

LEARNING IN MEGAPROJECTS: CONSTRUCTING IDENTITIES AND IMPROVING PERFORMANCE

Natalya Sergeeva¹ and Jens Roehrich²

ABSTRACT

This article applies organizational identity theory to explore how megaprojects construct their identities as learning organizations. The study draws on 33 in-depth interviews from megaprojects in the UK construction/infrastructure sector. Interviews were further triangulated with data from a series of industry events and workshops. The investigation explores key characteristics of learning in megaprojects and their impact on performance. The research demonstrates the shift towards informal ways of learning and importance of narratives about the programme mission. Boundary spanners actively engage in sharing learning through stories about lessons learned from past experiences in managing megaprojects.

KEYWORDS

Boundary spanners; identity; learning organization; megaprojects narratives

INTRODUCTION

Megaprojects are typically set up for a specific period of time to deliver innovative products or services across a range of industries such as construction, infrastructure, and engineering (Flyvbjerg, Bruzelius, & Rothengatter, 2003; Merrow, 2011). Large-scale infrastructure assets such as water facilities, airports, roads, railways are complex systems that require a large investment commitment, take many years to develop and build, involve multiple

¹ Assistant Professor/Lecturer in the Management of Projects, the Bartlett School of Construction and Project Management, University College London, UK, n.sergeeva@ucl.ac.uk

² Professor, Chair in Supply Chain Innovation, University of Bath, School of Management, j.roehrich@bath.ac.uk

public and private stakeholders, and have long-lasting impact on the economy, the environment, and society as a whole (Brookes, Sage, Dainty, Locatelli, & Whyte, 2017; Flyvbjerg, 2014). Creating and maintaining complex systems in megaprojects requires the mobilization of a wide range of capabilities including contractual and relational governance, innovation, and learning (Davies, Brady, & Hobday, 2006; Flyvbjerg, 2017).

Despite the growth in number and opportunities to benefit from learning in megaprojects, these temporary organizational structures continue to have poor performance records (Davies, Gann, & Douglas, 2009). Most megaprojects are delivered over time, over budget and fail to achieve users' needs (Gann, Davies, & Dodgson, 2017). It is a major challenge for megaprojects to learn throughout their life-cycle in order to be delivered on time, on budget and to specifications (Brady & Davies, 2004). The majority of extant literature emphasizes learning capability which is required during the front-end planning in seeking to reduce uncertainties (Williams & Samset, 2010). More recent studies have started to recognize the importance of the back-end operation where lessons are learned and learning is transferred to future megaprojects (Zerjav, Edkins, & Davies, 2018).

It is often taken for granted that learning capabilities in temporary organizations are not very different from those more permanent (project-based) organizations (Brookes *et al.*, 2017; Winch, 2014). The specific characteristics of megaprojects that shape learning capabilities are: (i) being bespoke (created for a specific purpose); (ii) one-off (specific end date, but usually long life-span throughout which managers keep changing; at the end megaproject members separate and not always work together on subsequent megaprojects); (iii) alliance contracting (collaborative framework, co-creative process which promotes openness, trust, risk and responsibility sharing, innovation); (iv) substantial risks (financial, operational, reputational, innovation); and (v) with different organizational cultures merging together (e.g. clients/owners and suppliers) which shape learning practices (Gann *et al.*,

2017). Learning in permanent organizations tends to be more continuous and routinized when compared to megaprojects where learning is more dynamic due to the transient nature of the business (Hobday, 2000; Prencipe & Tell, 2001). Hence, the frameworks and models on learning developed for permanent organizations (Duffield & Whitty, 2015; Wei & Miraglia, 2017) may not be applicable to temporary organizations, i.e. megaprojects, and further research is needed to address this gap in extant literature.

Thus, the following overarching research questions are positioned: (i) *What are the key characteristics of learning in megaprojects?* And (ii) *What is the impact of these key characteristics on megaprojects' performance?* We theoretically ground our study in extant literature on learning in megaprojects (temporary multi-organizations) versus permanent project-based organizations. When exploring the impact of key characteristics of learning in megaprojects on performance, we found that part of this impact is the ways they construct their identities as learning organizations. Hence we frame our analysis deploying organizational identity theory (Alvesson, Ashcraft, & Thomas, 2008; Gioia, Schulz, & Corley, 2000; Schultz & Hernes, 2013). Empirical findings are based on rich datasets of temporary megaprojects in the UK construction/infrastructure sector and permanent construction/infrastructure project-based firms, and senior managers' perceptions of learning in these firms.

The study offers two distinct, yet inter-related, contributions. First, the study offers theoretical and empirical insights into key characteristics of learning in megaprojects and compares them with more permanent organizations. This contributes to the temporary/permanent organization dilemma in research on learning. We also investigate the key characteristics of megaprojects and their influence on learning and organizational performance. Second, we adopted an underutilized theoretical lens - organizational identity perspective - in understanding the ways megaprojects construct their identities as learning

organizations (Grabher, 2004). This deepens our understanding of the impact of key characteristics of learning in megaprojects on performance.

In the following sections, we conceptualize learning in megaprojects and identify a set of emerging learning characteristics. We explore individual and organizational learning using organizational identity perspective. We then discuss the research method and present our data analysis. Key findings are then discussed in light of extant theory, drawing out key theoretical contributions. We conclude by drawing out practical implications, research limitations, and future research avenues.

THEORETICAL BACKGROUND

Learning in temporary vs permanent organizations

Megaprojects and their members are influenced by a focus on specified delivery focus and deadlines leaving limited time to reflect on previous experiences in managing megaprojects to, for instance, improve processes and activities, and thus vital learning opportunities might be missed (Flyvbjerg *et al.*, 2003; Davies *et al.*, 2009). Several studies argue that megaprojects often fail or underperform due to poor decisions made during the planning front-end stage (Gann *et al.*, 2017; Flyvbjerg, 2014). Megaprojects strive to drive knowledge creation throughout the lifespan from the front-end phase to the back-end maintenance and operation phase (Bakker, DeFillippi, Schwab, & Sydow, 2016; Brookes *et al.*, 2017). A megaproject improves performance over time as it gains experiences, and hence creates new knowledge. The majority of extant studies have adopted a system thinking and practice theory perspectives on learning capabilities and mainly applied to more permanent organizations (Brady & Davies, 2004; Davies *et al.*, 2006; Gann & Salter, 2000). However, little is known about the key characteristics of the dynamic learning process in megaprojects and their impact on performance.

The majority of megaprojects operate in a context of collaborative working meaning that they move away from mainly coordinating via formal, more rigid organizational structures (e.g. rules, schedules, division of labor) towards an emphasis on more inter-personal coordination and informal communication mechanisms (Bechky, 2006; Brookes *et al.*, 2017), highlighting the importance of individuals to drive learning. In megaprojects, different interests, professions and organizations are brought together to drive and promote learning (Bartsch *et al.*, 2013). However, prior studies offer limited empirical insights into the roles of key individuals driving and promoting learning in temporary multi-organizational settings (e.g. studies calling for further research: Bakker *et al.*, 2016; Burke & Morley, 2016; Ryan & O'Malley, 2016).

Key learning characteristics in megaprojects

Megaprojects offer dynamic learning capabilities (Burke & Morley, 2016). That means, new configurations of team members based on specific expertise and experience at different phases of a megaproject's lifespan is a source of innovation that in turn improves performance (Davies *et al.*, 2009). Lessons learned from past experience in megaprojects can be stored in databases and files which can then be used by team members in future megaprojects to avoid past mistakes and deliver the final outcomes successfully (Davies *et al.*, 2017). In addition to formal approaches to learning (e.g. reports, databases, contract), individuals create a social network of relationships (e.g. events, discussion groups, communities of practices) to share knowledge and experiences.

Interactionist approaches to roles focus on the ways individuals can (re)construct social arrangements through role-taking (Bechky, 2006; Burke & Morley, 2016). The role of individual boundary-spanners is increasingly emphasized in the literature on learning, especially in the settings of multi-organizational and multi-project interfaces (Brookes *et al.*, 2017; Zaheer, McEvily, & Perrone, 1998). Boundary-spanners are vital to deal with diverse

individuals and organizations coming together to deliver outcomes in megaprojects (Aldrich & Herker, 1977; Huang, Luo, Liu, & Yang, 2016). In other words, their frequent information exchange within and across organizational and project boundaries. Boundary-spanners play a key role in addressing uncertainty and equivocality stemming from a megaproject's environment and processes by crafting, receiving, processing, and communicating information (Lentonen & Martinsuo, 2008). They regularly communicate across firm boundaries and perform activities that support intra- and inter-organizational relationships (Perrone, Zaheer, & McEvily, 2003). Boundary-spanners also tend to relocate across megaprojects to transfer their knowledge and experience to other team members (Brookes *et al.*, 2017).

Knowledge and the way in which boundary-spanners interpret (sense-making) and promote learning (sense-giving) is vital to constructing learning organization (Gioia *et al.*, 2000). In other words, the ways of promoting learning by boundary-spanners entails an effort to construct learning organization (Bakker *et al.*, 2016). For instance, Huang *et al.* (2016) apply process perspective on interpersonal ties in inter-organizational exchanges, demonstrating the ways boundary-spanners perform two roles: (i) serving as a robust base for connecting and sharing information. They decode, filter and pass the received information to relevant internal users; and (ii) acting as a relationship lubricant for effective cooperation and problem solving. Yet, prior studies have not connected the informal roles of boundary spanners with organizational identity theory in terms of the ways megaprojects construct their identities as learning organizations. This study elaborates theory of learning in megaprojects by examining informal roles and approaches to learning and the ways they construct identities.

Organizational identity perspective on learning in megaprojects

We position social identity theory in explaining the ways learning is driven and promoted in megaprojects by key individuals. Weick's conceptual ideas shed some light on the connection between learning and meaning making, suggesting that components of identity construction

rise to relevance when guided by the underpinnings of learning: “*Only with ambivalent use of previous knowledge systems are able both to benefit from lessons learned and to update either their actions or meanings in ways that adapt to changes in the system and its context*” (Weick, Sutcliffe, & Obstfeld, 2005: 414). This quotation connects learning with future changes, with emphasis being placed on the importance of context and meaning making process. Limited empirical research has specifically explored learning from organizational identity perspective (Brown & Starkey, 2000; Handley, Sturdy, Fincham, & Clark, 2006). We apply a definition of organizational identity as a sense of who organizational members are, or who they are becoming, as an organization (Corley & Gioia, 2004; Gioia *et al.*, 2000). Following Schultz and Hernes (2013), we focus on identity labels and their associated meanings serving as key components of organizational identity construction. Past research has recognized the temporary nature of organizational identity construction, for example, the ways organizations re-construct their identities through time (Clegg, Kornberger, & Rhodes, 2005). To date, little is known about the ways in which megaprojects construct their identities as ‘learning organizations’. The issue of identity construction as learning organization is relevant to both permanent and temporary organizations. Yet, given the specific characteristics of megaprojects (e.g. high risks associated with reputation, high expectations from the public), it is even more critical to their performance (Brookes *et al.*, 2017). Organizations tend to self-promote themselves as learning organizations through verbal, written and symbolic narratives. In other words, megaprojects can be socially constructed as ‘learning’ through the ways people speak, communicate, interpret, and share knowledge in the context of project organizing. Senior managers play an important role in articulating these narratives and stories. Yet, there is a gap in current knowledge in understanding of the nature of narratives mobilized by senior managers in temporary multi-organizational settings in

constructing identities of learning organizations and their broader implications for performance improvement and identity construction.

RESEARCH METHODOLOGY

Data collection and analysis

Overall, 33 face-to-face, in-depth interviews with senior managers and directors from UK-based infrastructure owner, contractor and supplier organizations were conducted.

Interviewees were selected on the basis of their professional experiences and their roles as active individuals within an innovation and knowledge management system [boundary spanners] (Stamper & Johlke, 2003). They played an active role in system integration and knowledge exchange within and across multi-organizational and multi-project interfaces. On average, interviewees have more than ten years of experience working in project-based settings during their career paths. The interviews were one-to-one, typically taking place in interviewees' offices. The duration of the interviews varied from 32 to 75 minutes with an average of 58 minutes. The adopted social identity theory guided the design of the interview guide with questions focused around making sense, interpreting, synthesizing, and transferring lessons learned about past failures and successes. Interviews were taped and transcribed verbatim, whilst we assured confidentiality of participating companies and individuals. Data reliability was further supported by triangulation of data sources including company reports, presentations, and data collected via attending a series of industry events and workshops.

The transcripts were read by researchers several times over; identifying, analyzing, and reporting patterns (themes) within the data. Analysis included broader codes such as organizations' characteristics and more specific codes zooming in on the concepts under study such as individual and organizational learning, identity construction processes. The

researchers started with noticing patterns of meaning and potential interests in the data. The systematic analysis was reflective in nature by making sense of the identified themes and interpreting them in relation to theory. The themes were reviewed and refined to ensure they form coherent patterns. The reviewed themes were named and clustered under headings that relate to the research question and theoretical framework. Our analysis was concerned primarily with common patterns across different organizations (temporary vs permanent, owners and suppliers) and across individuals, where differences were noted, further investigated, and reconciled (Poole & Van de Ven, 1989). The following sections present key findings derived from the thematic analysis.

EMPIRICAL FINDINGS

Key learning characteristics in megaprojects and their influence on performance

The purpose of construction/infrastructure megaprojects is to successfully deliver assets on time and on budget (e.g. a new railway, a new tunnel, a new building), achieve organizational benefits, and create value for customers. Megaprojects (often were labelled as ‘pop-up clients’ by the interviewees) – from Heathrow Terminal 5, via the Olympic Park and Crossrail towards Thames Tideway Tunnel and High-Speed Two rail link – place Britain in a unique position. This was articulated especially clearly by the CEO from water infrastructure megaproject: *“London has a permanent state of temporary organizations. There is an industry of people that actually move from one temporary organization to another; and many of which move and start the next one not realizing they have taken the culture of the organization with them, and then they get re-shaped by the new project and move on in a new direction”*. The transient nature of megaprojects means that people tend to move between megaprojects by applying their past knowledge and experiences in re-shaping the culture and vision of a new megaproject. This has important implications on the dynamic

process of re-learning between megaprojects and their influence on performance. Changes are at the core of the operation of megaprojects: changes in people throughout stages of the life-cycle and between megaprojects represent the transient nature of work environment within which megaprojects operate. There was a clear comparison being made between special purpose megaproject and business as usual permanent owner organizations:

“Because [Name of the organization] is such high-profile and contentious, a key part of being a leader is to actually to be able to articulate a very clear narrative around why [Name of the organization] is important. Not just for the purpose of promoting it externally, but internally as well, to motivate people. People are knowing why they are doing it, and actually make sure we are delivering the right thing. Having a very clear narrative absolutely has been very important.” (CEO from rail megaproject). The clear purpose of a megaproject is at the center of what they do which distinguishes it from permanent owner and supplier project-based firms (Davies *et al.*, 2017; Winch, 2014). Constructing a strong narrative about organizational identity for internal as well as external audiences is seen crucial for the delivery of megaprojects.

Constructing identity of ‘learning megaproject’

Megaprojects tend to actively promote learning in comparison to permanent organizations.

They see themselves and are often recognized by other organizations as ‘learning

organizations’: *“We were far more focused on actively promoting Learning Legacy.*

Learning Legacy has been a big theme for 2017 because we are in that space now - we are the client who has the opportunity to take the time and capture everything that we have done wrong and the lessons that we have learnt along the way. You will never get [names of permanent owner organizations] doing Learning Legacy website because they are not special purpose client who will see to be upon the completion of their work. They are

business as usual client who will be around for the next 20,30,40 years. [Name of the organization] is only here for 2 years. I am only here for 12 months. When the project is delivered the people will go.” (Program Control Director). This quotation clearly points to the ways senior managers actively promote leaning legacy in a megaproject as a popular narrative.

Senior managers have a strong belief and value in constructing identity of a learning organization. This is evident from the Head of Innovation of a water infrastructure megaproject (#28): *“My ethos for the last 15 years is all about pick the right people and make sure they have got the sufficient knowledge and then get them to think in a right way. I just use the loose term collaboration, it is about sharing knowledge, sharing ways of doing things, so that we all work at big problems faced at infrastructure industry, and make a complete different to the future together.”* Of particular note is the collective and collaborative way of sharing knowledge in the infrastructure sector. Similarly, Director of Asset Management of permanent client infrastructure organization demonstrates his ambition to create a learning organization: *“One of my ambitions is to create a learning organization. Some of that is through stability, consistency of approach. But absolutely how individuals learn and make it part of collective learning rather than something they will never do again because it hurt them. They have personal consequences because of it.”*

Senior managers strive for consistent and stable approach for collective learning and creating a learning organization. This relates to the challenge emphasized by many interviewees about the next generation of project leaders: *“The biggest challenge we have got in the UK is how do we develop something that the next generation of leaders can learn from us. Because I do not think we have got the time. Actually, we are not that bad at doing projects at the moment. I feel we are not too bad at the moment because we have learnt all of that. We have a generation of people who have been through it who confidently can sell the*

picture, who make sure they get the right environment. But the next generation are going to be victims of our success. How could we leave them with a legacy, and capable owner has that, a framework for leadership, not management.” Of particular note is the emphasis being placed on ‘capable owner’ in creating learning legacy and providing a framework for leadership.

Leadership driving learning in megaprojects

Most interviewees recognized that it is quite often down to an individual’s willingness and motivation to learn from past experiences and transfer it to new experiences. This emphasizes the role of key individuals to drive learning within megaprojects and also capture information from external sources such as suppliers. The Development Director of UK major airport megaprojects shared his experience of learning from other senior management team and involvement in a community of infrastructure owners and suppliers committed to change: *“I get involved in things like Project 13. I believe what I learn will make the organization more efficient and add value. It is important to be in the conversation and actually we have something to offer.”* This quotation demonstrates a connection between individual learning driving organizational performance. It is a two-way process of improving internal performance through learning and also sharing their best practices to wider communities of practices. A number of interviewees argued that knowledge was created by boundary-spanners through capturing information, then analyzing it and being able to further develop it through *“making sense of information”*, *“applying it to our context”*, and ultimately *“communicating it effectively”* internally within and externally across megaprojects *“to stimulate learning”*.

Senior managers further reported that they found it difficult at times with so many emails and Twitter messages to *“actively participate, share knowledge, and experiences”*

within and across organizations. The boundary-spanners interviewed were constantly seeking innovative ways of embedding information and driving learning to deliver projects successfully.

From formal towards more informal approaches to learning in megaprojects

It was recognized by the interviewees that most both permanent and temporary project-based organizations have some form of formal processes in place to drive organizational learning via, for instance, databases and platforms to share knowledge, but there has been much stronger emphasis on more informal approaches to learning: *“We can write case studies. We can put stuff on our webpages. I think there is a place for cataloguing experiences. People can go and read it. My experience is that people quite often do not go and read it. Increasingly, the way we are going to do it in our business is to create a very connected, organic workforce, a sustainable workforce, where Jim knows Paul works in that job; Sue knows Susan did that. Learning, I think, is more organic in our company and quite often driven by key people [boundary-spanners] who then share key learning.”* (CEO, transport megaproject). Megaprojects are temporary, even though may last many years, and they disperse after completion, so the chances of creating a knowledge platform (such as databases) is problematic. Hence, the role of key individuals (boundary spanners, self-motivated individuals) and their networks is crucial to drive knowledge and learning initiatives.

Some interviewees stated that they do not have formal knowledge management systems in place, but they have established expert groups. These groups are networks across the business that are focused around selected areas of excellence or priorities such as Building Information Modelling Group, Innovation Group, and Market-Making Group. This creates learning across a network of people meeting and collaborating who feel comfortable with each other. The CEO from a permanent construction owner firm articulated this point especially

clearly: *“We have about 15 groups in the organization. That creates networks of people; they meet and collaborate. This is driven by key people. They use examples or stories to share experiences. Eventually, network and communication become the most powerful, strongest way of sharing the learning.”* This example underlines the argument that organizational learning is driven by individuals who share knowledge through personal stories and examples from their experience. This is consistent with the emergent recognition that knowledge transfers from the project setting to the permanent organization is mainly the transfer of individual focusing more on inter-personal and individual learning than on organizational learning (Aerts, Dooms, & Haezendonck, 2017).

The data further demonstrate that permanent supplier project-based firms have many difficulties in building their learning capabilities: *“We are not really using online tools, communication tools to transfer knowledge in the right way. We started to but it is not great. It is all based on the relationships you build by speaking to people rather than being a system”* (The Business Improvement Manager, permanent supplier firm). This example places an emphasis on the need for online communities of practices where people can connect with each other when solving similar problems. The Regional Managing Director from a permanent construction owner and operator provided an example of collecting data from users based on interviews and conversations after the building project was commissioned: *“You built the building, you use all the skills, you monitor the performance for the next twelve months. You interview people how usable the building is. The most important people are users who use it on a day-to-day basis. We have to have evidence-based design. Has that worked well? If not, what has not worked well? If it worked well, let us do that again. It is about collecting the data, understanding what the data means, and use it on the next project.”* This example shows a boundary-spanner’s initiative to gathering information about users’ perceptions as a helpful way of understanding meanings, and transferring it to future projects,

hence driving learning. It also shows a need for a greater integration of front-end (planning and delivery phases) of a project with a back-end (operation phase). This is consistent with the literature on dynamic capabilities of megaprojects from the delivery to operation (Zerjav *et al.*, 2018).

DISCUSSION

Key characteristics of learning in megaprojects

The senior managers interviewed emphasized different organizing principles all of which shape learning in megaprojects: multiple and complex temporariness, transient nature of the business, and special purpose of delivery. The temporary, transient and overlapping boundaries with multiple organizations and projects of megaprojects make formal approaches to learning (e.g. databases, platforms and reports) problematic. We found the role of boundary spanners is crucial to drive learning initiatives. In order to support learning in megaprojects, it is important to pay more attention to a network of individuals and their informal roles (Bechky, 2006; Manning, 2017). Of particular note is the behavioral and cultural aspects in changing megaproject members' mind-set to become part of the identity of a learning organization. Boundary spanners play important roles in creating an environment in megaprojects where learning is valued and employees are committed in enhancing learning capabilities. We found that in permanent organizations, the speed of learning tends to be slower than in megaprojects, as there is less sense of urgency and there are established routinized learning practices that employees follow (Hobday, 2000; Prencipe & Tell, 2001).

We have found that megaprojects play an important role in driving and promoting narratives of learning legacy in the UK infrastructure sector. This is consistent with the three domains of project organizing model developed by Winch (2014). Capable owners set directions and challenges and provide support for suppliers to innovate and learn from best

practices across the sector. Managers in owner organizations create an environment for learning to emerge through both formal (e.g. databases, catalogues, case studies) and informal (e.g. conversations, telling stories, using examples) ways. The empirical data demonstrate a clear shift towards more informal ways of learning in megaprojects. More specifically, findings show the importance of boundary spanners who actively engage in driving and promoting learning in the settings of intra- and inter-organizational and project interfaces (Aldrich & Herker, 1977; Bakker *et al.*, 2016). Narratives of learning legacy are also particular popular among senior managers interviewed.

We further found that megaprojects socially construct their identities as learning organizations via spoken, symbolic, and written forms: sharing stories, videos via digital platforms, and write reports, blogs. There was more emphasis on the importance of narratives of organizational identities of megaprojects when compared to permanent organizations. Past studies are silent about the role of narratives in identity construction, and their especially critical role in temporary multi-organizational settings. This is one of our key contribution to knowledge to the extant studies. Considering the temporary and dynamic nature of megaprojects, narratives about organizational identities motivate individuals to improve performance, but also play important role in recognition from external audiences (other organizations and public).

The impact of learning characteristics in megaproject on performance

We have found that learning in megaprojects is driven by past experiences from similar megaprojects. This empirically proves the rule outlined by Davies *et al.* (2017) that megaprojects capture prior experiences by studying past megaprojects. There has been an agreement among interviewees on the importance of sharing learning from mistakes and failures as it has impact on performance improvement in the future by avoiding past mistakes

and use past examples and experiences. However, there have been some disagreements amongst interviewees about the extent to which organizations are good at learning from failures. Whilst some interviewees take a more positive perspective, others are more skeptical (especially those from permanent supplier project-based firms) in indicating that failures are still often hidden from a public eye (due to reputation risks associated with megaprojects). It is people who bring their experiences with them from work in previous megaprojects and share their experiences with organizational and project members who face similar problems. Based on the interviewees' perceptions, sharing stories about lessons learned and support those who face similar issues impact on organizational performance improvement.

Key individuals and leaders who are actively involved in transferring learning through networks and telling stories about past success and failures play an important role in the dynamic process of learning in megaprojects. These individuals in their informal roles (e.g. boundary spanners, leaders, innovation champions and agents) are vital to drive learning in megaprojects. Some authors have warned that learning is of highly situated nature and this may make transfer from one context (i.e. one specific megaproject) into another problematic (Gherardi, Nicolini, & Odella, 1998). This is addressed by the importance of boundary-spanners in megaprojects to 'de-situate' specific domain knowledge and to communicate relevant information to megaproject's members helping to reduce uncertainty and equivocality (Ryan & O'Malley, 2016). With the help of personalized stories about past events, boundary-spanners are able to break down rich and complex content to transfer learning within and across megaprojects.

Summary of key contributions

This study contributes to our yet incomplete understanding of learning in megaprojects when compared to permanent project-based organizations. We found that narratives about the

specific purpose of a megaproject play an important role in constructing identity of ‘learning organization’. This contributes to a better understanding of the ways megaprojects socially construct their identities as learning organizations via narratives. Adopting organizational identity theory (Corley & Gioia, 2004; Gioia *et al.*, 2000; Schultz & Hernes, 2013), an under-utilized theoretical lens in extant studies on learning in megaprojects, this study uncovers learning characteristics in megaprojects and their impact on performance. Boundary spanners in their informal roles move across megaprojects bringing and sharing their experiences through stories about project failures and successes facilitates learning and improves performance.

References

- Aldrich, H., and Herker, D. (1977). "Boundary spanning roles and organization structure", *Academy of Management Review*, 2(2), 217-230.
- Alvesson, M., Ashcraft, K. L., and Thomas, R. (2008). "Identity matters: Reflection on the construction of identity scholarship in organization studies", *Organization*, 15(1), 5-28.
- Aerts, G., Dooms, M., and Haezendonck, E. (2017). "Knowledge transfers and project-based learning in large scale infrastructure development projects: An exploratory and comparative ex-post analysis", *International Journal of Project Management*, 35(3), 224-240.
- Bakker, R. M., DeFillippi, R. J., Schwab, A., and Sydow, J. (2016). "Temporary organizing: Promises, processes, problems", *Organization Studies*, 37(12), 1703-1719.
- Bakker, R. M., and Janowicz-Panjaitan (2009). "Time matters: The impact of 'temporariness' on the functioning and performance of organizations. In: P. Kenis, M. Janowicz-Panjaitan, B. Cambré (eds) Temporary organizations. Prevalence, Logic and Effectiveness. Cheltenham and Northampton: Edward Elgar.
- 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*, 31(2), 239-251.
- Bechky, B. A. (2006). "Gaffers, gofers, and grips: Role-based coordination in temporary organizations", *Organization Science*, 17(1), 3-21.
- Brady, T., and Davies, A. (2004). "Building project capabilities: From exploratory to exploitative learning", *Organization Studies*, 25(9), 1535-1555.
- Brookes, N., Sage, D., Dainty, A., Locatelli, G., and Whyte, J. (2017). "An island of constancy in a sea of change: Rethinking project temporalities with long-term megaprojects". *International Journal of Project Management*, 35(7), 1213-1224.

- Brown, A. D., and Starkey, K. (2000). "Organizational identity and learning: A psychodynamic perspective". *Academy of Management Review*, 25(1), 102-120.
- Burke, C. M., and Morley, M. J. (2016). "On temporary organizations: A review, synthesis and research agenda", *Human Relations*, 69(6), 1235-1258.
- Clegg, S.R., Kornberger, M., and Rhodes, C. (2005). "Learning/Becoming/Organizing", *Organization*, 12(2), 147-167.
- Corley, K. G., and Gioia, D. A. (2004). "Identity ambiguity and change in the wake of a corporate spin-off", *Administrative Science Quarterly*, 49(2), 173-208.
- Davies, A., Brady, T., and Hobday, M. (2006). "Organizing for solutions: Systems seller vs systems integrator", *Industrial Marketing Management*, 36(2), 183-193.
- Davies, A., Gann, D., and Douglas, T. (2009). "Innovation in megaprojects: Systems integration at London Heathrow Terminal 5", *California Management Review*, 51(2), 101-125.
- Davies, A., Dodgson, M., Gann, D., and MacAulay, S. C. (2017). "Five rules for managing large, complex projects", *MIT Sloan Management Review*, 59(1), 73-78.
- Duffield, S., and Whitty, S. J. (2015). "Developing a systematic lessons learned knowledge model for organisational learning through projects", *International Journal of Project Management*, 33(2), 311-324.
- Flyvbjerg, B. (2014). "What you should know about megaprojects and why: An overview". *Project Management Journal*, 45(2), 6-19.
- Flyvbjerg, B. (2017). *The Oxford Handbook of megaproject management*, ed., Oxford University Press, Oxford, UK.
- Flyvbjerg, B., Bruzelius, N., and Rothengatter, W. (2003). *Megaprojects and risk: An anatomy of ambition*, Cambridge University Press, Cambridge, UK.

- Gann, D. M., and Salter, A. J. (2000). "Innovation in project-based, service enhanced firms: The construction of complex products and processes", *Research Policy*, 29(7-8), 955-972.
- Gann, D., Davies, A., and Dodgson, M.. (2017). "Innovation and flexibility in megaprojects", In B. Flyvbjerg *The Oxford Handbook of megaproject management*, ed., Oxford University Press, Oxford, UK, pp. 313-337.
- Gherardi, S., Nicolini, D., and Odella, F. (1998). "Toward a social understanding of how people learn in organizations", *Management Learning*, 29(3), 273-297.
- Gioia, D., Schulz, M., and Corley, K. (2000). "Organizational identity, image, and adaptive instability". *Academy of Management Review*, 25(1), 63-81.
- Grabher, G. (2004). "Temporary architectures of learning: Knowledge governance in project ecologies", *Organization Studies*, 25(9), 1491-1514.
- Handley, K., Sturdy, A., Fincham, R., and Clark, T. (2006). "Within and beyond communities of practice: Making sense of learning through participation, identity and practice", *Journal of Management Studies*, 43(3), 641-653.
- Hobday, M. (2000). "The project-based organization: An ideal form for management of complex products and systems?", *Research Policy*, 29(7/8), 871-893.
- Huang, Y., Luo, Y., Liu, Y. and Yang, Q. (2016). "An investigation of interpersonal ties in interorganizational exchanges in emerging markets", *Journal of Management*, 42(6), 1557-1587.
- Köhtämäki, M., Radetino, R., and Möller, K. (2018). "Alliance capabilities: A systematic review and future research directions", *Industrial Marketing Management*, 68(1), 188-201.
- Lentonen, P. and Martinsuo, M. (2008), "Change program initiation: Defining and managing the program – organization boundary", *International Journal of Project Management*, 26(1), 21-29.

- Manning, S. (2017). "The rise of project network organizations: Building core teams and flexible partner pools for interorganizational projects", *Research Policy*, 46(8), 1399-1415.
- Merrow, E. (2011). *Industrial megaprojects: Strategies, and practices for success*. Hoboken, NJ: John Wiley & Sons.
- Perrone, V., Zaheer, A., and McEvily, B. (2003). "Free to be trusted? Organizational constraints on trust in boundary spanners", *Organization Science*, 14(4), 422-439.
- Poole, M. S., and Van de Ven, A. H. (1989). "Using paradox to build management and organization theories", *Academy of Management Review*, 14(4), 562-578.
- Prencipe, A., and Tell, F. (2001). "Inter-project learning: processes and outcomes of knowledge codification I n project-based firms", *Research Policy*, 30(9), 1373-1394.
- Ryan, A., and O'Malley, L. (2016). "The role of boundary spanner in bringing about innovation in cross-sector partnerships", *Scandinavian Journal of Management*, 32(1), 1-9.
- Schwab, A., and Miner, A. S. (2008). "Learning in hybrid-project systems: The effect of project performance on repeated collaboration", *Academy of Management Journal*, 51(6), 1117-1149.
- Schultz, M., and Hernes, T. (2013). "A temporal perspective on organizational identity", *Organization Science*, 24(1), 1-21.
- 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*, 29(4), 569-588.
- Tempest, S., and Starkey, K. (2004). "The effects of liminality on individual and organizational learning", *Organization Studies*, 25(4), 507-527.

- Weick, K.E., Sutcliffe, K.M., and Obstfeld, D. (2005). "Organizing and the process of sensemaking", *Organization Science*, 16(4), 409-421.
- Williams, T., and Samset, K. (2010). "Issues in front-end decision-making on projects", *International Journal of Project Management*, 41(2), 38-49.
- Winch, G. M. (2014). "Three domains of project organizing", *International Journal of Project Management*, 32(5), 721-731.
- Zaheer, A., McEvily, B. and Perrone, V. (1998). "Does trust matter? Exploring the effects of inter-organizational and interpersonal trust on performance", *Organization Science*, 9(2), 123-141.
- Zerjav, V., Edkins, A., and Davies, A. (2018). "Project capabilities for operational outcomes in inter-organisational settings: The case of London Heathrow Terminal 2", *International Journal of Project Management*, 36(3), 444-459.