights for understanding process and product factors influencing reputation of megaprojects.

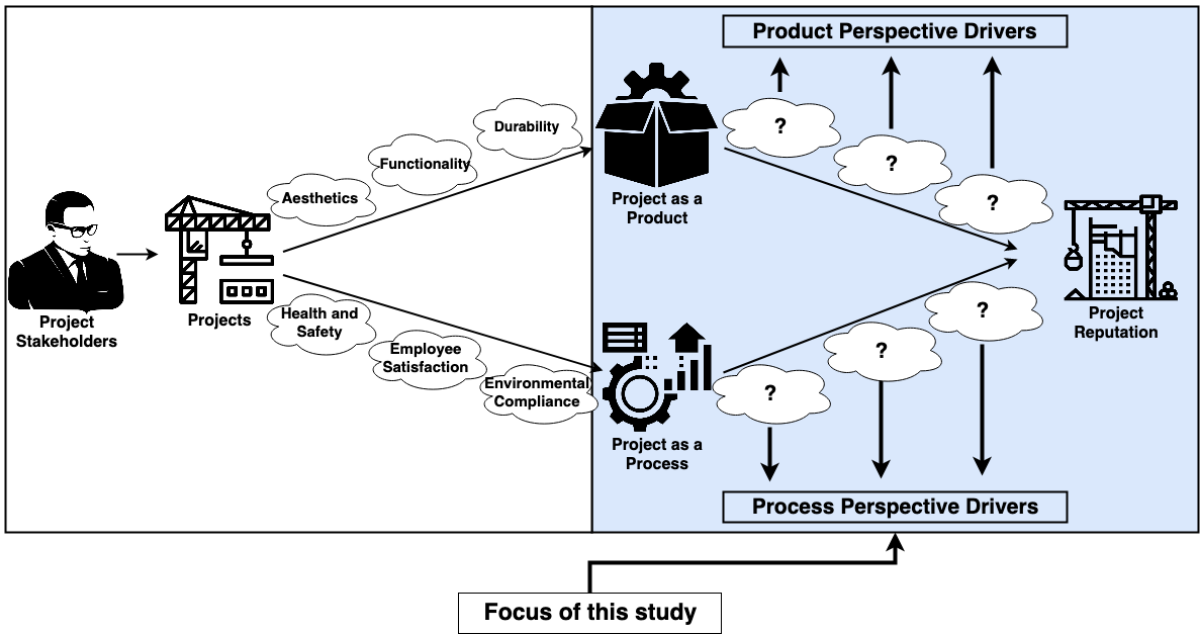

Figure 2: Project as a Product or as a Process

Hence, coming from the above background, the overall aim of this study is to "investigate the critical drivers influencing reputation of mega-projects from the perspectives of construction professionals within the UK construction sector". In order to achieve this aim, the following objectives have been identified for this study:

1. To identify a robust and reliable set of drivers of megaproject reputation in construction organisations from a product and a process-based perspective.
2. To identify the top drivers of megaproject reputation in construction organisations from a product and a process-based perspective.
3. To explore the underlying dimensions and structure of megaproject reputation of construction organisations from a product and a process-based perspective.

In order to fulfil the aim and objectives of the study, the first phase of the study employs a qualitative enquiry, using literature review and Focus Group Interviews (FGIs) as means of data collection. This is followed by a second phase quantitative approach where pilot-tested questionnaires will be used for eliciting broader construction practitioners' opinion. In line with

the objectives of the study, the responses of the questionnaire survey will be subjected to rigorous statistical analyses, which include reliability analysis, descriptive mean testing and exploratory factor analysis.

As a theoretical insight for this study, the next section will provide a theoretical distinction between process and product success factors and how they can diversely influence the concept of reputation. This is then followed by a research methodology section which describes and justifies the methodological approach employed in the study. Then, the findings of the exploratory factor analysis and a discussion of the identified key drivers are presented. Lastly, the conclusion of the study, re-emphasises the significant issues presented in the discussion and areas of further research is described.

2 Theoretical distinction between process and product success factors in project management

Owing to the ambiguous and multi-dimensional nature of project success, it is regarded as one of the most controversial concepts in project management (Rodriguez-Segura et al., 2016). A further proof of its ambiguity is the increasing acknowledgement by authors such as Baccarini (1999), Jugdev and Muller (2005), Ika (2009) and McLeod et al. (2012) that project success transcends project management success, and that it needs to be measured against the functional specifications and requirements of the project. According to McLeod et al. (2012), this therefore results in a distinction between a project's process success and a project's product success. Focusing on the former may lead to the consideration of short-term criteria such as time, cost and scope (Atkinson, 1999; Jugdev and Muller, 2005; Ika, 2009), while the latter leads to the consideration of long-term criteria such as product use, user or client satisfaction and benefits to users or clients (Wateridge, 1998; Shenhar et al., 2001; Bannerman, 2008). Based on these distinctions, it is not hard to imagine that project's process success and a project's product success will propagate different success factors which are crucial towards attaining project success as a whole. Based on this supposition, subsequent paragraphs will discuss "process success factors" and "product success factors".

In the case of project's process success, authors such as Egbu (1999), Nguyen *et al.* (2004) and Toor and Ogunlana (2008) argue that regular client consultation is of utmost importance when seeking to achieve overall process success. This is particularly important because it gives both the client and the project participants the opportunity to keep track of their activities. Since project process considers the manner at which a project is managed throughout the project life-cycle,

178 emphasis is placed on the competence (Caudron, 1999; Loo, 2002; Toor and Ogunlana, 2008) and
179 sufficient experience (Walker, 1995; Belassi and Tukel, 1996) of the team delivering the project.
180 According to Toor and Ogunlana (2008), this also includes the competency and leadership of the
181 project manager and how he/she manages the project. For example, in a construction project, the
182 project manager manages health and safety processes by identifying and upholding health and
183 safety measures to minimise threats to staffs and those affected by the work throughout the project
184 life cycle. As such, success will depend on the successful completion of project without health and
185 safety issues (Chan et al., 2004; Chua et al., 1999) and the successful completion of project without
186 environmental issues (Chan et al., 2004; Akinsola et al., 1997). Furthermore, a project manager
187 demonstrates his/her dexterity by delegating responsibilities to appropriate and capable team
188 members and setting deadlines where appropriate (Nguyen *et al.*, 2004; Jha and Iyer, 2006).
189
190 In regards to project product success, authors such as Bojanic (1991) and Zeithaml et al. (1990)
191 suggest that quality is an important product success factor because projects are delivered in a highly
192 competitive market, and meeting or exceeding client expectations can be a source of competitive
193 advantage. Although, design quality is not as important as time or cost to the client in the short-
194 term, using a high-quality design will increase end-user satisfaction which may lead to increased
195 market share (Diekmann and Girard, 1995; Chua *et al.*, 1999; Chan *et al.*, 2004). Since project
196 product considers the long-term satisfaction of the client, importance is placed on the sustainability
197 and durability of the project upon completion (Hubbard, 1990; Chua *et al.*, 1999; Chan *et al.*, 2004).
198 This is because clients are usually concerned about their project being able to withstand wear,
199 pressure or damage. According to authors such as Akinsola *et al.* (1997) and Chan *et al.* (2004),
200 using technologically advanced project materials plays an important role towards withstanding
201 wear and tear as it increases quality, safety and value for money which allures to the client.
202
203 *Table 1: Drivers influencing project reputation in construction organisations*

PRODUCT SUCCESS FACTORS	SOURCES IN LITERATURE
1. Exceeding client quality expectations	Diallo and Thuillier (2004); Hyväri (2006),
2. Sustainability and durability of project upon completion	Hubbard (1990); Chua *et al.* (1999); Chan *et al.* (2004).
3. Technological advancement of project materials	Pinto and Slevin (1987); Akinsola *et al.* (1997); Chan *et al.* (2004).
4. Using a high-quality design	Diekmann and Girard (1995); Chua *et al.* (1999); Chan *et al.* (2004).
5. Incorporating innovation in the design solution	Pinto and Slevin (1987); Kumaraswamy and Chan (1999); Chua *et al.* (1999); Bossink (2004); Young (2013).

6. Use of standard details and specifications in design	Sanvido *et al.* (1992); Laufer *et al.* (1996); Loo (2002).
PROCESS SUCCESS FACTORS	**SOURCES IN LITERATURE**
7. Preparation of a quality plan in line with clients brief	Saram and Ahmed (2001); Jha and Iyer (2006).
8. Awarding bids to the right designers/contractors	Songer and Molenaar (1997), Nguyen et al. (2004), Phua (2004) and Gale and Luo (2004); Toor and Ogunlana (2008).
9. Conducting regular meetings and design reviews	Saram and Ahmed (2001); Nguyen *et al.* (2004); Jha and Iyer (2006).
10. Creating a positive group environment	Kerzner (1987); Hassan (1995).
11. Finishing within budget	Belout (1998); Akinsola *et al.* (1997); Chan *et al.* (2004).
12. Finishing on time	Atkinson (1999); Diallo and Thuillier (2004); Hyväri (2006),
13. Competent project team	Sanvido *et al.* (1992); Laufer *et al.* (1996), Caudron (1999); Loo (2002); Toor and Ogunlana (2008).
14. Competent project manager	Jaselskis and Ashley (1991); Belassi and Tukel (1996); Chua *et al.* (1999); Toor and Ogunlana (2008).
15. Sufficient level of project experience from project team	Walker (1995); Belassi and Tukel (1996).
16. Delegation of responsibilities to appropriate project team members	Beath (1991); Belassi and Tukel (1996); Nguyen *et al.* (2004); Jha and Iyer (2006).
17. Top management support	Pinto and Slevin (1987); Hubbard (1990); Belassi and Tukel (1996); Belout and Gauvreau (2004); Nguyen et al. (2004); Yu et al. (2005) and Fortune and White (2006).
18. Regular client consultation	Egbu (1999); Nguyen *et al.* (2004); Toor and Ogunlana (2008).
19. Ensuring the availability, suitability and compatibility of materials used in the design	Tukel and Rom (1995); Belassi and Tukel (1996); Minato (2003).
20. Successful completion of project without environmental issues	Belassi and Tukel (1996); Akinsola *et al.* (1997); Chan *et al.* (2004).
21. Successful completion of project without adverse health and safety issues	Chua *et al.* (1999); Kumaraswamy and Chan (1999); Chan *et al.* (2004).

3 Research Methodology

In order to achieve the aim and objectives of this study, an exploratory sequential mixed method approach which commences with a qualitative study and culminates with a quantitative study was adopted (see figure 3 for the methodological flow-chart of the study).

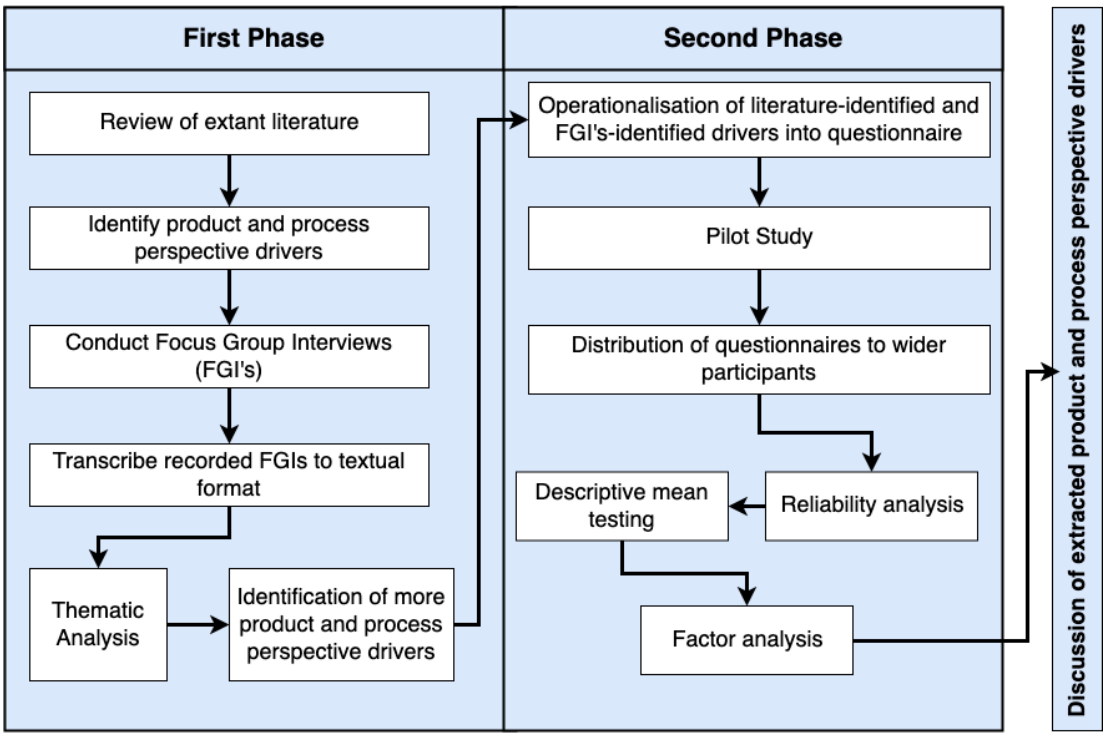

Figure 3: Methodological flow chart for the study

3.1 Qualitative Study

After careful identification of several hypothetical process and product success factors influencing megaproject reputation through a literature review, the study proceeded to conduct 4 Focus Group Interviews (FGIs) to identify more process and product success factors that may not have been identified in the literature. FGI participants were purposively selected based on defined and specific qualities (Creswell, 2013) which include: (1) suitable participants must be a staff of a construction organisation in the UK, and (2) participants must have over seven years' experience of working in the construction industry. Based on the above-stated selection criteria, participants were reached using the research team's network of contacts within the UK's construction industry. Participants that signified their interest to participate in the FGIs had job titles which include construction manager, project managers, deputy project managers, line managers (contracts manager, site manager, design manager, quality control manager etc). Most of the participants were professionally positioned at middle or higher management level which implies that a certain level of accuracy and credibility in the data collected were achieved. Similar to Toor and Ogunlana (2009), participants were clustered into the following: (1) client/developer representatives; (2) project management consultants; (3) construction supervision consultants; (4) design consultants; and (5) construction contractors.

Table 2: Overview of the focus group interviews and the participants

Focus Group Interviews	Profession of Participants	Years of experience	Total experts
FG1	2 CR 1 PMC 1 CSC 1 DC	8-16	5
FG2	1 PMC 1 CSC 1 CR 2 CC	11-18	5
FG3	2 PMC 1 CSC 2 DC 1 CC	10-19	6
FG4	1 CC 1 CSC 1 PMC 2 DC 2 CR	8-13	7
			23
Notes: CR – client representative, PMC – project management consultants, CSC – construction supervision consultants, DC – design consultants, CC – construction contractors			

Table 2 shows the ensuing cluster and the vast experience of the interviewees. The interview outline was developed jointly by the research team based on the key issues that emanated from the review of extant literature. Foremost among these issues was the fundamental need to confirm whether construction project stakeholders view projects as a product or as a process. Furthermore, there was the imperative need to validate the drivers identified from extant literature were still relevant in today's practice. After series of modification, the interview outlines covered themes such as: the demographics of the respondent, the experience of the respondent; validation or invalidation of the literature-identified project drivers influencing megaproject reputation of construction organisations; and the opportunity for participants to add more project drivers influencing megaproject reputation of construction organisations based on their experiential opinion. The ensuing FGIs were moderated by two members of the research team, with each interview spanning 70, 75, 69 and 74 minutes respectively.

3.1.1 Thematic Analysis

To analyse the qualitative data collated from the FGIs, a content-driven thematic analysis was adopted to carry out an exhaustive comparison of all the segments of the qualitative data to identify relationships and structures among recurring themes (Braun et al., 2014). Using NVivo 12 on Mac,

the recorded data from the FGIs were transcribed into written statement and read several times to identify main themes and sub-themes that explain the driver's participants suggest influences the project reputation of construction organisations. The thematic analysis was carried out using a structured coding scheme which focused on four main labels which include source, discipline, context and keywords. The 'source' identifies the respondent, 'discipline' represents the category of the respondent, 'context' labels the circumstances informing the transcript segment which include context coding classification such as New, Response, Build-up and Moderator. Lastly, the 'keyword' label depicts a summary of the main issue raised within a statement. Example of quotation classification based on this coding scheme is shown in Table 4. At the end of the content-driven thematic data analysis, the qualitative study revealed 6 additional project drivers influencing the megaproject reputation of construction organisations (see Table 5 for drivers that emanate from the FGIs). These drivers were subsequently grouped under the categories of product-based perspective drivers and process-based perspective drivers.

Table 4: Example of classification based on the coding scheme

No	Quotation	Source	Discipline	Context	Keywords
1.	"…. **high level of staff commitment and motivation** are paramount in an **organisational structure**. If these are present, everyone will be determined in their work, proactive in offering support. This will invariably impact the delivery of the project.	FGI-3	Supervision Consultant	Response	High level of staff commitment and motivation throughout organisational structure

Table 5: Drivers influencing the project reputation of construction organisation that emanated from FGIs

DRIVERS	FGI-1	FGI-2	FGI-3	FGI-4
PRODUCT-BASED PERSPECTIVE DRIVERS				
1. *Correct use of construction materials, methods and techniques	✓	✓	✓	
PROCESS-BASED PERSPECTIVE DRIVERS				
1. * Mutual trust among project stakeholders	✓	✓		✓
2. * High level of staff commitment and motivation			✓	✓
3. * Amicable resolution of differences/confusion amongst project participants		✓		✓

**Drivers not found in the literature but obtained in the FGIs*

3.2 Quantitative Study

To elicit broader opinion on the applicability and acceptability of the qualitative findings, the second phase of the study involved the dissemination of a questionnaire survey to broader audience of construction practitioners. According to Creswell (2013), this survey provides a cost-effective way of reaching out to wider relevant audiences and ensure external validity of findings. To formulate the questionnaire, the categories of drivers identified from the literature were combined with the categories of drivers obtained from the FGIs. This resulted in 7 product-based perspective drivers and 21 process-based perspective drivers. The questionnaire contained three sections. Section I was intended to gather the demographic information of the respondents. Section II illuminated the concept of project as a process and as a product, and respondents were asked to select which concept best describes their assumed perception when adjudging a megaproject' reputation. Section III of the questionnaire asked the respondents to assign an importance value to each of the drivers in their assumed category based on how it influences their construction megaproject's reputation. They were requested to rate the drivers based on a 5-point Likert Scale (1=Not Important, 2=Slightly Important, 3=Moderately Important, 4=Important and 5=Most Important). After the initial draft of the questionnaire, in order to improve the internal consistency of the research instrument (Creswell, 2013), a pilot study was conducted (3 from industry and 1 from academia).

Using a random sampling technique, a distribution list of 220 survey respondents was collated using directories from the Institution of Civil Engineers (ICE), Royal Institute of Chartered Surveyors (RICS), Royal Institute of British Architects (RIBA), Local Government Association (LGA) and Chartered Institute of Buildings (CIOB). To ensure high response rate, appropriate permissions and approval were obtained from the various professional and government bodies. After appropriate approval was granted, introductory conversations and email contacts were made with each respondent to explain and clarify the objectives of the research in order to get a response commensurate with their experience and expertise. The survey respondents include project managers, clients, architects, building contractors, civil engineers, quantity surveyors and structural engineers (See Table 3 for the demographics of survey respondents). A total of 220 questionnaires were distributed to respondents with complete email and postal addresses. The survey was distributed between February 2019 and May 2019. After several reminder emails, a total of 134 questionnaires were returned out of 220 distributed. This showed a return rate of 55.4%, which is considered very impressive for research of this nature. The returned questionnaires were in five

broad categories, which are 31 Client Representatives, 26 Project Management Consultants, 25 Construction Supervision Consultants, 23 Design Consultants and 17 Construction Contractors.

Table 3: Demographics of survey respondents

Variables	Sample size	% of Respondents
Total questionnaire distributed	220	100%
Total of submitted responses	134	60.9%
Discarded responses	12	8.9%
Total number of usable responses	122	91%
Cluster of Professions		
CR – Client Representative	31	25.4%
PMC – Project Management Consultants	26	21.3%
CSC – Construction Supervision Consultants	25	20.5%
DC – Design Consultants	23	18.9%
CC – Construction Contractors	17	13.9%
Years of experience		
0-5	7	5.7%
6-10	25	20.5%
11-15	13	10.6%
16-20	27	22.1%
21-25	32	26.2%
Above 26 years	18	14.7%

3.2.1 Reliability analysis

After thorough arrangement of the questionnaire survey data into SPSS, the quantitative analysis commenced by conducting a reliability analysis to determine the internal consistency of the dataset as recommended by social scientists (Field, 2009). As such, Cronbach's alpha (α) coefficient of reliability was calculated for the drivers using Eq. (1).

$$\alpha = \frac{N^2\overline{COV}}{\sum_{i=1}^{N} S_i^2 + \sum_{i=1}^{N} COV_i} \quad (1)$$

Where N represents the total number of drivers, COV is the average covariance between drivers, and S^2_i and COV_i are the variance and covariance of driver 'i' respectively. Cronbach's alpha ranges from 0 to 1, where $a < 0.5$ is unacceptable, $0.6 > a \geq 0.5$ is poor, $0.7 > a \geq 0.6$ is questionable, $0.8 > a \geq 0.7$ is acceptable, $0.9 > a \geq 0.8$ is good and $a \geq 0.9$ is excellent. Thus, the higher the reliability coefficient, the greater the internal consistency of the data (Field, 2009). Using SPSS version 24 on Mac, the Cronbach's alpha coefficient for the product perspective drivers and process perspective drivers influencing project reputation was 0.723 and 0.876 respectively (See Table 5 and Table 6

for the results of the statistical tests). Based on the above Cronbach alpha ranges, these two coefficients depict an acceptable internal consistency of the data. Furthermore, to confirm that all the drivers in the respective categories are contributing to the internal consistency of the data, the "Cronbach's alpha if item deleted" is further examined as shown in column four of Table 5 (product perspective) and Table 6 (process perspective). This is heavily reliant on the view of Field (2009) that a criterion is not a good measure of the desired construct if it is not contributing to the overall reliability of the data. In this case, any item with Cronbach's alpha above 0.723 for the product drivers or 0.876 for the process drivers means that such item is not a good construct and should be deleted from the list of variables. On this basis, none of the listed drivers in both categories had a value over the respective threshold. This signified that all the drivers in both categories contribute to their respective overall reliability and were subsequently retained for further analyses.

3.2.2 Mean ranking

The categories of drivers were ranked based on their mean following the 5-point Likert Scale. Based on the result of the mean testing as shown in Table 5, the top five drivers influencing the megaproject reputation of construction organisations from a product perspective are: (1) PPD1– exceeding client quality expectations; (2) PPD2– sustainability and durability upon completion; (3) PPD4– using a high-quality design; (4) PPD5– incorporating innovation into the design solution; and (5) PPD3– technological advancement of project materials. On the other hand, as shown in Table 6, the top five drivers influencing the megaproject reputation of construction organisations from a process perspective are: (1) PRPD-14 successful completion of project without adverse health and safety issues; (2) PRPD-15 successful completion of project without adverse environmental issues; (3) PRPD-8 competent project manager; (4) PRPD-7 competent project team members; and (5) PRPD-2 awarding bids to the right designers/contractors.

Table 5: Outputs of reliability analysis, and mean ranking for product perspective drivers

Label	Product Perspective Drivers	Reliability analysis		Significance Index	
		Corrected Item: Total Correlation	Cronbach's Alpha if Item Deleted	Mean Value	Overall ranking
PPD-1.	Exceeding client quality expectations	0.317	0.713	4.5082[b]	1
PPD-2.	Sustainability and durability of project upon completion	0.526	0.674	4.3607[b]	2
PPD-3.	Technological advancement of project materials	0.33	0.715	3.8525[b]	5
PPD-4.	Using a high-quality design	0.539	0.669	4.3443[b]	3
PPD-5.	Incorporating innovation in the design solution	0.345	0.721	4.0328[b]	4
PPD-6.	Use of standard details and specifications in design	0.313	0.683	3.445	7
PPD-7.	Correct use of construction materials, methods and techniques	0.362	0.706	3.6393	6
	[a]Overall Cronbach's alpha = 0.723. [b]Top five items based on mean ranking				

Table 6: Outputs of reliability analysis, and mean ranking for process perspective drivers

Label	Process Perspective Drivers	Reliability analysis		Significance Index	
		Corrected Item: Total Correlation	Cronbach's Alpha if Item Deleted	Mean Value	Overall ranking
PRPD-1.	Preparation of a quality plan in line with clients brief	0.753	0.857	3.5902	17
PRPD-2.	Awarding bids to the right designers/contractors	0.692	0.861	4.1803[b]	5
PRPD-3.	Conducting regular meetings and design reviews	0.745	0.859	4.0492	7
PRPD-4.	Creating a positive group environment	0.484	0.87	4.082	6
PRPD-5.	Finishing within budget	0.492	0.87	3.9016	12
PRPD-6.	Finishing on time	0.608	0.865	3.9672	10
PRPD-7.	Competent project team members	0.388	0.874	4.2623[b]	4
PRPD-8.	Competent project manager	0.444	0.872	4.2787[b]	3
PRPD-9.	Sufficient level of project experience from project team	0.386	0.873	3.9508	11
PRPD-10.	Delegation of responsibilities to appropriate project team members	0.414	0.873	3.7377	14
PRPD-11.	Top management support	0.674	0.862	3.7213	15
PRPD-12.	Regular client consultation	0.213	0.879	4	9
PRPD-13.	Ensuring the availability, suitability and compatibility of materials used in the design	0.264	0.878	3.9016	12
PRPD-14.	Successful completion of project without environmental issues	0.385	0.874	4.3607[b]	2
PRPD-15.	Successful completion of project without adverse health and safety issues	0.286	0.876	4.5082[b]	1
PRPD-16.	Amicable resolution of differences/confusion amongst project participants	0.556	0.867	3.7049	16
PRPD-17.	High level of staff commitment and motivation	0.678	0.861	4.0328	8
PRPD-18.	Commitment and motivation throughout organisational structure	0.723	0.843	3.012	20
PRPD-19.	Sound expectations of staff performance and requirements	0.647	0.811	3.4282	18
PRPD-20.	Provision of organised means for gathering information and compiling records	0.592	0.834	3.271	19
PRPD-21.	Materials have been thought about throughout the design process	0.372	0.841	3.01	21
	[a]Overall Cronbach's alpha = 0.876. [b]Top five drivers based on mean ranking				

3.2.3 Factor analysis

To fulfil the objective of examining the underlying relationships of the identified drivers in the respective categories, factor analysis was performed on the dataset using SPSS, version 24 on Mac. According to McDonald (2014), this analysis is an advanced statistical method for reducing and grouping observed variables according to their underlying patterns or relationships. While factor analysis is a traditional mathematical model, it is still being extensively employed in numerous research studies because it reduces exhaustive lists of factors/drivers into fewer grouping that cause the maximum variance (Toor and Ogunlana, 2008). To this effect, many recent research studies in construction have employed it (i.e. Doloi *et al.*, 2012; Kumar, Luthra and Haleem, 2014) and recommended it for further use (Li et al., 2005). In order to assess the suitability of the respective categories of survey data for factor analysis, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy, Bartlett's test sphericity and determinant of coefficient matrix were conducted (Field, 2005). From the results, the KMO, Bartlett's test and determinant of coefficient matrix of the product perspective drivers indicated 0.591, 8.74e-4 and 2.16e-7. On the other hand, the aforementioned tests were also carried out on the process perspective drivers, and they indicated 0.644, 1.39e-3 and 0.56e-5.

Using the rule of thumb that a survey data's KMO should be above 0.5, Bartlett test should be less than 0.5 and the determinant of coefficient matrix should be greater than 0.00001, the respective categories of survey data met the minimum criteria except that of the coefficient matrix. To address this problem, Field (2005) suggested examining the diagonal of anti-image correlation matrix in the SPSS output data where any attributes having a value of less than 0.5 should be removed, before conducting another factor analysis. Implementing this in our respective datasets, 2 drivers were removed from the product perspective drivers (PPD1 and PPD4) while 4 drivers (PRPD5, PRPD6, PRPD19 and PRPD21) were removed from the process perspective drivers. For the product perspective drivers, 5 drivers were retained while for the process perspective drivers, 17 drivers remained. After these removals, a new factor analysis was conducted on the respective reduced datasets. The new result of the KMO, Bartlett's test and determinant of coefficient matrix of the product perspective drivers indicated 0.746, 1.41e-7 and 2.59e-3 while the process perspective drivers indicated 0.902, 4.39e-4 and 3.15e-5. Checking the anti-image correlation matrix, all the values in the diagonal were above 0.5. With all these tests satisfying the minimum standards and the suitability of the respective datasets, the reduced data containing 5 product perspective drivers and 17 process perspective drivers was therefore used for the remaining analysis of this paper.

Subsequently, factor extraction was conducted on the respective reduced datasets using the principal axis factoring to understand the underlying relationships of the respective datasets. The orthogonal rotation of the attributes was performed using varimax rotation where factors with eigenvalue greater than 1 were extracted. Going by the factor analysis, the product perspective survey data revealed a one-group solution (results are tabulated in Table 7) while the process perspective survey data revealed a three-group solution (results are tabulated in Table 8). Based on the characteristics underlying them, the product perspective one-group solution was labelled "project quality" while the process perspective three-group solution were labelled "robust social and environmental sustainability plan", "project team competence and interpersonal relationship" and "project process efficacy" respectively (see Figure 4). In the following sections, these key drivers of megaproject reputation in the construction industry will be elaborated in further detail.

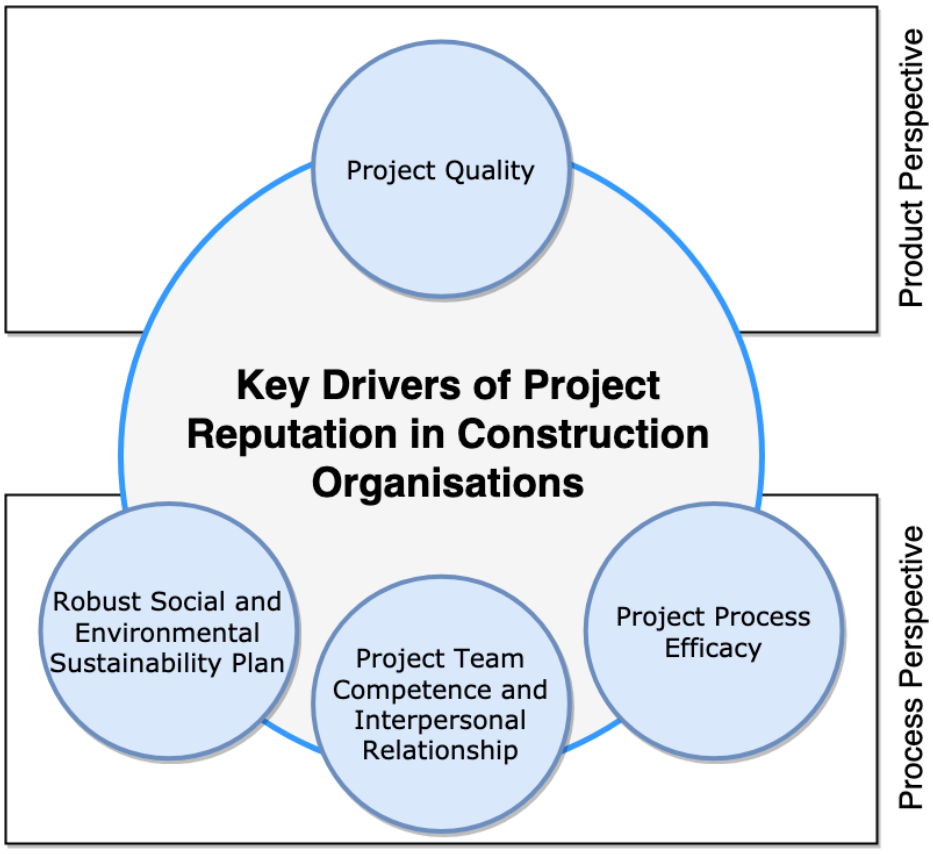

Figure 4: Key drivers of project reputation in construction organisations

Table 7: Factor loading for product perspective drivers of project reputation in construction organisations

Label	Product Perspective Drivers	Components (Driver groupings)
		1
PPD-5.	Using a high-quality design	
PPD-3.	Technological advancement of project materials	
PPD-2.	Sustainability and durability of project upon completion	
PPD-7.	Correct use of construction materials, methods and techniques	
PPD-6.	Incorporating innovation in the design solution	
Kaiser-Meyer-Olkin = 0.746 **Bartlett's test of sphericity = 1.41e-7** **Determinant of coefficient matrix = 2.59e-3** **Extraction method = Principal Component Analysis.** **Rotation method: Varimax Rotation and Principal Axis Factor.**		

56 *Table 8: Factor loading for process perspective drivers of project reputation in construction organisations*

Label	Process Perspective Drivers	Components (Driver groupings)		
		1	2	3
PRPD-15.	Successful completion of project without adverse health and safety issues	0.840		
PRPD-14.	Successful completion of project without environmental issues	0.786		
PRPD-8.	Competent project manager		0.899	
PRPD-7.	Competent project team		0.871	
PRPD-9.	Sufficient level of project experience from project team		0.825	
PRPD-10.	Delegation of responsibilities to appropriate project team members		0.792	
PRPD-17.	High level of staff commitment and motivation		0.754	
PRPD-18.	Commitment and motivation throughout organisational structure		0.740	
PRPD-16.	Amicable resolution of differences/confusion amongst project participants		0.686	
PRPD-4.	Creating a positive group environment		0.642	
PRPD-2.	Awarding bids to the right designers/contractors			0.903
PRPD-12.	Regular client consultation			0.846
PRPD-11.	Top management support			0.811
PRPD-3.	Conducting regular meetings and design reviews			0.803
PRPD-1.	Preparation of a quality plan in line with clients brief			0.800
PRPD-13.	Ensuring the availability, suitability and compatibility of materials used in the design			0.701
PRPD-20.	Provision of organised means for gathering information and compiling records			0.577
Kaiser-Meyer-Olkin = 0.902 **Bartlett's test of sphericity = 4.39e-4** **Determinant of coefficient matrix = 3.15e-5** **Extraction method = Principal Component Analysis.** **Rotation method: Varimax Rotation and Principal Axis Factor.**				

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4 Discussion of the extracted product perspective drivers

4.1 Project Quality

This driver grouping accounts for 71.4% of the total variance and consists of five drivers as shown in Table 7. The name "project quality" was imposed on the driver grouping because all the drivers integral in this grouping are geared towards attaining client-desired quality based on client specification. Based on these drivers, the term 'quality' as defined by Crosby (1992) connotes the 'conformance to requirements'. Basu (2014) argues that in a project situation, quality is mostly relegated to a 'lip service' and to simply 'ticking boxes' because most projects managers tend to focus more on only meeting time and staying within agreed budget. As such, Anderson (1992) suggests that when seeking to tailor project quality in line with the specifications of the client, two broad spectra of management issues must be attained. One issue of interest is the implementation of a sound project management practice to control and maintain project quality, such as using a high-quality design throughout the lifecycle of the project (Anderson, 1992). However, for this project management practice to be implemented fittingly, it must be overseen by a project manager who understands the latest technological advancement of project materials (Chan *et al.*, 2004) and then ensures their correct use on the project at hand. This will then ensure the sustainability and durability of the project upon completion, which will delight the client. If this is assured, clients and even end-users of the project are much more likely to acknowledge and sing the megaproject's praises. This would consequently strengthen the organisational reputation of the construction organisation immensely.

5 Discussion of the extracted process perspective drivers

5.1 Robust Social and Environmental Sustainability Plan

This driver groupings accounts for 44.12% of the total variance. It underlies two drivers as shown in Table 8. Based on these drivers, the term "robust social and environmental sustainability plan" is imposed on the driver grouping. This term within this context is defined as the plans developed by a construction organisation on a megaproject to foster social and environmental sustainability where the project is being delivered. This driver grouping confirms the assertions of previous studies by Chan *et al.* (2004) and Chua *et al.* (1999) that the social and environmental implications of construction projects must be considered and catered for during project delivery process. For instance, in recent years, the social and environmental impacts of construction megaprojects have been disreputable (Chan *et al.*, 2004) as a result of two main issues, which include environmental

concerns and health and safety issues. In the first instance, the construction industry is known to consume the most portion of resources excavated from nature, and generates the highest portion of landfill waste (Ajayi *et al.*, 2017). As a result of recent global sustainability agenda, the industry is under pressure to drastically reduce, reuse and recycle project materials (Olawale et al., 2019). Hence, the level at which construction megaproject adhere or abandon green initiatives determines their reputation. On the other hand, whilst it is commonplace that the construction industry is bedevilled with health and safety risks, there has been a concentrated effort by Health and Safety Executives to reduce site injuries/deaths to the bare minimum (Ajayi et al., 2019). The extent to which health and safety functions are maintained and casualties were non-existent on construction projects determines the megaproject's reputation.

5.2 Project Team Competence and Interpersonal Relationship

This driver grouping constitutes 31.7% of the total variance, encompassing eight drivers. From the set of drivers inherent in the driver grouping, it can be construed that project team competence and interpersonal relationship is a group of requisite expertise, project experience, skills, commitment and harmony that influences construction project's performance and reputation. Due to the intricate nature of a construction project's delivery, it is practically impossible for one staff/participant/member to implement and execute a project (Munns and Bjeirmi, 1996). As such, only a competent and consistent set of individuals, consisting of all necessary professionals tasked with different roles crucial to aspects of the construction megaproject are essential because they are the catalyst for determining if the megaproject will be considered a success or a failure (Loo, 2002), hence its reputation. Furthermore, the lessons learned from previous projects by these professionals which form their project experience is also important as they can then transfer them to other projects. However, the reputation of a megaproject is also reliant on the interpersonal relationship of the project team which breeds a good working environment among project participants (Khalfan *et al.*, 2007; Hassan, 1995). For instance, a positive group environment will foster good working condition for project participants which will ultimately enable them to discharge their duties appropriately (Constantine, 1993). This will enable project participants to share task information, solve problems and resolve confusions quickly (Wang and Noe, 2010). This would, in turn, create a collaborative work environment, free of negative criticism, ridicule or fear, leading to better communication and reduced conflict (Rego *et al.*, 2007), which will influence the megaproject's reputation.

5.3 Project Process Efficacy

This driver grouping accounts for 23.02% of the total variance and underlies seven drivers as shown in Table 8. The term "project process efficacy" in this context refers to the efficient initiation, planning and delivery of a project which ultimately results in the achievement of project objectives. When initiating a construction project, it is important to select and award bids to the right project partners (i.e. designers/sub-contractors). This is because every construction project has its own unique features, which can only be delivered by competent and experienced participants who have the resources to achieve the project objectives at hand. Hence, awarding of bids to subcontractors should be free from nepotism, favouritism or cronyism when seeking to employ project participants because only competent project participants deliver projects effectively (Olawale et al., 2019). Throughout the lifecycle of the project, Jaselskis and Ashley (1991) assert that top management support maximises a project's chances of a favourable reputation because only the management, if competent can ensure the availability, suitability and compatibility of project materials. As the project progresses, regular client consultation and regular meetings and design reviews among project participants on construction projects is important because it is vital to project performance (Toor and Ogunlana, 2008; Nguyen *et al.*, 2004). This relationship is particularly imperative because the client, who is usually the owner of the project knows his/her expectations of the ideal product/project/service. As such, contracted project stakeholders must aim to deliver the project to the client's satisfaction and design reviews because the client will have a say on the project's performance and reputation.

6 Conclusion

This study emerged on the backdrop of the non-inclusiveness of the dynamics of the construction industry in the business/marketing dominated reputation research. In a bid to correct this simplistic existing discourse, the study examined the key product and process drivers for developing project reputation of construction organisations from the perspective of construction professionals. Using an exploratory sequential mixed methods approach, the study provided an in-depth understanding of the phenomenon by collecting and analysing qualitative and quantitative data. Accordingly, four FGIs were conducted to corroborate drivers from the literature and to identify more drivers that are crucial for developing project reputation. Twenty-eight (28) drivers were identified altogether and were subsequently inputted in a questionnaire survey and then distributed to 220 professionals. The responses of the questionnaire survey were then subjected to three statistical analyses, which includes, reliability analysis, descriptive mean testing and

exploratory factor analysis. In particular, the exploratory factor analysis of the product perspective survey data revealed a one-group solution ("project quality"), while the process perspective survey data revealed a three-group solution ("robust social and environmental sustainability plan", "project team competence and interpersonal relationship" and "project process efficacy").

These driver-groupings, which form the key drivers of reputation in mega-construction projects has a great impact for both research into construction project's reputation and construction practices. Once stakeholders, professionals and organisations are well aware of these key drivers, they can easily identify and prioritise critical issues associated with enhancing and sustaining the project reputation of construction organisations. Therefore, such organisations can integrate such drivers into their overall business strategy in a manner that allows quality project delivery to translate into positive project reputation. This positive reputation will in turn become a differentiation and competitive strategy for construction organisations seeking to gain an advantage in the increasingly volatile and dynamic construction industry. In acknowledgement of Pareto's law, the identification of the key drivers of project reputation can effectively allow construction organisations to divert their resources in the directions where they know their maximum project reputation lies. For instance, these key drivers can assist project forerunners to plug gaps in their respective projects by highlighting essential developmental needs that will guarantee positive project reputation. This could be in form of addressing social and environmental implications at the inception of construction projects.

Despite the contributions of this study, as all studies, it also has its limitations. A major limitation of this study stems from the fact that the study was undertaken in the UK construction industry context, and therefore the results may only be considered valid in this context. Future research studies can seek to replicate this study in other geographical locations which may have a distinct construction industry with distinct project characteristics which together influences the reputation of a given project. Furthermore, future studies may seek to review more literatures and identify more product and process perspective drivers of construction megaproject reputation.

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