

ATTENUATING DISRUPTIONS IN KNOWLEDGE FLOWS IN CONSTRUCTION PROJECTS

Olubukola Tokede¹, Dominic Ahiaga-Dagbui and John Morrison

¹ School of Architecture and Built Environment, Deakin University, 1 - 11 Gheringhap Street, Geelong, VIC 3220, Australia

² Frontline Coach Pty Ltd, 9 Ashmore Avenue, Mordialloc, VIC 3195, Australia

Attenuating disruptions in knowledge flows during the delivery of construction project is beneficial for problem-solving; relationship-management; and reflexive practice in the project environment. There are however limited studies that have examined the role of knowledge-brokering and relationship management in construction project delivery. Knowledge-brokers are often beneficial in attenuating disruptions in knowledge flows; in-graining positive relational dynamics and encouraging healthy team culture across project teams. This research presents a conceptual framework for visualising the mechanism of knowledge flow across different levels (i.e., individuals; teams; and project) in a construction setting to enhance project performance outcomes. Using an inductive case-study method; we collect triangulated data through questionnaire surveys; focus-groups; and semi-structured interviews on an Australian construction project that engaged a facilitator as knowledge-broker between construction teams. This research found that the intermediate role of the facilitator was instrumental in shaping how problems were identified and efficiently resolved. The novelty of this study is that alliance principles of knowledge-brokering are being applied in a fixed-price lump-sum contractual arrangements, which typically tends to be adversarial and hinders effective knowledge flow between parties in projects.

Keywords: facilitator; knowledge-broker; knowledge flow; relationship management

INTRODUCTION

In recent times, attention to relationship management as a means of enhancing project success in construction project delivery has gained prominence in the literature (Daboun *et al.*, 2022). However, the responsibility for ensuring proper relationship management tends to be devolved to the project manager as well as senior management team (Davis and Love, 2011). The PMBOK (2017) provides some guidance on the role of project managers in relation to planning, leading, organising and controlling teams but does not specify the competencies of project managers in nurturing relationships within project teams. Consequently, it is observed that the flow of knowledge is stifled because of the adversarial relationships in the project environment (Ahiaga-Dagbui *et al.*, 2020). Previous research by Kelly *et al.*, (2013) reported that 51% of technical staff believe that knowledge flow occurs spontaneously through conversation and team-working. In many construction projects, it is generally

¹ olubukola.tokede@deakin.edu.au

assumed that appropriate channels exist to facilitate the flow of knowledge within and across teams (Hartmann and Doree, 2015). However, the recurrence of contractual disputes in construction projects attests to the prevalence of relationship breakdowns in many project-delivery context (Fuller *et al.*, 2011). The dearth of expertise in relationship management within mainstream construction discipline has subsequently led to the evolution of knowledge-brokers who are external to the technicalities of construction projects but whose skills are invaluable in maintaining and nurturing positive relationships in projects (Holzmann, 2013).

To provide some context, the contractual environment and governance structures associated with competitive tendering and low-profit margins often perpetuate adversarial behaviours within project teams (Ahiaga-Dagbui *et al.*, 2020). Ahiaga-Dagbui *et al.* (2020) further note that traditional lump-sum contract environments generally set the commercial drivers that define the strategic goals of clients and contractors on a collision course. In an alliance framework, the organisations involved are generally more willing to share information and collaborate to identify and jointly solve problems as their remunerations are linked to the joint success of the entire alliance (Davis and Love, 2011). Alliances are thus driven generally by win-win mentality, joint problem ownership and best-for project principles (Ahiaga-Dagbui *et al.*, 2020). The key departure of this research is that the project facilitation model was implemented within a traditional design-bid-build project environment instead of an alliance. The decision to opt for a traditional procurement approach rather than an alliance arrangement lies in the economic efficiency of the former. Furthermore, against the backdrop of previous alliance projects, there were possibilities that behavioural and trust expectations could be leveraged to translate some alliance principles to future projects delivered using traditional procurement approach.

Knowledge-brokers are equipped in encouraging learning, stimulating participation, fostering knowledge-creation, and enhancing healthy project teams (Pemsel and Wiewiora, 2013). Langeveld *et al.*, (2016) recounts that knowledge-brokering is being embraced to ensure a strategic focus on enhanced knowledge flows and robust stakeholder engagement in projects. The diversity of knowledge-brokering roles in the literature includes 'orchestrator', 'knowledge-broker', 'lessons-learned champion', 'boundary-spanner', 'maestro' and 'project facilitators' (Tokede *et al.*, 2022). More specifically, project facilitators are equipped for creating the right conditions for reflexive activities in a project, thereby, encouraging problem-solving and innovation (Fuller *et al.*, 2011). Facilitators are also able to function at both an individual and team level; and to engage in problem-solving in the project environment. Furthermore, facilitators could be fundamental in breaking down rich and complex situations to accelerate the speed of learning within project teams (Sergeeva and Roehrich, 2018). In addition, facilitative approaches could complement traditional project management roles in achieving a flexible, intuitive, and spontaneous access to knowledge in the project environment (Kelly *et al.*, 2013). This research presents a conceptual framework for visualising the mechanism of knowledge flow across different levels (i.e., individuals, teams, and project) in a construction setting to enhance project performance outcomes. The novelty of this study is that alliance principles of knowledge-brokering are being applied in a fixed-price lump-sum contractual arrangements.

Knowledge Flows in Projects

Knowledge flows between projects and organisations is becoming more difficult, as the planning, implementation and delivery of projects comprise of many knowledge-intensive activities that require different types of knowledge (Jiao *et al.*, 2019). Hartmann and Dorée (2015) conclude that the problem with project-based organisations is that knowledge accessible in projects remain as “messages in bottles” without translating into catalysts for organisational improvements. Attenuating disruptions in knowledge flows in projects will require new competencies and organisational capabilities within and between project teams.

The most widely accepted distinction of knowledge forms in the construction sector are still explicit and tacit knowledge (Oluikpe, 2015). Explicit knowledge is regarded as factually and technically correct prescriptions that address a specific design, process, or decision towards reducing or eliminating a potentially negative result (Addis, 2016). On the other hand, Oluikpe (2015) describes tacit knowledge as a construct that an individual has but which cannot be articulated. Van de Hoorn and Whitty (2019) also added that tacit knowledge is a contextual and subjective knowledge which is difficult to recognise. Oluikpe (2015), however, concluded that despite evidence on the value of tacit knowledge to construction organisations, there are limited frameworks to effectively explicate tacit knowledge in construction projects.

The implications for recognising the explicit and tacit nature of knowledge relates to the continuum of knowledge management processes adopted in construction project delivery (Tokede *et al.*, 2022). In instances, where there is more emphasis on explicit knowledge, logical rationality is privileged over context (Addis, 2016), and thus predictability is emphasised over uncertainty management (Ahiaga-Dagbui *et al.*, 2020). Also, in situations where tacit knowledge is prioritised over the explicit dimension, empirical frameworks are insufficient in steering the knowledge management process (van der Hoorn and Whitty, 2019). An integrated knowledge management model is, therefore, needed to facilitate the flow of explicit and tacit knowledge in project delivery processes.

Knowledge Brokering

Knowledge-brokering is a relatively emerging discipline and has become increasingly important based on the challenges with stimulating knowledge flows in projects (Holzmann, 2013). Fundamentally, knowledge-brokering can be accomplished by individuals or teams within an organisation, or by external actors contracted to be part of the project team for the sole purpose of managing the interface for knowledge-creation and exchange in projects (Langeveld *et al.*, 2016). Knowledge-brokering activities are social processes with the broker participating in the interactions and establishing connections between communities by introducing elements of one practice into another (Holzmann, 2013). Knowledge-brokers are fundamentally equipped to accomplish interactions between different communities of practice (Fuller *et al.*, 2011), and can support the creation of knowledge in cross-functional teams. Knowledge-brokers also assist in the structured collection of explicit knowledge, which can be beneficial for improving lessons-learned initiatives in projects (Fuller *et al.*, 2011). It has also been recognised that knowledge-brokers can assimilate diverse information and convert them into useful strategies leading to exchange of tacit knowledge (Hering, 2016).

Within a project, knowledge-brokering can take place at several levels during construction (e.g., organisation, team, and individual) (Ayub *et al.*, 2019), and, therefore, if performance improvements are to be realised, then triumphs and setbacks that materialise need to be shared and communicated as soon as they are identified to enhance the delivery of future projects. Emerging knowledge can be effectively utilised to acquire new, or modify existing knowledge, behaviours, skills, values, or preferences of the project team (Waheed and Ogunlana, 2019). This accumulated new knowledge can then be immediately and in the future applied to practice. The discovery of explicit and tacit knowledge can be used to provide the groundwork for a much-needed backdrop for reflexive practice to be engendered in construction projects (Hering, 2016).

It is, however, acknowledged that identifying knowledge-brokers early in the project can enhance the performance of the project (Waheed and Ogunlana, 2019). Despite these realisations, many organisations still fail to have a mechanism for identifying the nature of knowledge-brokering required in their projects (Holzmann, 2013). Perhaps, more challenging is assessing the effectiveness of knowledge-brokering in construction settings (Langeveld *et al.*, 2016). Pemsel and Wiewiora (2013) cautioned that incompetent knowledge-brokers could be detrimental to effective project delivery. Consensus, however, exists that knowledge-brokers can add value to projects by attenuating disruptions in knowledge flows within cross-functional teams and instituting healthy team dynamics (Hering, 2016).

METHOD

An inductive case study research approach was adopted to examine the experiences of a public sector authority that engaged a project facilitator during the delivery of a significant piece of critical construction project. Case study research is particularly appropriate when the phenomenon and its context are not readily distinguishable and when a deeper understanding of practical issues on how things work is required (Terry *et al.*, 2017). The case study used for this research is the Colac Water Supply Upgrade (CWSU) completed in the state of Victoria, Australia. Early cost estimates indicated the project could cost about \$AUD19 million. The project was eventually delivered at \$AUD14.3 million.

This case was selected for the facilitation approach, due to it being classified as a high-value and high-priority asset by the client, who anticipated a significant number of change requests during delivery. This was because the design stage of the project was fast-tracked to meet the accelerated timeline to operationalise the project. Triangulated data was sequentially collected from surveys, focus group interaction, semi-structured interviews, and content analysis of the documents from the facilitation program. Given the limited space allowed for this paper, only an overview of the data is provided here. *Table 1* shows the post-project review survey results and the mean scores, rated on a Likert scale of 1 - 5, where 1 indicates poor performance and 5 is excellent performance.

The survey was administered to project team members from all four Principal Contractors (PC's), the Design Contractors and the Client to solicit quantitative and qualitative information on the project. The survey in *Table 1* provided a snapshot of key issues that contributed to the list of agenda for the next stage of the data collection - focus group interactions. Eight (8) focus group sessions, involving 35 participants drawn from across the entire delivery team were held. This generated 12 hours of audio data (1.5hr x 8). This was followed by a series of 27 semi-structured interviews

with project participants to further explore some of the issues identified in the focus group sessions. The interviewees (P1 - P27) included a variety of personnel including Project Managers, Site Supervisors, Design Engineers, Safety Quality and Environment (SQE) Manager, Project Delivery Managers and Construction Coordinators. Overall, over 30 hours of interview data were collated and were transcribed verbatim for analysis in NVivo 12 plus. Archival records, documentary materials used by Facilitator and the lessons learnt register compiled by the Client's Design Team were crucial to understanding the background and delivery context of the project. Twenty-four (24) different documentary records of the facilitated workshops held between the PC's and Client were carefully reviewed to understand the mechanism of facilitation in the case study.

Content analysis was undertaken by coding the data derived from the focus group interactions, interviews and documentary sources using NVivo 12 plus. The qualitative data analysis occurred simultaneously with the data collection, the detailed interpretation and sense-making process. The analysis involved theme identification, word frequency assessment, concept mapping, and thematic coding. Terry *et al.*, (2017) suggests that there are two critical stages in the thematic analysis (1) eliciting lower-level ideas in texts; and (2) identifying themes in coded string. This process allowed the researchers to move away gradually from the descriptive level of the initial coding toward an increasingly more analytic level; and (3) identification of conceptually consistent first-order themes and constructs. At this stage, the researchers sort to also ascertain recurring patterns and connections between the themes and concepts while also exploring the evidence for the "why?" behind these constructs.

FINDINGS

In this paper, the mediating role of a project facilitator is examined in a construction project delivery process. The data collected through survey questionnaire, focus group workshops and semi-structured interviews have been distilled into the key dimensions - tacit (behavioural), explicit (operational) and an integrated explicit and tacit (technical). The survey in *Table 1* indicates that the project team performed very well in relation to incident management, innovation, positive relationships between the client and Contractors, and delivery of the project on time and budget. Areas that received relatively poor scores (i.e., lesser than 4) include design team involvement in the project, Request for Information (RFI) management, project commissioning, design completion and constructability review.

Comparatively, the overall average score of the project facilitation process and relationship-based outcome is 4.5 and 4.4 out of 5 respectively. While the average is a crude assessment, it gives us a sense of where the project outcomes were at least above average. Based on the focus-group workshop and semi-structured interviews, it was deduced that the facilitator utilised constructive interactions and strategies for transforming complex situations into stratified events that can be more readily comprehended and responded to appropriately. Given these, some of the issues in *Table 2* addressed in the project were used to scaffold the dynamics of knowledge flow accomplished by the intervention of the project facilitator within the project delivery team. In summary, the facilitator stimulated knowledge flows and achieved healthy team-dynamics by fostering collaboration, joint problem-solving and problem-ownership.

Table 1: Post-project review survey on the issues identified in the case study project

Post-project review	Rating
<i>Section 1: Involvement and project outcomes</i>	
a The design team availability and involvement were adequate for the project	3.27
b Incidents were managed promptly and effectively	4.00
c RFI process was managed promptly and effectively	3.67
d Project innovations were effective in providing benefits to the project?	4.08
e The contract requirements were clear and consistently administered	3.83
<i>Section 2: Relationship-based outcomes</i>	
a There was a high level of commitment to relationships between Asset-owner and contractor of the project	4.69
b There was a high level of commitment to involvement from the Asset-owner and contractor's project managers	4.17
c Landowner relationships were managed very well on the project	4.46
<i>Section 3: Project Facilitation Process</i>	
a Overall importance of the workshop	4.42
b Usefulness for clarifying needs	4.50
c Effectiveness of outcomes for honest communication	4.50

Table 2: Tacit dimensions of the behavioural issues in the CWSU project

Post-project review	Rating
Identify Narratives	<p>"Facilitation is effectively what it is; it's to facilitate a relationship... an understanding of how we work, how others work, and to establish some ground rules and like a frame of reference for having conversations" [P1].</p> <p>"...being able to work out a compromise that meets enough of my requirements, that it's moral and legal, and meets enough of their requirements that they can keep going and be more efficient, that's, to me, what I think about 'best for the project'"[P21].</p> <p>"A good independent gauge, like a health check on the project that provides an understanding of how we work, how others work, and to establish some ground rules and like a frame of reference for having conversations. It also enabled difficult conversations to take place" [P1].</p>
Build Trust	<p>"Got to be able to make a connection with everyone they're speaking to. So, there's a level of trust between the parties"</p> <p>"let everybody have their say and air their grievances"</p> <p>"Ensuring that the contractor is aware of all the expectations"</p>
Cultivate Mindsets	<p>"On previous projects, there was a "them versus us" mentality that came from both sides and the relationships were really hostile. Whereas this [project] was completely different"[P8].</p> <p>... "If you've got an issue, don't jump straight in there and tell a sub-contractor or a worker it's an issue, unless it's an immediate safety issue" ...[P4]</p> <p>"Can definitely see areas where the conversations around reaching a conclusion probably would have taken a bit longer," [P9].</p>

Table 3 provides an overview of knowledge that were captured in the post-project review and facilitation meetings. These lessons include (1) promoting the use of prompts on sites, and (2) developing checklists and prescriptive guidelines for the code of practice. Other key lessons involved adjusting the times for specific activities and exploring the potential for innovative technologies. In summary, the facilitator's role was considerable in highlighting the key operational issues impacting the project by instituting jointly developed protocols within a framework for accountability.

Figure 1 provide the conceptualised framework of the knowledge flow in the project environment and summarised some of the crucial knowledge-brokering outcomes delivered through the facilitators' role as a mediator. The conceptual framework recognised that knowledge-creation occurs at different levels in construction organisations - individual, team, and organisation. Each of these levels embodies

different dynamics in the knowledge-creation capabilities. However, both explicit and tacit knowledge are explicated across all levels of learning in construction settings.

Table 3: Explicit Knowledge captured for problem-solving in the CWSU project

	Additional Details	Project Phase	Actionable Items	Updated in Standards
Initiatives by the contractor to promote the use of Start Card Resulted in Start Cards being better utilised.	Prompt in large bold letters: "Have You Completed Your Start Card?". This acted as a reminder for in site personnel to complete the card.	Construction	Construction team to be asked to promote prompt on-site sign in form.	Construction - Contractor Performance
Confusion about what level of detail is required in Activity Method Statements (AMS).	Client staff unsure about the expectation of contractors about AMS	Construction	Develop toolbox presentation clearly outlining requirements for AMS.	Construction - Contractor Performance
Many RFI's at the start of construction.	Early meeting should be organised between contractor and design consultant to clarify contractor RFI's	Construction	Modify standard kick Off Meeting agenda to include prompt to organise a meeting between project teams	Templates/Forms
Provide TIN file to contractors at the start of a job as part of the tender documentation.	TIN file would have been useful for contractors to determine earthworks and cut/fill volumes.	Procurement	Tender checklist to be developed	Delivery - Contract
Commissioning Kick-Off Meeting occurring too late in construction	Commissioning meeting late during construction leaves little time for proper preparation for commissioning	Commissioning	Specify commissioning kick-off meeting ahead. Suggested 2 weeks into construction program?	Construction - Contractor Performance
Fortnightly Construction Meeting agenda improvements	The meetings created a culture of openness and proactive problem solving as a team.	Construction	Review facilitated meeting agenda in conjunction with project manager/s	Construction - Contractor Performance
Contractor initially cut into the incorrect pipe for a final tie-in.	Final connection of pipeline was to tie into Colac water supply. The wrong pipe was identified in service checking and carried through to design.	Construction	Investigate with Survey team the technology available to non-destructively identify live water pipes.	Design Guide - Pipelines - Water

In line with our research objectives, our study highlighted the benefits of a knowledge-broker in excogitating both explicit and tacit knowledge. In our work, explicit knowledge directly attributed to the intervening role of the facilitator include the development of best practice strategies for information sharing and optimal policies to support quality assurance. Equally, tacit knowledge accrued in the project included a renewed sense of psychological safety, joint problem-ownership, and the development of a virtue system of ethics. It was observed that both explicit and tacit knowledge flows were creatively stimulated in the project, due to the presence and input of the project facilitator. Jiao *et al.* (2019) surmised that this shared knowledge among team members enhances the team's ability to resolve conflict and misunderstanding. A proactive stance towards problem-solving also translates into tangible benefits of improved team culture and resilience. While the project managers may be able to support the technical and tangible delivery of projects, the knowledge-broker or in this case, the 'facilitator' is pivotal in serving as a glue that holds the team together through creating and nurturing healthy relationships and enhancing the team dynamics.

It must, nevertheless, be acknowledged that knowledge flow in a project environment tend to be dynamic and emergent rather than systematic, uniform, or organised (Kelly *et al.*, 2013), and skilled facilitators are well-positioned as knowledge-brokers to encourage knowledge flows in construction project settings. Fuller *et al.*, (2011), for instance, noted that facilitators can be brokers, but there is still a need to have boundary objects and forms of interactions between different communities of practice. Our experience, however, depicts that a skilled and versatile facilitator can leverage on the diverse competencies within the team and create useful interactive activities in the project environment.

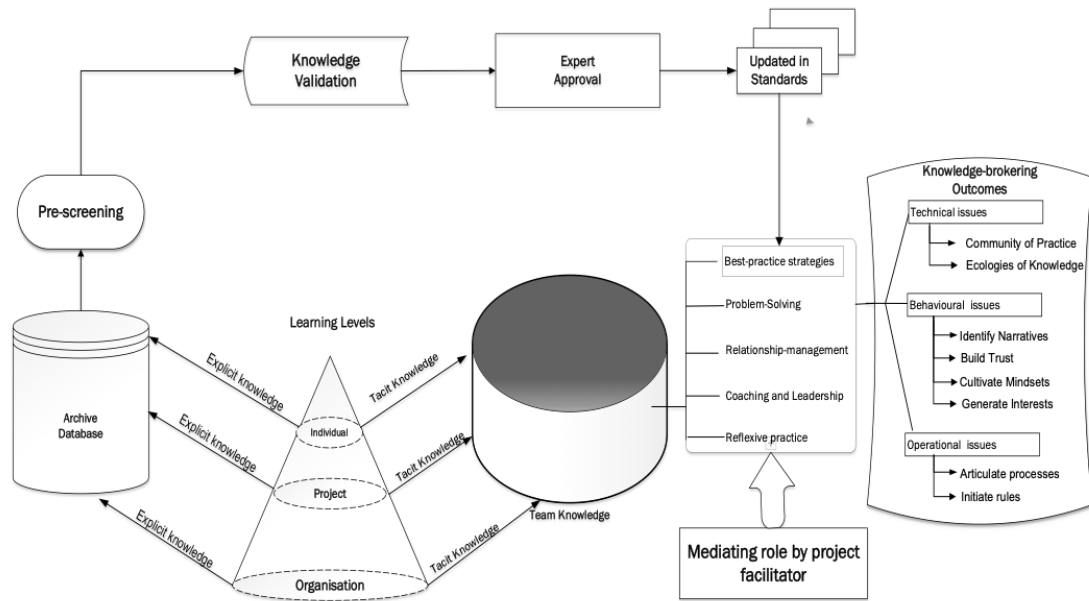


Figure 1: Conceptualised framework of the mechanism of knowledge flow in the project environment

In the CWSU project, there was evidence for robust interface management at the design, construction, and commissioning activities, during the project delivery process. Davis and Love (2011) also corroborated those transformative experiences and bonding through informal events, could develop deep-rooted dialogues within teams and enhance the flux of knowledge flows within and across the project teams. Rather than rely on contractual prescriptions to resolve tensions (Daboun *et al.*, 2022), the facilitator demonstrated transformational leadership and practised idealised influence, inspirational motivation, intellectual stimulation, and personalised consideration (Ayub *et al.*, 2019) to defuse tensions as well as shaping how problems were identified and efficiently resolved.

CONCLUSIONS

This paper presents a conceptual framework for attenuating disruption in knowledge flows in a construction project setting. Using a triangulation approach, we utilise a questionnaire survey, focus-group workshops, and semi-structured interviews to collect data on an inductive case study of a significant public sector project in Australia. The facilitator achieved high scores on relationship-based outcomes and stimulated knowledge flows across and between team. The conceptual framework depicts that knowledge flows in construction projects occur at different levels and that

explicit and tacit knowledge flows can be stimulated across all levels of interaction in the project environment.

The conceptual framework also portrays the connections between the explicit knowledge captured in databases and the tacit knowledge embodied within the project team. The novelty of this study is that alliance principles of knowledge-brokering are being applied in a fixed-price lump-sum contractual arrangements, which typically tends to be adversarial and hinders effective knowledge flow between parties in projects. It was found that the intermediate role of the facilitator, as a knowledge-broker in a project was instrumental in shaping how problems were identified and efficiently resolved. Specifically, the role of the knowledge-broker is pivotal in uncovering the intricate processes and agencies associated with the flux of knowledge flow in the project environment. In our work, the knowledge-broker was funded by the client and contractors were paid to participate in the monthly facilitation sessions. To have an impartial knowledge-broker, each party might be willing to bear the cost. It is, therefore, recommended that future studies could evaluate whether co-payment by both client and contractors will affect the viability of the process and perceived conflict of interest of the client-funded knowledge-broker.

REFERENCES

- Addis, M (2016) Tacit and explicit knowledge in construction management, *Construction Management and Economics*, **34** (7-8), 439-445.
- Ahiaga-Dagbui, D, Tokede, O, Morrison, J and Chirnside, A (2020) Building high-performing and integrated project teams, *Engineering, Construction and Architectural Management*, **27**(10), 3341-3361.
- Ayub, M U, Kanwal, F and Kausar, A.R (2019) Developing knowledge creation capability: The role of big-five personality traits and transformational leadership, *Pakistan Journal of Commerce and Social Sciences*, **13**(1), .30-61.
- Daboun, O, Md Yusof, A and Khoso, A R (2022) Relationship management in construction projects: Systematic literature review, *Engineering Management Journal*, 1-24.
- Davis, P and Love, P (2011) Alliance contracting: Adding value through relationship development, *Engineering Construction and Architectural Management*, **18** (5), 444-461.
- Fuller, P A, Dainty, A R and Thorpe, T (2011) Improving project learning: A new approach to lessons learnt, *International Journal of Managing Projects in Business*, **4**(1), 118-136.
- Hartmann, A and Dorée, A (2015) Learning between projects: More than sending messages in bottles, *International Journal of Project Management*, **33**(2), 341-351.
- Hering, J (2016) Do we need more research or better implementation through knowledge brokering? *Sustainability Science*, **11**(2), 363-369.
- Holzmann, V (2013) A meta-analysis of brokering knowledge in project management, *International Journal of Project Management*, **31**(1), 2-13.
- Jiao, Y, Saeed, M A, Fu, S and Wang, X (2019) How knowledge sharing contributes to project portfolio success, *International Journal of Managing Projects in Business*, **13**(7), 1600-1616.
- Kelly, N, Edkins, A J, Smyth, H and Konstantinou, E (2013) Reinventing the role of the project manager in mobilising knowledge in construction, *International Journal of Managing Projects in Business*, **6**(4), 654-673.

- Langeveld, K Stronks, K and Harting, J (2016) Use of a knowledge broker to establish healthy public policies in a city district: A developmental evaluation, *BMC Public Health*, **16**(1), 271-279.
- Oluikpe, P I (2015) Knowledge creation and utilisation in project teams, *Journal of Knowledge Management*, **19**(2), 351-371.
- Pemsel, S and Wiewiora, A (2013) Project management office a knowledge broker in project-based organisations, *International Journal of Project Management*, **31**(1), 31-42.
- Project Management Institute (2017) *A Guide to the Project Management Body of Knowledge, 6th Edition*, Pennsylvania: Project Management Institute, Inc., 1-547.
- Sergeeva, N and Roehrich, J (2018) Temporary multi-organisations: Constructing identities to realize performance improvements, *Industrial Marketing Management*, **75**, 184-192.
- Terry, G, Hayfield, N, Clarke, V and Braun, V (2017) Thematic analysis, *In: The Sage Handbook of Qualitative Research in Psychology*, 17-37.
- Tokede, O, Ahiaga-Dagbui, D and Morrison, J (2022) Praxis of knowledge-management and trust-based collaborative relationships in project delivery: Mediating role of a project facilitator, *International Journal of Managing Projects in Business*, **15**(4), 595-618.
- Van der Hoorn, B and Whitty, S (2019) The five modes of comportment for project managing: Disclosing the tacit in project work, *International Journal of Project Management*, **37**, 363 - 377.
- Waheed, Z and Ogunlana, S O (2019) Harnessing knowledge of building end-users: Identifying knowledge brokers that matter, *Journal of Corporate Real Estate*, **21**(1), 19-35.