BRITISH ACADEMY OF MANAGEMENT

BAM CONFERENCE

3RD-5TH SEPTEMBER
ASTON UNIVERSITY BIRMINGHAM UNITED KINGDOM

This paper is from the BAM2019 Conference Proceedings

The Characteristics of Knowledge Brokering Positions in Project-based Organizations

Ali Hadi [a,*], Shenxue Li [b], Christine Unterhitzenberger [c]

[a] *University of Warith Alanbiyaa, Karbala, Iraq*

[b] *University of Kent Business School, Kent, UK*

[c] *Lancaster University Management School, Lancaster, UK*

Abstract

Although research on knowledge flow in project-based organizations (PBOs) is emerging, studies focusing on knowledge brokering are very limited. Previous contributions studied knowledge brokering behavior of some personnel or entities in a variety of contexts. However, a role-centered research on how those occupying knowledge brokering positions (KBPs) mediate knowledge flow between projects and PBOs is seriously lacking especially in the current prevalence of these positions in job market. This study aims to establish a firm understanding on how KBPs elicit, integrate and mobilize knowledge between projects and PBOs. A conceptual framework delineating structural, operational, strategic, and individual characteristics promoting KBPs' functional effectiveness is produced as part of this research.

Track 17: Operations, Logistics and Supply Chain Management

Word Count: 2,188

* Corresponding author. Tel.: +964 780 100 7878, Email address: ali.hadi@uowa.edu.iq (Ali Hadi)

Introduction

Turbulent and uncertain economic conditions have necessitated organizations to pay much attention to knowledge generation and innovation in the face of increasingly fierce market competition. Projects as "powerful generators" of new knowledge (Wiewiora *et al.*, 2014) and potent agents to introduce change (OGC, 2017) are being extensively deployed in response (Kerzner, 2005). Such dynamic conditions not only made projects more common, but also PBOs. A growing number of organizations find it more feasible to transform into project-based setting to overcome barriers associated with knowledge generation and innovation (Sydow, Lindkvist and DeFillippi, 2004).

Despite their powerful capacity in knowledge generation, PBOs still confront substantial difficulties in capturing and exploiting projects' knowledge (Edmondson and Nembhard, 2009). Research recognized several barriers justifying defective knowledge flow between projects and PBOs (e.g., Solli-Sæther, Karlsen and Van Oorschot, 2015). In general, most of this literature agrees that the extreme focus on the delivery of products and services are expected to leave project teams with less time and motivation to thoroughly share knowledge up to the parent organization (Swan, Scarbrough and Newell, 2010; Bryde *et al.*, 2018).

Several studies focused on the roles of some workers in mediating knowledge flow between knowledge producers and users building on Hargadon's (1998) construct of knowledge brokering. Surprisingly, very little attention has been paid to knowledge brokering as independent positions despite their current prevalence in job market. Job search engines show an emerging market for KBPs across different industries. Using "Indeed", as an example of popular job search websites, we found that the total number of jobs that contain the word "knowledge" exceed 500 advertised vacancies (Indeed, 2019). This study therefore aims to develop a firm understanding on how KBPs elicit, integrate and mobilize knowledge between projects and PBOs. Studying KBPs at PBOs is crucial, given the problematic knowledge flow seen in such organizations (Scarbrough *et al.*, 2004) and the widespread presence of PBOs in contemporary economies (Sydow, Lindkvist and DeFillippi, 2004). Drawing on theories of brokerage and project management functions, we develop a conceptual framework to the structural, operational, strategic, and individual characteristics of KBPs that promote their functional effectiveness in mediating knowledge flow between projects and PBOs.

Theoretical Background

The explosive growth of knowledge-based research has attracted growing academic interest studying knowledge workers and their crucial role in knowledge generation and innovation. Earlier contributions viewed knowledge workers as those who "think for living", their major capital is knowledge, such as experts and scientists (Davenport, 2005). This view by implication tended to restrict knowledge creation with specific cohorts of workers. However, current body of research has taken more holistic view considering that all employees are knowledge workers but at different levels of contribution and involvement (Hagel, Brown and Davison, 2010). The major role of firms therefore is seen to elicit and integrate employees' specialist knowledge and embody it into products and services (Grant, 1996).

Along with knowledge generation, knowledge dissemination strategies are viewed as key to organizational maturity (Swan, Scarbrough and Newell, 2010), although they usually collide with the tacit nature of knowledge (Goffin and Koners, 2011). Inherent difficulties in knowledge dissemination have attracted several studies examining potential motivators to employees' knowledge share tendency. For example, personality traits (Wang, Noe and Wang, 2011), ability and motivation (Radaelli *et al.*, 2014), knowledge-oriented leadership

(Donate and Sánchez de Pablo, 2015), coordination behavior (Wen and Qiang, 2016), and organizational practices (Mura *et al.*, 2016). Knowledge workers therefore have not only been seen in the lens of knowledge generators, but also in those of knowledge disseminators.

Nevertheless, "structural holes" are not unusual in organizations as social networks whereby weak ties between units and/or actors exist, limiting knowledge integration and dissemination (Burt, 2004). This suggests that such "holes" are more likely to neutralize knowledge workers' capabilities to share knowledge despite their possibly significant knowledge generation capacities. This is especially the case in PBOs whereby project personnel collaborate to generate and integrate knowledge while project boundaries pose an evident structural gap impedes effective knowledge flow into parent organizations. Projects' autonomy, unique experience, goal orientation are viewed as major boundary attributes diminishing project workers' motivation, opportunity and ability to share knowledge outside project boundaries (Bartsch, Ebers and Maurer, 2013; Eriksson and Leiringer, 2015).

Other body of literature viewed contemporary challenges in knowledge mobilization in the lens of "liminality". Earlier definition to liminality by Turner (1969) described it as the space between two boundaries whereby specific actors or groups operate "betwixt and between" two positions. Particularly, employees suffering role ambiguity and role conflict in their operation between firms or units (Stamper and Johlke, 2003). Research has associated such workers with lack of effective learning (Tempest and Starkey, 2004), occasional reflection on learning (Scarbrough *et al.*, 2004), and identity "corrosion" (Sennett, 1998). Particularly, captured knowledge is found to be superficial (Brady and Davies, 2004) and most of reported was about achievement rather than its underlying success elements (Newell *et al.*, 2006).

Literature on PBOs as a powerful example to liminality (see Borg and Söderlund, 2015) highlights substantial difficulties in maintaining effective knowledge flow between projects and parent organizations. For example, Bartsch, Ebers and Maurer (2013) argue that the low the social capital, the more learning barriers witnessed between projects and PBOs. Likewise, Carrillo, Ruikar and Fuller (2013) suggest that lack of interaction and transparency between project and corporate teams is more likely to diminish the value of captured knowledge. Similarly, Solli-Sæther, Karlsen and Van Oorschot (2015) posit that cultural and strategic inconsistencies between projects and parent organizations are the major reason of poor knowledge flow. A key conclusion can be drawn from these studies is that projects as "powerful generators" of new knowledge (Wiewiora *et al.*, 2014) are more likely to have their workforce more focused on knowledge generation and innovation than knowledge elicitation and dissemination, leaving to them less time and motivation to share their experience throughout projects (Brady and Davies, 2004). Therefore, we not only need to stimulate knowledge generation within specific entity, but also to boost knowledge exchange between its elements (Meyer, 2010). Borg and Söderlund (2015) argue that project workers need to develop "liminality competence" in order to promote their knowledge share ability and to stay employable with the increasingly competitive and dynamic work conditions.

Research in response sought to find a theoretical explanation on how flawed knowledge dissemination strategies can be rectified in contemporary organizations. Building on the concept of knowledge brokering, research tried to explain how the process of knowledge flow from, into and within businesses can be mediated. This construct was originally coined in literature by Hargadon (1998) who defines knowledge brokers as the intermediaries, between otherwise isolated bodies of knowledge, benefiting from their in-betweenness state to elicit, integrate and mobilize knowledge across the boundaries. These studies focused on knowledge brokering roles of some personnel in a range of contexts as shown in Table (1).

Table 1: Research focused on knowledge brokering roles of some workers

Research	Actors	Key Findings	Context
Pawlowski and Robey (2004)	IT professionals	IT professionals' interaction with different business units helped bridging conventional boundaries between units.	Distribution & manufacturing firms
Gagnon (2011)	Researchers	Researchers' knowledge brokering behavior facilitated collaboration between research producers and users.	R&D businesses
Burgess and Currie (2013)	Hybrid middle managers	Hybrid middle managers brokered knowledge flow from, into and across organizational boundaries.	Healthcare
Kidwell (2013)	Principal investigators	Effective principal investigators brokered the transactions between university and industry to achieve commercialization goals.	Universities
Pemsel and Wiewiora (2013)	Project management office	Project management office requires more brokering skills to meet project managers knowledge share behavior.	PBOs
Waring *et al.* (2013)	Hybrid positions	Middle managers and clinical leaders are better positioned to broker knowledge flow to their "ambassadorial" positions across business units.	Healthcare
van den Berg *et al.* (2014)	Sales workers	Specific genetic traits predict sales workers' internal knowledge brokering in NPD.	NPD
Currie, Burgess and Hayton (2015)	Hybrid middle managers	Hybrid middle managers are more effective in brokering knowledge down the professional hierarchy.	Healthcare

Although these studies came with valuable insights into knowledge brokering, they assume that knowledge brokering is an embedded part within the roles and responsibilities of specific workers. The focus of these employees as knowledge workers on knowledge generation and innovation may therefore leave them with less time and motivation to perform knowledge brokering roles in more effective manner (Brady and Davies, 2004).

In comparison, only few contributions studied knowledge brokers as independent positions whose major roles focused on mediating knowledge exchange between two or more entities. For example, knowledge brokers linking medical research producers and practitioners in healthcare sector (Chew, Armstrong and Martin, 2013), connecting scientists and decision-makers in environmental sector (Cvitanovic *et al.*, 2017), and mediating knowledge exchange between competing business units in video-game industry (Chiambaretto, Massé and Mirc, 2018). Despite the unique focus of these studies on knowledge brokering as independent positions, results may be less applicable to PBOs' setting whereby projects' attributes pose considerable contextual differences blocking generalization. Theories explaining how KBPs mediate knowledge flow between projects and PBOs are needed, given the current prevalence of these positions in job market and the problematic knowledge flow seen in PBOs.

The Characteristics of KBPs in PBOs: A Conceptual Framework

In this section, we developed a conceptual framework by applying Gould and Fernandez's (1989) brokerage typology to KBPs in the context of PBOs to explain how their structural, operational, strategic, and individual characteristics facilitate knowledge elicitation, integration and dissemination.

1. Structural Characteristics

Structural characteristics refer to the roles and functions performed by those occupying KBPs who usually have a range of horizontal and vertical structural obligations. Drawing on Gould and Fernandez's (1989) typology of brokering roles, we categorize KBPs into five distinct groups as shown in Table (2).

Table 2: Structural characteristics of KBPs adapted from (Gould and Fernandez, 1989)

Roles of KBPs	Affiliation	Functions and Transactions
Coordinator	Insider	Coordinate internal knowledge exchange
Representative	Insider	Coordinate and negotiate access to external knowledge
Gatekeeper	Insider	Coordinate outsiders' access to internal knowledge
Cosmopolitan	Outsider	Coordinate knowledge exchange within the same group
Liaison	Outsider	Coordinate knowledge exchange between two distinct groups

Since knowledge management is a corporate function (APM, 2012), KBPs are expected to have a range of direct to indirect reporting lines with corporate bodies, such as portfolio and program management, depending on their affiliation. While liaison and cosmopolitan as external KBPs are expected to have direct reporting channels, coordinator, representative and gatekeeper as internal KBPs are not; therefore:

> **Proposition 1**: KBPs are expected to establish a range of direct to indirect reporting lines with corporate bodies in their mediating roles between projects and PBOs.

2. Operational Characteristics

This includes the specific practices and processes KBPs use on day-to-day basis to perform their mediating roles between projects and PBOs' personnel. The literature defines these practices and processes more closely with the construct of boundary objects since they serve

as a shared space of multiple social worlds established to facilitate communication (see Star and Griesemer, 1989). While practices are more formal and tangible activities, such as meetings, gateway reviews, and lessons learned sessions, processes are less formal embedded within the culture of the group, such as social network expansion and initiation of trust and collaboration culture (APM, no date). This suggests that coordinator KBPs are more likely to use more process-based approach since their operations and transactions are solely internal. By contrast, liaison and cosmopolitan KBPs are expected to have more practice-based approach to their both external affiliation and transactions. To their internal affiliation yet external transactions, representative and gatekeeper KBPs are expected to have a balanced use of practices and processes (see table 2); therefore:

> **Proposition 2**: *KBPs are expected to perform a range of practice to process based operational approaches in their mediating roles between projects and PBOs.*

3. Strategic Characteristics

This covers the knowledge-laden strategic objectives, usually cascaded from corporate down to project and business-as-usual levels (see APM, 2012), to which knowledge brokering daily operations are directed. Due to their internal operations, coordinator, representative and gatekeeper KBPs are more likely to operate in pursuit of more intra-group objectives, such as improved explorative and exploitative project learning (Eriksson, Leiringer and Szentes, 2017). However, liaison and cosmopolitan KBPs are expected to have more corporate level objectives to their both external affiliation and transactions, such as building absorptive capacity (Foss, Husted and Michailova, 2010), supporting decision-making (Cvitanovic *et al.*, 2017), decreasing uncertainty (Bolisani and Bratianu, 2018); therefore:
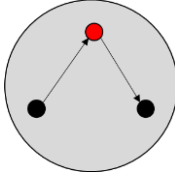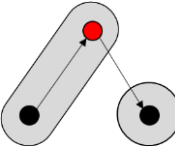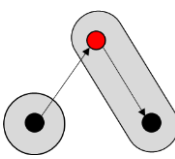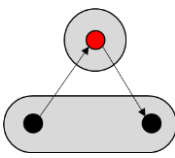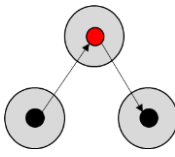
> **Proposition 3**: *KBPs are expected to follow a range of corporate to intra-group level strategic objectives in their mediating roles between projects and PBOs.*

4. Individual Characteristics

This denotes the individual qualities, of those occupying KBPs. Because of the transient, flexible and in-between nature of knowledge brokering, individual attributes of KBPs can be defined more closely with the construct of "liminality competence" (see Borg and Söderlund, 2015). In other words, the ability to encounter role ambiguity and role conflict (see Stamper and Johlke, 2003). Knowledge brokers are also expected to have superior interpersonal skills to their intensive need to coordinate, communicate and integrate different bodies of knowledge (Cvitanovic, McDonald and Hobday, 2016). While interpersonal skills are expected to be highly crucial equally for all of the five categories of KBPs illustrated in table (2), liminality competence are likely to vary. Since liaison and cosmopolitan KBPs are external to both projects and PBOs teams, they are expected to have liminality competence in the face of the in-betweenness they experience. However, coordinator, representative, and gatekeeper KBPs are less expected to have liminality skills to their internal affiliation to projects or PBOs' teams; therefore:

> **Proposition 4**: *KBPs are expected to have a range of liminality competence with exceptional interpersonal skills in their mediating roles between projects and PBOs.*

Table 3: Conceptual framework of KBPs in PBOs (diagrams are adapted from Gould and Fernandez, 1989)

KBPs Category	Structural	Operational	Strategic	Individual
Coordinator	Indirect reporting lines with corporate bodies	Process-based operational approaches	Intra-group level strategic objectives	Superior interpersonal skills
Representative	Indirect reporting lines with corporate bodies	Both practice and process based operational approaches	Intra-group level strategic objectives	Superior interpersonal skills
Gatekeeper	Indirect reporting lines with corporate bodies	Both practice and process based operational approaches	Intra-group level strategic objectives	Superior interpersonal skills
Cosmopolitan	Direct reporting lines with corporate bodies	Practice-based operational approaches	Corporate level strategic objectives	Superior interpersonal skills and liminality competence
Liaison	Direct reporting lines with corporate bodies	Practice-based operational approaches	Corporate level strategic objectives	Superior interpersonal skills and liminality competence

Discussion and Implications

Extant research on KBPs in PBOs does not provide sufficient explanation of how KBPs elicit, integrate and mobilize knowledge between projects and PBOs. The limited number of studies on KBPs focus on the role of knowledge brokers in connecting internal product developers and external practitioners and policy makers (e.g., Chew, Armstrong and Martin, 2013; Cvitanovic *et al.*, 2017) or knowledge exchange between competing business units in a specific industry (Chiambaretto, Massé and Mirc, 2018). Our conceptual framework delineates the structural, operational, strategic and individual characteristics of KBPs that promote their functional effectiveness in mediating knowledge flow between projects and PBOs. Our intention is to illuminate the rationale behind the increasingly prevalent phenomenon of KBPs in PBOs and to extend the knowledge brokering theory and the conceptualization of project management functions. Our ongoing research prior to BAM 2019 will focus on further developing key constructs of the conceptual framework and refining the proposed propositions that underline the main contribution of the model.

References

APM (2012) *Association for Project Management Body of Knowledge*, *APM Body Of Knowledge*. doi: 10.1080/10894160.2010.508411.

APM (no date) *Knowledge Management Practices*. Available at: https://www.apm.org.uk/resources/find-a-resource/knowledge-management/knowledge-management-practices/ (Accessed: 13 February 2019).

Bartsch, V., Ebers, M. and Maurer, I. (2013) 'Learning in project-based organizations: The role of project teams' social capital for overcoming barriers to learning', *International Journal of Project Management*. doi: 10.1016/j.ijproman.2012.06.009.

van den Berg, W. E. *et al.* (2014) 'Salespersons as internal knowledge brokers and new products selling: Discovering the link to genetic makeup', *Journal of Product Innovation Management*. doi: 10.1111/jpim.12156.

Bolisani, E. and Bratianu, C. (2018) *Knowledge Strategies*. doi: 10.1007/978-3-319-60657-6_5.

Borg, E. and Söderlund, J. (2015) 'Liminality competence: An interpretative study of mobile project workers' conception of liminality at work', *Management Learning*. doi: 10.1177/1350507613516247.

Brady, T. and Davies, A. (2004) 'Building project capabilities: From exploratory to exploitative learning', *Organization Studies*. doi: 10.1177/0170840604048002.

Bryde, D. J. *et al.* (2018) 'Knowledge Management and Project Management', in Syed, J. et al. (eds) *THE PALGRAVE HANDBOOK OF KNOWLEDGE MANAGEMENT*. Springer Nature, pp. 539–562. Available at: https://doi.org/10.1007/978-3-319-71434-9.

Burgess, N. and Currie, G. (2013) 'The knowledge brokering role of the hybrid middle level manager: The case of healthcare', *British Journal of Management*. doi: 10.1111/1467-8551.12028.

Burt, R. S. (2004) 'Structural Holes and Good Ideas', *American Journal of Sociology*. doi: 10.1086/421787.

Carrillo, P., Ruikar, K. and Fuller, P. (2013) 'When will we learn? Improving lessons learned practice in construction', *International Journal of Project Management*. doi: 10.1016/j.ijproman.2012.10.005.

Chew, S., Armstrong, N. and Martin, G. (2013) 'Institutionalising knowledge brokering as a sustainable knowledge translation solution in healthcare: How can it work in practice?', in *Evidence and Policy*. doi: 10.1332/174426413X662734.

Chiambaretto, P., Massé, D. and Mirc, N. (2018) '"All for One and One for All?" - Knowledge broker roles in managing tensions of internal coopetition: The Ubisoft case', *Research Policy*. doi: 10.1016/j.respol.2018.10.009.

Currie, G., Burgess, N. and Hayton, ; James C. (2015) 'HR Practices and Knowledge Brokering By Hybrid Middle Managers in Hospital Settings: The Influence of Professional Hierarchy', *Human Resource Management*. doi: 10.1002/hrm.21709.

Cvitanovic, C. *et al.* (2017) 'Using Social Network Analysis to Monitor and Assess the Effectiveness of Knowledge Brokers at Connecting Scientists and Decision-Makers: An Australian case study', *Environmental Policy and Governance*. doi: 10.1002/eet.1752.

Cvitanovic, C., McDonald, J. and Hobday, A. J. (2016) 'From science to action: Principles for undertaking environmental research that enables knowledge exchange and evidence-based decision-making', *Journal of Environmental Management*. doi: 10.1016/j.jenvman.2016.09.038.

Davenport, T. H. (2005) *Thinking for a Living: How to Get Better Performance and Results from*

Knowledge Workers, *Human Resource Development Quarterly*. doi: 10.1002/hrdq.1221.

Donate, M. J. and Sánchez de Pablo, J. D. (2015) 'The role of knowledge-oriented leadership in knowledge management practices and innovation', *Journal of Business Research*. Elsevier Inc., 68(2), pp. 360–370. doi: 10.1016/j.jbusres.2014.06.022.

Edmondson, A. C. and Nembhard, I. M. (2009) 'Product development and learning in project teams: The challenges are the benefits', in *Journal of Product Innovation Management*. doi: 10.1111/j.1540-5885.2009.00341.x.

Eriksson, P. E., Leiringer, R. and Szentes, H. (2017) 'The Role of Co-Creation in Enhancing Explorative and Exploitative Learning in Project-Based Settings', *Project Management Journal*. doi: 10.1177/875697281704800403.

Foss, N. J., Husted, K. and Michailova, S. (2010) 'Governing knowledge sharing in organizations: Levels of analysis, governance mechanisms, and research directions', *Journal of Management Studies*. doi: 10.1111/j.1467-6486.2009.00870.x.

Gagnon, M. L. (2011) 'Moving knowledge to action through dissemination and exchange', *Journal of Clinical Epidemiology*. doi: 10.1016/j.jclinepi.2009.08.013.

Goffin, K. and Koners, U. (2011) 'Tacit Knowledge, Lessons Learnt, and New Product Development', *Journal of Product Innovation Management*, 28, pp. 300–318. doi: 10.1111/j.1540-5885.2010.00798.x.

Gould, R. V. and Fernandez, R. M. (1989) 'Structures of Mediation: A Formal Approach to Brokerage in Transaction Networks', *Sociological Methodology*. doi: 10.2307/270949.

Grant, R. M. (1996) 'Toward a knowledge-based theory of the firm', *Strategic Management Journal*. doi: 10.1002/smj.4250171110.

Hagel, J., Brown, J. S. and Davison, L. (2010) *Are All Employees Knowledge Workers?*, *Harvard Business Review*. Available at: https://hbr.org/2010/04/are-all-employees-knowledge-wo.html (Accessed: 4 January 2019).

Hargadon, A. B. (1998) 'Firms as Knowledge Brokers: Lessons in Pursuing Continuous Innovation', *California Management Review*. doi: 10.2307/41165951.

Indeed (2019) *Knowledge Management Vacancies*. Available at: https://www.indeed.com/jobs?q=%22Knowledge%22+title%3AKnowledge&limit=50&radius=25&start=450 (Accessed: 27 January 2019).

Kerzner, H. R. (2005) 'Using the project management maturity model: strategic planning for project management', in *John Wiley & Sons*.

Kidwell, D. K. (2013) 'Principal investigators as knowledge brokers: A multiple case study of the creative actions of PIs in entrepreneurial science', *Technological Forecasting and Social Change*. doi: 10.1016/j.techfore.2012.05.004.

Meyer, M. (2010) 'The rise of the knowledge broker', *Science Communication*. doi: 10.1177/1075547009359797.

Mura, M. *et al.* (2016) 'Behavioural operations in healthcare: a knowledge sharing perspective', *International Journal of Operations and Production Management*. doi: 10.1108/IJOPM-04-2015-0234.

Newell, S. *et al.* (2006) 'Sharing knowledge across projects: Limits to ICT-led project review practices', *Management Learning*. doi: 10.1177/1350507606063441.

OGC (2017) *Managing successful projects with PRINCE2*. 6th ed. London: TSO.

Pawlowski and Robey (2004) 'Bridging User Organizations: Knowledge Brokering and the Work of Information Technology Professionals', *MIS Quarterly*. doi: 10.2307/25148658.

Pemsel, S. and Wiewiora, A. (2013) 'Project management office a knowledge broker in project-based organisations', *International Journal of Project Management*, 31(1), pp. 31–42. doi: 10.1016/j.ijproman.2012.03.004.

Radaelli, G. *et al.* (2014) 'Knowledge sharing and innovative work behaviour in healthcare: A micro-level investigation of direct and indirect effects', *Creativity and Innovation Management*. doi: 10.1111/caim.12084.

Scarbrough, H. *et al.* (2004) 'Project-based learning and the role of learning boundaries', *Organization Studies*. doi: 10.1177/0170840604048001.

Sennett, R. (1998) 'The Corrosion of Character', *Corrosion*.

Solli-Sæther, H., Karlsen, J. T. and Van Oorschot, K. (2015) 'Strategic and cultural misalignment: Knowledge sharing barriers in project networks', *Project Management Journal*. doi: 10.1002/pmj.21501.

Stamper, C. L. and Johlke, M. C. (2003) 'The impact of perceived organizational support on the relationship between boundary spanner role stress and work outcomes', *Journal of Management*. doi: 10.1016/S0149-2063(03)00025-4.

Star, S. L. and Griesemer, J. R. (1989) 'Institutional Ecology, "Translations" and Boundary Objects: Amateurs and Professionals in Berkeley's Museum of Vertebrate Zoology, 1907–39', *Social Studies of Science*. doi: 10.1177/030631289019003001.

Swan, J., Scarbrough, H. and Newell, S. (2010) 'Why don't (or do) organizations learn from projects?', *Management Learning*. doi: 10.1177/1350507609357003.

Sydow, J., Lindkvist, L. and DeFillippi, R. (2004) 'Project-Based Organizations, Embeddedness and Repositories of Knowledge: Editorial', *Organization Studies*. doi: 10.1177/0170840604048162.

Tempest, S. and Starkey, K. (2004) 'The effects of liminality on individual and organizational learning', *Organization Studies*. doi: 10.1177/0170840604040674.

Turner, V. (1969) 'The Ritual Process', *The Ritual Process Structure an Antistructure*. doi: 10.4198.116.

Wang, S., Noe, R. A. and Wang, Z.-M. (2011) 'Motivating Knowledge Sharing in Knowledge Management Systems: A Quasi–Field Experiment', *Journal of Management*, 40(4), pp. 978–1009. doi: 10.1177/0149206311412192.

Waring, J. *et al.* (2013) 'An exploratory study of knowledge brokering in hospital settings: Facilitating knowledge sharing and learning for patient safety?', *Social Science and Medicine*. doi: 10.1016/j.socscimed.2013.08.037.

Wen, Q. and Qiang, M. (2016) 'Coordination and Knowledge Sharing in Construction Project-Based Organization: A Longitudinal Structural Equation Model Analysis', *Automation in Construction*. Elsevier B.V., 72, pp. 309–320. doi: 10.1016/j.autcon.2016.06.002.

Wiewiora, A. *et al.* (2014) 'Interactions between organizational culture, trustworthiness, and mechanisms for inter-project knowledge sharing', *Project Management Journal*. doi: 10.1002/pmj.21407.