BUILDING PROJECT MANAGEMENT CAPABILITIES WITH KNOWLEDGE NETWORKS

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# Table of Contents

1. Introduction .................................................................3

2. Research Question and Objectives .................................5

3. Literature Review and Conceptual Framework ..................6

4. Methods .........................................................................9
   4.1 Case Study Descriptions ...........................................9
   4.2 Data Collection .......................................................9
   4.3 Data Analysis .........................................................10

5. Results and Discussion of Findings .................................11
   5.1 Life Sciences Company (LSC) ...................................11
   5.2 Research Center (RC) .............................................12
   5.3 Cross-Case Discussion ............................................13

6. Conclusion ....................................................................15

References ........................................................................16
   List of Outputs ............................................................18
1. Introduction

This final report presents the findings of our research project, led by the Principal Investigator, Associate Professor Chivonne Algeo, and the other investigators, Associate Professor Henry Linger (Monash University) and Katrina Pugh (Columbia University), with invaluable assistance from Dr. Zaheer Asif.

We would like to thank the Sponsored Research Program of the Project Management Institute (PMI) for funding this research on the contribution of knowledge networks to building project management capability. Such support for research makes an important contribution to the development of the project management field. Our project team is grateful for the support and understanding PMI provided throughout the project and specifically Professor Martina Huemann, PMI liaison for this research project. We are also appreciative for the support we received from the participating organizations.

Organizations introduce knowledge networks hoping to reap the benefits of innovation, higher productivity, and job satisfaction among members. To explore how project professionals can use knowledge networks to build their project management capability, our research examined how knowledge networks are deployed as a place to learn in order to achieve organizational ends and support members in a trusted space. Our research explored how project professionals can best use knowledge networks to build project competencies and transform the network into an engine for collaborative innovation. Our project extends the literature on knowledge networks, focusing on how such networks facilitate cooperative behaviors in support of organizational outcomes. Our research examined knowledge networks in practice in Australia and the United States. Traditionally, knowledge networks are volunteer-led and improvisational. However, in a paradoxical way, knowledge networks are most effective when there is an intentional design. In light of this paradox, we have framed our study on the knowledge network framework developed by Pugh and Prusak (2013) that formalizes the formation and operations of the knowledge network toward organizational outcomes and captures essential links between the design, dynamics, behaviors, and outcomes of such a network.

Our study examined knowledge networks in a bilateral government funded research center (RC) in Australia and a Life Sciences Company (LSC) in the United States. This allowed us to explore the continuums of traditional/nontraditional project settings and formal/informal networks. The LSC established a corporate-sanctioned, formal knowledge network across the business technology function supporting multiple departments. The members were primarily PMI certified and strove to improve their project management practices by affiliating with others in the profession.

The RC was an informal knowledge network. The RC represents explicit bilateral arrangements between Australia and another Asia-Pacific country, a large number of academic institutions in both countries, and four diverse research clusters (energy, health, infrastructure, and food and agriculture). The RC was focused on the coordination and support across the research clusters to address the RC goals and aspirations, overtly promoting the knowledge network. Additionally, there was a degree of recursion in the knowledge network with knowledge networks emerging, in turn, in each cluster to support the specific goals of that cluster. Our study addressed both knowledge networks and their interactions.
This report will guide the reader through the conduct of the research and our findings. Section 2 presents the research questions and objectives, Section 3 summarizes the most relevant literature reviewed and describes the knowledge network framework used to conduct this study, Section 4 explains the methodology, Section 5 summarizes and discusses our findings, and Section 6 discusses the conclusions and contributions of this research project.

In summary, our research found that in order to build project management capability, knowledge networks need to have clarity and agreement on objectives to be successful. Also, because they are voluntary, knowledge networks are fragile and their members need to be motivated, either by social capital or faith in something larger than themselves. Our research also confirmed the need of an alignment between the intent and the implementation of a knowledge network, because misalignments inhibit problem solving, project practice innovation, knowledge sharing, and improved project outcomes. Successful project management knowledge networks should inspire organizations and their project professionals to discover and share new practices that result in improved project management capabilities and project outcomes.
2. Research Question and Objectives

The management of projects relies on the capability of professionals using their skills and knowledge. This knowledge encompasses both the management of projects and the enterprise itself. Projects of any significant size involve professionals who acquire and transfer knowledge and “make relevant knowledge available to the project team . . . throughout the duration of the project” (Reich, 2007, p. 8). Communities of Practice (CoP) are one theoretical construct that has been widely proposed as a means to address knowledge transfer and learning in projects. The term CoP has been widely misunderstood and misused. We are using the term “knowledge network” (KN) to represent the practical and intentional use of CoPs that “are collections of individuals and teams who come together across organizational, spatial, and disciplinary boundaries to invent and share a body of knowledge” (Pugh & Prusak, 2013, p. 79).

Functioning knowledge networks learn from their own activities and capitalize on cognitive diversity. They integrate and coordinate fragmented and dispersed knowledge to resolve problems specific to members’ projects. However, little empirical evidence exists about the contribution of knowledge networks to the development of project management capability. This research therefore addresses the following question:

How do project professionals best use knowledge networks to build project management capability?

Our research focused on understanding the role of formal and informal knowledge networks in creating, managing, and transferring project practice knowledge. The significance lies in how such capability development can contribute to learning that drives project effectiveness. We also aimed to identify empirically the mechanisms used for designing and operating knowledge networks sustainably and with impact.
3. Literature Review and Conceptual Framework

Knowledge is widely seen as a vital, competitive asset for thriving in a highly complex and dynamic environment. In the global knowledge economy, the ability to create, share, access, and use knowledge across and within organizations is a vital determinant of success (Solli-Sæther & Gottschalk, 2015). To ensure knowledge has meaning, it “must be continuously recreated and reconstituted through dynamic, interactive, and social . . . activity” (Swan, Newell, Scarbrough, & Hislop, 1999, p. 14). In the context of managing projects, knowledge can be defined as “the application of principles and processes designed to make relevant knowledge available to the project team . . . throughout the duration of the project” (Reich, 2007, p. 8).

The concept of knowledge networks has attracted many researchers. Fiore (2007) sees knowledge networks as a place for boundary-spanning learning and innovation. A knowledge network is a specific type of social network that is specially built to generate and spread knowledge within a social network. Phelps, Heidl, and Wadhwa (2012) conceptualize knowledge networks as “consisting of nodes that serve as repositories of knowledge and agents that search for, adopt, transmit, and create knowledge. Nodes are simultaneously sources and recipients of information and knowledge” (Phelps et al., 2012, p. 1236). In the mid-2000s, an increasing number of researchers began realizing the importance of social networks for knowledge creation and dissemination: Fong (2003); Bresnen, Edelman, Newell, Scarbrough, and Swan (2003); Kase and Zupin (2009); Fritsch and Kauffeld-Monz (2010); and Cross and Parker (2004).

Many studies have explored knowledge sharing and transfer within project networks. Alin, Taylor, and Smeds (2011) explored how knowledge is transformed when it is shared across organizational and specialization boundaries. They found that within a project network, knowledge is created when existing knowledge crosses organizational and specialization boundaries, especially if there is diversity in knowledge across the boundaries and there is an alignment of interests. Takahashi, Indulska, and Steen (2018) emphasize that knowledge transfer is essential for innovation in collaborative research projects. They hold that novel ideas and innovative outcomes are generated through knowledge interaction and exchange among the team members (p. 36). Furthermore, they discovered that the strength of the links between members along with network diversity are important determinants of such exchanges. Solli-Sæther and Gottschalk (2015), on the other hand, explored the relationship challenges influencing knowledge sharing in project networks. They identified cultural, strategic, and technical challenges that could influence the process of knowledge sharing and exchange.

Ruan, Ochieng, Price, and Egbu (2012) considered information sharing as a critical factor to benchmark project performance. They highlighted the importance of informal relationships that are not based on contractual commitment for knowledge integration, and considered knowledge integration across organizational boundaries as an effective method of achieving collaborative advantages. Anderson-Gough, Grey, and Robson (2006) reported that projects with super-high technological uncertainty have more informal communication than projects with low technological uncertainty. Dillon and Taylor (2015) found multiple modes of communication both internal to the project and also with external stakeholders to be an important project management competency. However, according to Solli-Sæther and Gottschalk (2015), organizations often face difficulties in trying to encourage knowledge-sharing behaviors.

Mechanisms used to transfer knowledge can include project documentation such as IT tools and practices for people integration, but if “used incorrectly, they can become a barrier to the knowledge transfer process” (Frank & Echeveste, 2012, p. 244). Due to a lack of “integrating mechanisms, the possibility of short-term efficiency and long-term innovation through projects may be limited” (Eriksson, 2013, p. 335). Knowledge networks can bring down such barriers. They provide a forum for interrelating tacit and explicit knowledge (Gueldenberg & Helting, 2007) in order
"to resolve an applied problem in context" (McKenzie, 2004, p. 127; Rynes, Bartunek, & Daft, 2001). Knowledge network "members identify with the network and its aspirations, readily share their connections inside and outside the network and are committed to moving knowledge sharing to the platform so that everyone can benefit" (Pugh & Prusak, 2013, p. 93). Knowledge networks can also provide a learning forum where new knowledge can enhance decision making. The capacity to "extend the organization’s capability to make informed, rational decisions . . . [is enhanced by the] . . . transformation of personal knowledge between individuals through dialogue, discourse, sharing, and storytelling” (Dalkir, 2005, p. 60).

Citing Ebadi and Utterback (1984), Schilling and Phelps (2007), and Uzzi and Spiro (2005) as evidence, Phelps et al., 2012 note that studies of knowledge networks are rare despite their demonstrated influence on knowledge creation, transfer, and adoption. They call for additional research to better understand how the structural characteristics of the knowledge network influence knowledge outcomes.

There is tension between improvisation and structure. In some studies, knowledge networks fail due to a lack of adoption by project managers and the necessity to balance the attractiveness of free-flowing participation with consensus-driven, but structured, knowledge asset production and use (Stein, Stren, Fitzgibbon, & MacLean, 2001; Wenger, McDermott, & Snyder, 2002). Integrating a strategic, structural, or tactical design framework into knowledge networks may balance the desire for structure with the imperative to facilitate emergent knowledge creation. Pugh and Prusak’s "design dimensions" (2013) explore this framework through theories of change, articulated objectives, learning postures, participation parameters, ground rules, facilitation norms, specific convening modes, and measured goals.

A structured approach will equip knowledge networks to assess their own activities and capabilities, and make changes to improve project outcomes and the capabilities of individual members. This approach will also generate an understanding of knowledge network strategies and behaviors for project managers and their organizations. Pugh and Prusak’s (2013) initial concern was to better understand the leverage that knowledge network leaders have to design their networks for optimal effectiveness. It soon became obvious that one size does not fit all. There are ontological and qualitative differences between the types of networks, resulting in varied dynamics and behaviors. Basing their preunderstanding on the long-established and rigorously respected theory of system dynamics, Pugh and Prusak formulated a model that captures essential links between design dimensions, dynamics, behaviors, and outcomes of a knowledge network (see Figure 1).

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**Figure 1.** Knowledge network effectiveness framework (Pugh & Prusak, 2013).
The dimensions themselves were identified through a rigorous and empirical study involving firsthand observations, focus groups, and detailed interviews with key knowledge network leaders. These dimensions are given as follows:

Table 1. Knowledge Network Design Dimensions

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<td>4. Inclusion and participation</td>
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<td>5. Operating model</td>
<td>6. Convening structures and infrastructures</td>
<td>7. Facilitation and social norm development</td>
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<td>TACTICAL</td>
<td>8. Measurement, feedback, and incentives</td>
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These dimensions are termed “design dimensions” (Pugh & Prusak, 2013) as it is believed that network leaders have the maximum leverage in designing these aspects. These design dimensions, in turn, influence the “drivers” (also called dynamics) of the network, which describe collaboration, contribution, building of confidence, and the maintenance or loss of psychological safety. Such drivers and dynamics, in turn, influence individual behaviors, such as speaking up, helping, capturing knowledge, identifying oneself as a member, and egalitarianism (see Figure 2).

Figure 2. Translating a desired outcome back to the design.
4. Methods

Using case studies permits a deeper understanding of the emergent constructs and phenomena under study in their rich real-world contexts (Eisenhardt & Graebner, 2007). A multiple case study design (Shanks, 2002; Yin, 2011) permits a contrast and comparison. In addition, a multiple case study extended the generalizability and external validity of the study (Ellram, 1996; Merriam, 1995; Meyer, 2001). We chose Eisenhardt and Graebner’s “polar-type” case study approach to enhance the chances of comparing and contrasting different contexts to extend theory (2007, p. 27). The case studies used for this research were from a large multinational corporation headquartered in the United States (LSC) and a medium-sized nonprofit based in the Asia-Pacific region (RC).

4.1 Case Study Descriptions

The RC focused on international economic cooperation as a case study of an informal knowledge network. The RC was selected, as it represents explicit bilateral arrangements and a large number of academic institutions involved in four diverse research clusters (energy, health, infrastructure, and food and agriculture). The RC runs many multidisciplinary programs with an emergent nature of activity. The focus of the RC is on R&D across the research clusters and their coordination and support. Our research investigated two knowledge network levels, one at the RC central level and one at the research cluster level.

The LSC is multinational company headquartered in the United States and actively involved in knowledge generation and exploitation. It is one of the leading innovators in the domain of life sciences. It is a company firmly established with a history spread over 150 years. The company firmly believes in and enacts the precept that innovation comes from collaboration. The company is currently involved with multiple formal and informal knowledge alliances. The knowledge partners include community organizations, government organizations, and organizations from business partners. Internally, the company engages in creating and maintaining both inter- and intradepartmental knowledge networks. Our research focused on the company’s informal intradepartmental knowledge network pertaining to project management practices.

4.2 Data Collection

We employed qualitative techniques for data collection. In order to elaborate the design framework, we used four techniques to collect data: semi-structured interviews, observations, document analysis, and focus group meetings. While each technique is an independent source of data, and required the development of emergent research instruments, we were able to combine them to ensure the integrity of the findings, as follows:

- **Semi-structured interviews.** In each setting, we followed a purposive sampling approach (Miles & Huberman, 1994) to determine the interview cohort and the activity and/or knowledge network that was the focus of the study. Those participating in the research study, the actors, were at different organizational levels and had varying roles within the activity and the knowledge network. Interviews with project managers, project team members, and support staff were conducted. A total of 15 individuals from both organizations were formally interviewed. Interviews explored a range of issues that related to the knowledge network effectiveness framework identified by Pugh and Prusak (2013). The interviews examined the actors’ engagement in the knowledge network and learning processes, their ability to make sense of events in their project/activity with the backdrop of the knowledge network, the project challenges the actors faced and their strategies for addressing these, and their understanding of how knowledge networks contribute to project capabilities.
Observations. We observed a variety of activities relating to the project and the conduct of the knowledge network. Field notes were written from these observations to provide further evidence of the relationships and interactions within the knowledge network and how these impact on the project management capabilities. The observations were linked to the eight design dimensions introduced in the literature review.

Document analysis. Multiple internal as well as public documents were examined to provide a richer picture of the activity, the knowledge network, and the actors. In some instances, such documents related specifically to the activities of the knowledge network. This analysis helped to establish both institutionalized processes used to support the activity and the invisible work (Star & Strauss, 1999; Strauss, 1988) that maintains the knowledge network.

Focus groups. Focus groups were conducted with knowledge network members to discuss what they did with the framework through a series of open-ended questions. The selection of this approach gave the actors an opportunity to engage in discussion with each other and the researchers, and encouraged different views to be expressed in discussions (Kemmis, McTaggart, & Nixon, 2014) to build on each other’s experiences of using the framework.

4.3 Data Analysis

To analyze the data we collected, we employed an interpretivist research paradigm. Our research contributed to the body of knowledge and literature on knowledge networks and knowledge transfer. Our findings were developed using thematic analysis and the hermeneutic circle (Klein & Myers, 1999) to compare specific insights with emergent holistic understanding. All the findings were confirmed with the participants to ensure their validity and accuracy.
5. Results and Discussion of Findings

5.1 Life Sciences Company (LSC)

The goals of the LSC knowledge networks were enabling consistency of practice, growing the credibility of the project management function, and improving project managers’ sense of community. We found that the knowledge network members had a deep commitment to project management as a discipline, whereas the larger organization did not invest in project management as a respected, funded centralized function. Our interviews with the knowledge network members revealed that practitioner/member support was the most important goal for them. They recounted the openness with which meeting members helped each other between meetings, having built trusted relationships in their monthly meetings. This, in turn, took down barriers to asking for help.

Our interviews identified both horizontal coordination and learning/innovation as the second most important goals. The knowledge network members talked about purchasing continuing education as a group rather than within the budgets of the individual business subunits with the department. This coordination helped with financial cost management. Knowledge network members reported that learning/innovation (product artifact creation) was useful, as they felt that it co-created content or artifacts from the knowledge network that were not otherwise adequately published or socialized. One interviewee mentioned that using artifacts generated outside the knowledge network was rare: “Even when we have a step at the beginning of a project that is designated as ‘review the lessons learned from last time,’ we don’t do it.”

The third goal reported by interviewees was translation/local adaptation. Knowledge network members reported that they had to work on testing and other project activities. Interpreting the policy and other changes in their organizations stumped some knowledge network members, and they came to rely on each other to interpret the policies and translate the approaches from one project to the next.

When asked what design dimensions matter most, it was not surprising that the interviewees agreed on the operating model and facilitation and social norm development. In addition, there was praise for the facilitators. Several knowledge network members interviewed within the LSC remarked on the clarity of membership (inclusion and participation) and the sense of safety and welcome they found as novices (expert-learner balance). These two design dimensions are strongly associated with psychological safety. However, there was disagreement on other areas. Two interviewees remarked how important metrics, feedback, and incentives were to them but bemoaned the fact that, to their knowledge, there were no knowledge network metrics gathered or published. The meeting convening structure was non-negotiable, as were the foundation of knowledge network learning conversations. Regular sharing of lessons learned at the beginning of each meeting enabled members to see the nuances of project management practices at work in different contexts. One interviewee observed, “It enhances the idea that it’s not just a role—it’s a craft.”

Another knowledge network meeting activity was on presentations. When asked to describe the most memorable moments, many knowledge network members who were interviewed recounted colorful presentations by fellow members at the meetings. For example, one member handed everyone a puzzle piece, and showed the value of project management through the missing puzzle piece metaphor. Others recounted their own knowledge network meeting presentations, which, even when not quite so theatrical, had forced them to research a topic in depth (e.g., you up your game by researching topics). For example, some members recounted presenting on designing a project plan for implementing a cloud service or for working with a vendor who would provide software as a service. Another
learning was about their own knowledge network process. Knowledge network identity improved when there were intermeeting interactions (beyond simply emails), and some members felt that this should be introduced as a practice. The early years of the LSC’s knowledge network focused first on creating psychological safety and credibility for project management "as a craft." The members look forward to an evolution and stated that design dimensions of membership and participation; convening structures; and measurement, feedback, and incentives will evolve.

5.2 Research Center (RC)

The RC was established as a "constellation of clusters." The business goal of the RC (also known as the hub) was to support the clusters in Australia and overseas to undertake solution-driven collaborative research while developing leadership skills and fostering the exchange of knowledge. The RC focused on productivity and anchoring the RC through coordinated bilateral and multinational outcomes. This was the horizontal coordination knowledge network goal. The RC disbursed government funds and managed publication of the research outcomes, in addition to facilitating workshops with key stakeholders to meet their collective goals. All of these impacts were managed centrally to address the economic, social, and cultural dimensions of the two countries, allowing the four clusters to concentrate on their individual goals. The interviewed leaders in each cluster stated that they each fostered the cohesion of their and other cluster networks, by informally contacting several of those involved with the center to share information.

On the other hand, members of the four clusters felt that the most important goals were member support and translation/local adaptation. For example, they needed to find ways to support each other and build trust, starting with empathy and belonging, to create knowledge that represents the truth and is sincere. The interviewed members also articulated that they need to immerse the research team in the community to build trust. Money brought them together, but they realized that they were part of a bigger family. When the clusters genuinely engaged, they found some benefit from working together. For example, the energy cluster worked very well with their international partners and the health cluster, resulting in unintended learnings through being pragmatic.

We found evidence of sharing information within clusters. This was observed at a summit when one leader asked what the impact would be on another cluster’s research project, as there appeared to be some duplication, and some members helped a presenter with responses to questions. However, this was rarely evident between clusters, demonstrating a lack of respect (facilitation and social norm development). For example, when members were presenting to each other, most of the participants were distracted (used phones or computers, wrote notes to each other, chatted, etc.).

We found that the inclusion/participation norms were limited to in-cluster relationship building and communication. Cross-cluster communication was undervalued, and communication to the RC was done by cluster leads and administrators, noting some were not permanent employees of a partner. One cluster leader articulated to us the need to engage more collaboratively with international partners, otherwise it will be unbalanced. We also observed that when clusters worked together in teams, the international members, even though encouraged to contribute, were limited in what they offered, especially the female international members. Another cluster lead we interviewed suggested the communication with the hub was poor and even toxic, leading to anger, frustration, and missed funding opportunities, yet they were grateful to the center for all they did to coordinate the projects.

We found that the expert-learner balance appeared to favor the expert and therefore thwarted open dialogue about failure across clusters. However, lessons learned were shared within clusters with the aim of enhancing outcomes. We found this evident in the level of technical detail used to share research outcomes and plans (verbally and in reports), which relied on context- or domain-specific knowledge. This, in turn, could reinforce the barrier between
clusters. We also observed a focus on updating knowledge, which was emphasized at the summit by the leader’s fellow cluster members “if there is at least one take-home message, it is to constantly update your models with new knowledge.”

Our case study review found that the convening structures were not conducive to trust across clusters. Clusters used in-person and video meetings with lots of presentations but little dialogue. They also used email as a sequential writing process rather than co-authoring. However, within clusters, the members met formally to workshop projects, with the funder (government) requiring a balance of representation from both partners. The clusters followed operational models, for example, to manage contracts at the center and not at cluster levels. We observed that these contracts drive the timeframes within which members work. They are managed by the administrators to leave the members to focus on where their research focus is. However, at central hub level, the focus is on strategic direction, funding proposals, approvals, contracts, and progress reviews of cluster projects. This was seen by the clusters to be a highly “bureaucratic process to get projects up.”

Our interviewees also told us that within the RC, the facilitation/social norm development design dimension was often driven by personalities and individuals, and limited to symbols but not explicit matchmaking between people with common interests or research that had common tracks. Connections were not facilitated by the center. They were left to the clusters. The practical steps of building trust after the summits was missing, and few cross-cluster dialogues were planned and facilitated. Also, status differences were not addressed. However, there appears to be a common attempt to establish simple norms, such as printed and verbal communications being predominantly in English (which is not the first language of the international partners), and the local language was used out of respect and to emphasize key points.

Finally, feedback, metrics, and incentives were limited to productivity (publication counts, dates met, etc.) against a strategic plan, and not the health of the network. However, a leader stated that there was positive research performance through collaboration with the RC, indicating there was a desire to foster the network to meet performance targets of research impact. Stepping back to the leaders’ shared theory of change objective, the RC founders may have said, “If we manage the financials and promote the clusters’ research, everything else will take care of itself.” Noting that, project goals and criteria often changed throughout the process. Interviewees learned tolerance for uncertainty in what members called “cross-cultural chaos.”

5.3 Cross-Case Discussion

The subjects of both case studies focused on delivering appropriate and innovative outcomes for their key stakeholders—a broad project manager community for the LSC, and government and at-risk communities for the RC. We found a clear difference in the knowledge network objectives of the LSC and the RN. The four objectives of a knowledge network can be upleveled to product and members (cf. Figure 2). LSC leaned toward members (“member support” and “translation/local adaptation”). They downplayed the creation of things,” and up-played mutual support and problem solving. The RC hub focused on product “coordination” through the central money disbusers and publishers, while the RC clusters focused on “learning/innovation.” That difference may have been “fine unto itself had the hub and the clusters not been related. Interviewees observed that, as a knowledge network (including both the spokes and the hub), the RC needed to focus on the member support objective, and design around psychological safety and support for risk taking. In the fraught political environment, leaders realized too late that they should have started with a focus on members. Misaligned objectives meant the design and behavior failed to yield knowledge network benefits.
There were clear differences in the knowledge network design, dynamics, and behaviors across the LSC and RC knowledge networks. Due to the differences in the maturity levels of the two knowledge networks, it was possible to speculate on the design factors that allowed differential gain of benefits for the two knowledge networks. One obvious difference was the level of trust among the members of the two networks. In the LSC network, trust was built intentionally, while there was a recognizable dearth of trust building in the RC. Second, there was a difference in the level of expert-learner balance enjoyed by the members of the two knowledge networks. The LSC network members commonly felt safe to experiment with, while risks. This was not the case for the RC network. The LSC knowledge network designers had a shared theory of change that capacity building required psychological safety, and they designed for that. Members felt safe about taking risks, laughing at themselves, conducting bold experiments, and playing games as a way of learning.

The operating models of the two networks studied also differed. At the hub of the LSC was a junior project manager with strong convening skills (working under the tutelage of the sponsor). The hub of the RC knowledge network was more of a bureaucrat than a connector. The RC hub concentrated power and drove people-agnostic procedures. Meanwhile the spokes (clusters) formed internal subnetwork connections, having pictures of people, family, and friends and displays of affect. Whereas LSC members of many levels in the hierarchy came to meetings to laugh and learn, a status difference was visible in the RC knowledge network, in the sense that even in the informal collaborations and interactions, the signs, symbols, and rituals of power differences were not set aside. We feel that this may be due to the cross-border, cross-cultural politics that necessitated a different approach for the RC.

Ultimately, the role of the knowledge network in legitimizing the project management practices was also different in the two cases studied. The LSC organization’s project management practices became more consistent, as the knowledge network provided a sense of authority for the project management standards. For the RC, as there was a lack of opportunities for cross-pollination of ideas and methodologies (project management or otherwise), there was little effect of the knowledge network on legitimizing practices.
6. Conclusion

This study of knowledge networks in different contexts resulted in the development of an evidence-based framework that builds on the design dimensions identified by Pugh and Prusak (2013).

Our study confirms the value of knowledge networks and also addresses the research question How do project professionals best use knowledge networks to build project management capability? by demonstrating that as the knowledge networks disseminate new practices, they contribute to project managers’ capabilities and facilitate their organizations’ learning. To build project management capability, the knowledge network framework can be deployed both to assemble an effective knowledge network as well as to diagnose why a network is not effective.

The translational outcomes of this framework are twofold: First, the knowledge network allows project managers to assess their own activities and capabilities and make changes to improve knowledge network outcomes over time. Meanwhile, the project organizations are able to exploit knowledge network strategies and behaviors to facilitate collaboration across disciplinary and organizational boundaries in order to broaden the knowledge base, transfer knowledge, solve ad hoc problems, and innovate.

Second, we confirmed the research of Pugh and Prusak (2013) in that there needs to be an alignment between the intent and the design of a knowledge network. Misalignment leads to gaps in desired behaviors (problem solving, project practice innovation, sharing) and knowledge network outcomes. Successful knowledge network designs for project managers should inspire organizations to step out of a command-and-control model for governance of the project management function. As these knowledge networks discover and spread new practices, they can lead their organizations in the project management capability learning process.

Our research found that, to be successful, knowledge networks need to first have clarity and agreement on objectives. We are aware of the fragility of the network because it is voluntary. There needs to be glue, for example, something that motivates members to stay together despite their differences and time constraints. Members are tied by social capital or faith in something larger than themselves.
References


**List of Outputs**

To share the application of our findings, we have developed academic and practical deliverables. We submitted an extended abstract for a special issue of the Project Management Journal (PMJ) and received constructive feedback, which we are using to develop a full paper for a general submission to PMJ. We have completed a draft for a practitioner webinar, an article for ProjectManagement.com, and have confirmed a presentation for the PMI Victoria Chapter meeting in the second half of 2019.

Our aim is to continue working on disseminating the research findings after the project is completed through the development of additional papers to be published and presented in appropriate academic journals and practice forums.