EXAMINING CONSTRUCTION AND PROJECT MANAGEMENT PERSPECTIVES OF PROJECT-BASED FAILURE

Danstan Chiponde, Barry Gledson[1] and David Greenwood

Faculty of Engineering and Environment, Northumbria University, Ellison Place, Newcastle Upon Tyne, NE1 8ST, UK

Projects are distinctive, time-constrained, undertakings meant to generate benefits for their stakeholders. They are delivered by Project-based organisations (PBOs) whose various actors separately consider achievement in relation to a project's outputs, outcomes, and impact. For example, contracting organisations typically consider projects that fail to meet their principal cost and time targets as having been unsuccessful, whereas the various sponsors, customers, collaborators, and end-users may instead base their evaluation upon the ultimate operational results of these same projects. The aim was to examine the knowledge base for contrasting perspectives around project-based failure in the construction sector. This required scrutiny and analysis of the extant literature, using a systematic-type literature review approach within and across construction management (CM) and project management (PM) literature. This revealed that in PM literature, considerations of failure are often more introspective and discussed in more general terms; with its main causes being associated with the PM function itself. Whereas the CM literature instead focuses on more specific and external failures; with causes more likely attributed to the wider supply chain and contextual factors. Results can help inform the design of dedicated research instruments to help better understand the impact of failure on PBOs.

Keywords: failure, organisational learning, performance, success

INTRODUCTION

Projects pervade across society (Jensen *et al.,* 2016) and their success, or lack thereof, impacts upon organisational performance and wider economic activity. Thus, key factors such as project managers (PMs), and specific to the construction sector, construction managers (CMs), regularly review progress to try to ensure delivery success. Unfortunately, project-related failures are frequent despite ever-improving education and training to prevent this (Shore, 2008). Much prior research has focused on project success factors, particularly focussing on the PM function (Jugdev and Muller, 2005) with, as Turner and Zolin (2012) point out, similar analysis of the CM function being far rarer. To address this, the present study adopts both PM and CM perspectives in focusing on project failure: A topic that itself, according to Velikova *et al.,* (2018) is rarely considered and poorly understood.

[1] barry.gledson@northumbria.ac.uk

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The construction sectors importance, performance, and its considerations of success and failure

The construction sector is important to any nation's economy since it contributes to the Gross Domestic Product (GDP) and creates employment through the provision of its services. For example, in 2017 UK construction accounted for; £113 billion of the value of the economy (6% of the total), 2.4 million jobs and 1 million construction businesses (Rhodes, 2018). Fuelled by population growth, urbanisation and efforts to mitigate the physical impacts of climate change, its importance will continue; with an estimated $78 trillion to be spent on infrastructure between 2014 and 2025 worldwide (PWC, 2014; KPMG, 2017). Unfortunately, it experiences many failures. For example, Ojiako *et al.,* (2008) identified: the London Millennium Bridge; the London Millennium Dome; Wembley Stadium, and; the Scottish Parliament buildings as notable projects that have publicly experienced failure. Reviewing failure in construction reveals that it can be broad and multi-faceted, and of any scale. For example, more recent instances of construction -related failures include the Grenfell tower fire disaster, with 70 lives lost and the Carillion liquidation with 2,782 job losses and £65m redundancy costs (Gerrard, 2018b, Gerard, 2019, Mor *et al.,* 2018). Additionally, it is reported that the presently delayed Crossrail project requires £1bn extra funding indicating that it too may encounter failure (Gerrard, 2018a). Evidently, in construction, failure can range from design, engineering, or technological type failures (Minato, 2003; Love *et al.,* 2008; Shohet and Paciuk, 2006) to business failures with value not realised from investment (Holt, 2013; Alaka *et al.,* 2015, 2016), or beyond.

Traditionally project success or failure has been considered based upon the achievement or otherwise of outputs (i.e. the time-cost-quality triad), however, now, achievements are also considered in relation to a project's outcomes and impact (DBIS, 2010). To clarify, Turner and Zolin (2012) view project output as being the newly built assets immediate and tangible project results as measured at the end of a project in terms of time, cost, and quality (Baccarini, 1999). Project outcomes are instead the new capabilities gained after investing in the project as a result of the project outputs (DBIS, 2010), while impact(s) enable(s) project beneficiaries to do new things, solve problems and are mostly measured months or years post project completion (Turner and Zolin, 2012). Emphasising these distinctions, Baccarini (1999) contends that achieving project outputs is considered more as project management success whilst the realisation of outcomes and impact is instead project success. Additionally, end users tend to focus more on performance (outcome and impact) or project success while the PM delivery team focuses on the project outputs achieved as measures of project management success (Baccarini, 1999; Turner and Zolin, 2012). Evidently, perceptions of project success (or failure) vary between stakeholders because of their own perspectives, and also fluctuate throughout stages of the projects life cycle (Lim and Mohamed, 1999; Gupta *et al.,* 2018). Thus, PMs and CMs should consider this wider spectrum of failure/success variables (including outcomes and impact) and not just the narrow efficiency measures of the iron triangle. Hence, for this studys focus, any lack of intended achievement(s) in one or more of, output, outcome and impact, be it small or large, constitutes an example of project-related failure.

METHODOLOGY

A systematic literature review (SLR) type approach, as described by Bryman (2012; and Oraee *et al.,* (2017) was used for the study which is viewed as an appropriate

research methodology for analysing and synthesising knowledge (Mostafa *et al.,* 2016; Xia *et al.,* 2018). Based on Bryman (2012) discussion of a SLR-type approach, Stage 1 involved defining the purpose of the research which, was to review project failure in construction project management from the perspectives of project- and construction- managers. Stage 2 involved seeking out relevant articles using the keyword search, "Project Failure". In order to obtain these materials, whilst keeping the scope of the operation within reasonable limits, leading journal ranking websites were consulted to determine the 10 most appropriate journals (5 relating to each of the PM and CM domains). Stage 3 involved appraising the articles sourced in Stage 2 for relevance to the research, based on titles relative to failure and the construction industry as per exclusion/inclusion criterion (of correct sector, and the topic being related to both construction, and failure). A further check for duplication and appropriateness of articles sourced was performed by reviewing abstracts and main contents. Thus, the search for key journal articles about failure in PM literature gave an initial total of 418 articles with 10 appropriate articles, having satisfied the exclusion/inclusion criteria, ultimately being selected from the: International Journal of Managing Projects in Business (108 potential articles identified, with 2 appropriate articles selected), International Journal of Project Management (260 identified; 5 selected), Journal of Project Management (42 identified; 2 selected) and Scandinavian Journal of Management (8 identified; 1 selected). A similar search on failure in the CM literature yielded 112 initial articles, filtered down to the most appropriate 14 as follows: Building Research and Information (3 identified; 1 selected), Construction Innovation: Information, Process, Management (5 identified; 2 selected), Construction Management and Economics (28 identified; 1 selected), Engineering, Construction and Architectural Management (35 identified; 5 selected), and ARCOM conference proceedings (41 identified; 5 selected). In total therefore, 24 articles were selected for use in Stage 4, analysis and synthesis.

FINDINGS AND DISCUSSION

When analysing the following aspects were considered: A) research approach; b) their manifest understanding of failure; c) the identified causes of failure, or; d) any recommended mitigation measures. Each is now discussed in turn:

Research approaches and areas of focus

PM literature had much interest on identifying critical failure factors (CFF) or, project success/failure factors (PSFF) (Chen, 2015) revealing a positivist perspective that frequently focused on the need for upskilling of the PM, yet often neglected contextual factors. CM literature also evidenced some focus on failure prediction, and CFF identification models (Trangkanont and Charoenngam, 2014; Lindhard and Larsen, 2016), but by also advocating for managerial and social factors to be considered in failure mitigation, interpretivism was apparent (Chipulu *et al.,* 2014; Saunders *et al.,* 2016). Thus, pragmatic and pluralistic approaches are recommended for undertaking research around project-related failure. Further, research in both PM and CM literature is mostly qualitative, with empirical data usually derived from case studies and semi-regular questionnaire surveys based on purposive sampling observed.

Understanding around failure: Perception, indicators and types

In PM literature, Chipulu *et al.,* (2014) observes there are no singular agreed criteria for measuring success or failure and so variables that merely indicate success or failure on projects are developed, such as: wider society/economic factors, organisational goals, project level- scope, time, cost, quality, risk, safety,

communication, leadership, decision-making, and project team effectiveness. Regarding failure types organisational death and associated synonyms were considered (Dalcher, 2012; Lechler and Thomas, 2015). Poor quality, delays and cost overrun(s) were typically highlighted (Orouji, 2016; Mahmoudi and Feylizadeh, 2017) with inadequate quality mainly considered amongst PM literature as the biggest form of failure (Belassi and Tukel 1996). In the CM literature no singular agreed definition and measure of failure was apparent with instead specific manifestations of failure, such as time delays instead being more prominent (Ansah and Sorooshian, 2018). Razak *et al.,* (2016, p. 835) did offer a definition of failure as "a lack of success, falling short, or omission of some persons, processes or products". Trangkanont and Charoenngam (2014, p. 422) also define program failure as "set of program objectives that were not hierarchically met", citing in their study, failures to meet a projects objective of ensuring low-income earners access to housing and ownership as an example of failure in project outcomes and impact. CM literature also acknowledged business-level failures, giving it much attention, with terms such as bankruptcy, insolvency and financial distress used (Dikmen *et al.,* 2010; Alaka *et al.,* 2016). Love *et al.,* (2008) focused instead on procedural failures such as task errors, omissions, and oversimplifications. Other failures focus on failing to meet customers' requirements around product quality (Razak *et al.,* 2016). It was noted therefore that CM literature is more specific about failure types (defects, delays, costs) when compared to the PM literature. As expected, cost and time overruns were frequently highlighted in both PM and CM literature (Ansah and Sorooshian, 2018) as the common type of failures (Love *et al.,* 2008) and as measures of success/failure (Nahyan *et al.,* 2012). Evidently, both PM and CM research tends to focus on outputs instead of outcomes and impacts in perceiving project failure/success with CM literature particularly focused on financial outcomes (Dalcher 2012).

Causes (and effects) of project failure

Within PM literature there are many causes of project failure, with technical and engineering factors being frequently considered (Sauser *et al.,* 2009). The PM function itself receives attention (Belassi and Tukel, 1996), with Sage *et al.,* (2014) referring to the managerialisation of failure, where failure is attributed purely as a result of project management practices. However, other project parties, culture and contextual factors are also known to lead to failure. CM literature instead attributed various external actors as causes of failure, including designers, labourers, suppliers, subcontractors and the client (Trangkanont and Charoenngam, 2014). Conflicting goals, weather, lack of information, competition, site conditions, social-economic and partnering challenges (Ansah and Sorooshian, 2018) were also cited. Changes in law, politics, procurement strategy, interest rates, and inflation are other causes, note Trangkanont and Charoenngam (2014), especially on larger projects. Other causes include design capacity, bureaucracy, design changes, errors, corruption (Nguyen and Chileshe, 2013) supply chain, decision making, (Dikmen *et al*., 2010) cost cutting, non-compliance and unreasonable contractual constraints (Layzell and Ledbetter, 1998a). According to Nguyen and Chileshe (2013), these issues can be summarised as being related to knowledge and technical; management; financial and economic, and; social and legal matters. However, it is again worth emphasising that PM literature often views the project manager themselves as a root cause (Sage *et al.,* 2014) while CM literature attributes other parties in the supply chain as more likely being the root causes of failure (Dikmen *et al.,* 2010). Considering effects of failure, both PM and CM literature focused on project outputs, particularly cost. Other effects in terms of quality and delay are also viewed in terms of costs. For example, Lindhard and

Larsen (2016) noted that quality-related failures add costs of between 3.6-6.6% and delays add 16-23% to total project costs. Reported effects of failure included customers dissatisfaction, company reputations, and unsatisfactory safety performance, as apparent in both the PM and CM literature (Bell and Taylor, 2011; Trangkanont and Charoenngam, 2014; Saunders *et al.,* 2016).

Mitigation of project failure

According to Sage *et al.,* (2014) the most common approach to mitigating or avoiding project failure is upskilling the PM equipping them with standardized knowledge, and tools. Belassi and Tukel (1996) contend that organisational commitment is vital in attempting to mitigate project related failure, and Sauser *et al.,* (2009) suggest that a contingency approach be adopted to project management be adopted. In contrast, CM literature suggested improvement to the supply chain and external project environment is necessary (Rwelamila *et al.,* 1999; Dikmen *et al.,* 2010). Ansah and Sorooshian (2018) and Mahmoudi and Feylizadeh (2017) both recommended better attention to scheduling and planning practices be adhered to, with Lindhard and Larsen (2016) echoing the need for clarity in success/failure definition and measurement. Motivation and risk management (Nguyen and Chileshe, 2013) were also cited. Furthermore, notable models for mitigating failure were found including: Ansah and Sorooshians (2018) 4Ps (Project Related; Participants, Practices and Procurement) model for analysing delays; Failure Mode and Effects Analysis by Layzell and Ledbetter (1998) for defects; Construction Industry Bankruptcy Prediction Models (CI-BPMs) by Alaka *et al.,* (2015) for business failure; and Enterprise Resource Planning (ERP) model by (Orouji, 2016) in managing cost and time- failures. Overall, since the value chain influences failure (Dikmen *et al.,* 2010), a holistic approach should be considered instead of focusing on upskilling.

Implications - A call for active learning from project failures

Even with the advancement in technology and PM training, failure still occurs (Shore, 2008). Evidently, without the ability to extract learning from project-related failures, upskilling PM practitioners alone will not mitigate failure: As certain failures still exist regardless of skill levels (Love *et al.,* 2008). Failure mitigation models also require learning (Layzell and Ledbetter 1998). Hence, proactive prevention of failure by way of active learning is recommended since, as Dalcher (2012) points out, lessons from past failed projects can potentially improve capabilities to manage future challenges. Furthermore, there is merit in adopting a holistic approach that embraces what March (1991) refers to as exploratory and exploitative learning, as well as Stead and Smallmans (1999) concept of isomorphic; learning that comes from both personal failures and those of others. Table 1 summarises the reviewed literature on project-related failures and contrasts the different perspectives between PM and CM literature.

Table 1: Contrasting Understanding of failure based on PM and CM Literature

	Research	Definition	Types	Causes	Mitigation
PM	Positivism - CSFF	Non-standardised.	Generic mainly on quality	PM practice failure	Upskilling the PM
CM	Positivism - CSFF	Non-standardised.	Specific - cost, delays, defects.	Supply chain oriented	Wider supply chain action.

CONCLUSION

The results from the SLR across PM and CM literature accord with the assertion of Bakker *et al.,* (2016) that research on project failures is mainly qualitative. As identified by Hall *et al.,* (2012) and Liu *et al.,* (2017) findings are generally derived

from empirical case studies, and, as observed by Gupta *et al.,* (2019) these provide limited generalisability. In PM literature, considerations of failure are often of an introspective nature with the main causes of it, often identified as being associated with the PM function itself or simply caused by poor project management practices. In contrast, the CM literature focuses more on more specific, and external, instances of failures, with causes often attributed back to the wider context or the involvement of the supply chain. Being mindful of all of these aspects should help inform any future follow-on work, in either domain or across both. Specifically, this should help inform research that seeks to better understand construction and project related failure. They are particularly useful for the subsequent data collection stage of the current doctoral work which seeks to more fully understand how failures and learning affects PBOs.

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