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Introduction

Foundations are increasingly interested in decentralizing knowledge sharing among grantees in order to strengthen the adaptive capacity of organizations and systems (Lewis-Charp, Berman, Lench, & Siddall, 2020.) Communities of practice (CoPs) can decentralize the flow of information in a way that can accelerate innovation and dissemination.

The original CoPs arose organically and informally among practitioners who wanted to share tacit knowledge. Efforts by corporations to implement them have often fallen short of the concept’s original objectives. This article presents the lessons learned and outcomes achieved from the long-term commitment to CoPs by the McKnight Foundation’s Collaborative Crop Research Program (CCRP).

CoP Theory of Change

The CCRP’s theory of change for funder-led CoPs makes clear that there are costs to forming a funder-initiated CoP, such as the financial outlay for supporting facilitation and convenings. (See Figure 1.) There are also costs in terms of the loss of some control by the funder. One way this can show up is less alignment in the portfolio in order to have enough diversity

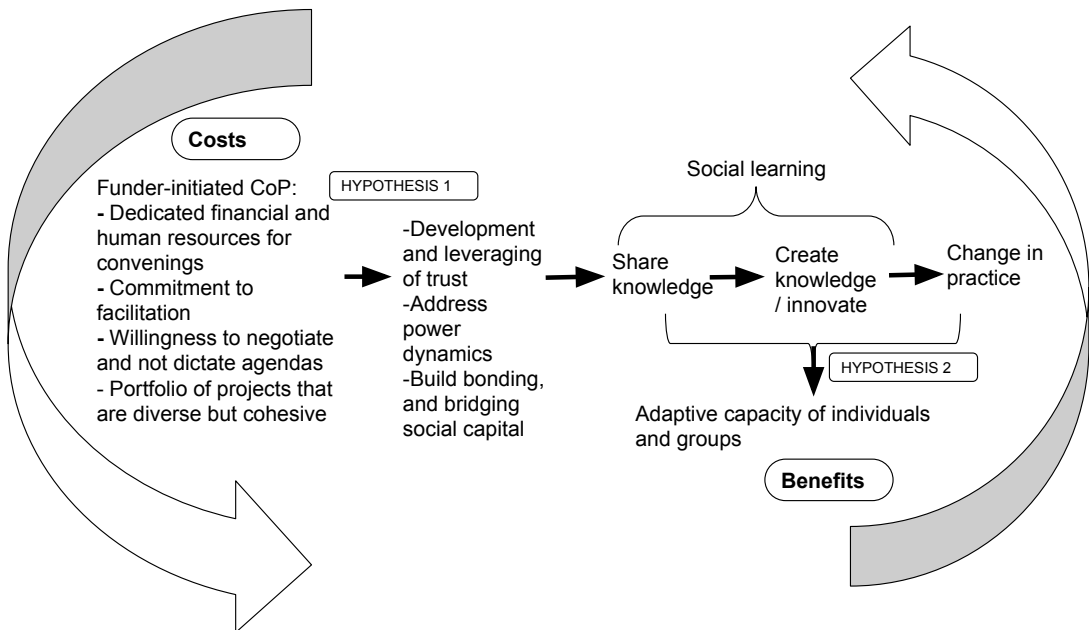
Key Points

- Planned communities of practice can be an effective means to spread and create knowledge. This article explores the degree to which communities of practice can be initiated by funders, and presents the lessons learned and outcomes achieved from the long-term commitment to this concept by the McKnight Foundation’s Collaborative Crop Research Program.
- This article provides a novel contribution to the literature by showing that a funder can initiate, support, and participate in a community of practice comprised of its grantees, which can succeed in sharing and creating knowledge. Factors that organizations should consider when investigating this concept include long-term investment in convenings and facilitation, as well as relinquishing some control over outcomes.

(continued on next page)

for cross-learning to happen, but not so much that it is hard to find common agendas. It is hypothesized that those investments lead to more trust, shared power, and social capital. This sets the conditions for social learning and

FIGURE 1 How Funder-Initiated CoPs Can Influence Adaptive Capacity: A Theoretical Model



the hypothesized main benefit of this approach, which is the increased adaptive capacity of individuals and groups to meet new challenges. Finally, this is not a linear process; instead, it is an iterative one that is constantly evolving. New knowledge and practice inform grantmaking and other support for a CoP, whose composition is fluid and changing, as are the levels of trust and social capital.

CoPs and Power Dynamics

Self-organization is a defining feature of the original CoPs, such as those for photocopier technicians and midwives. Wenger (1998) argues that even if a mandate for a CoP comes from the outside, it is the community that ultimately decides if it will engage in the practice and learning.

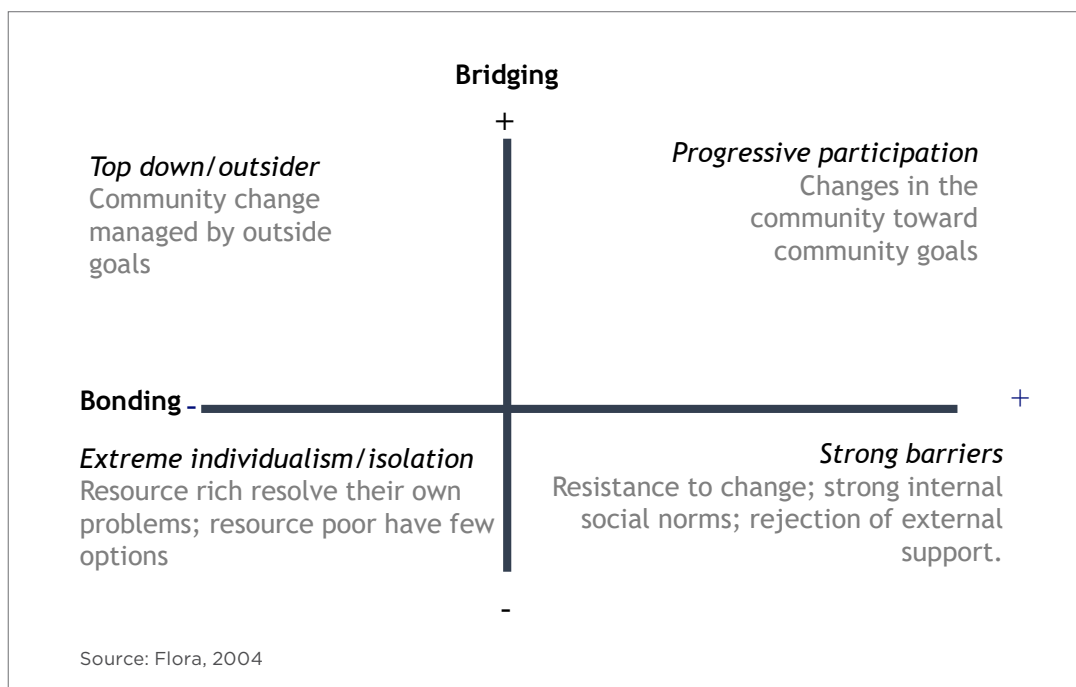
Outside entities like private-sector corporations (Murillo, 2011) have tried to harness the power of CoPs to increase the efficiency of knowledge sharing and induce innovation. The literature from this sphere suggests that when such an entity gains a level of power that allows it too much control, the arrangement changes from a CoP to more of a hierarchical structure, with

Key Points (continued)

- Research shows that the McKnight program's communities of practice have provided a space for various actors in Africa and the Andes region to develop adaptive capacity related to food system research and action through social learning. As funders increasingly look outside of the traditional logic of projects to explore how they can contribute to enabling long-term conditions and capacity for change and adaptation, well-supported and facilitated communities of practice offer a promising approach.

its attendant problems of potential low buy-in and diminished trust (Newell, Tansley, & Huang, 2004). This, in turn, inhibits knowledge sharing, which is mediated by trust and is a necessary input to the creation of new knowledge or innovation.

Funders reward grantees through financing, which can create a sense of competition among

FIGURE 2 Dimensions of Social Capital in Communities

grantees that impedes the building of social capital. Grantees are usually subject to explicit contractual obligations and implicit understandings of mandatory behavior that could be described as a coercive type of power that the funder exerts over the grantee.

Within any CoP there may be many subtle and overt exercises of power. For one to be functional, however, information and expertise needs to be shared with minimal reifying of the status associated with them. Pyrko, Dörfler, and Eden assert:

The formulation of CoPs was founded within a postmodern framework that tends to be skeptical about the notion of knowledge (as a term), associating it with appointed (or self-declared) experts who “monopolize” the possession and creation of knowledge as their source of power. (2017, p. 391)

The literature suggests that a CoP initiated by an outside actor will become a successful mechanism for the sharing and creation of knowledge only when power is shared (Pemberton, Mavin, & Stalker 2007).

Social Capital

Networks such as CoPs are mediated by social capital, defined as the benefits that come from the sum of personal connections among individuals. The concepts of bonding and bridging social capital help to describe the quality of social capital in a community of practice. Bonding social capital refers to the “strong” ties within a group, whereas bridging social capital refers to the “weak” ties among different groups (Nayaran, 1999). Weak ties are important for providing novel information, while strong ties, because of high levels of trust and familiarity, can be more accessible to the knowledge seeker and more readily absorbed or used (Newell et al., 2004). Bonding and bridging social capital are not mutually exclusive, but can be fluid concepts that shift over time depending on how social spaces are bounded.

Flora (2004) has explored how the interrelationship of bonding and bridging social capital influences community dynamics. She argues that high-bridging but low-bonding capital generates a top-down process where a population

is connected to an “expert” that tries to do what the expert wants because there is little internal cohesion or voicing of collective needs. High levels of bonding combined with low levels of bridging social capital leads to fear or distrust of the outsider and a general resistance to change. (See Figure 2.) It can also lead to redundant information, groupthink, and lack of innovation.

Adaptive Capacity

Many funders are shifting toward support for adaptive capacity within systems (Knight, Lowe, Brossard, & Wilson, 2017). Improving adaptive capacity in individuals, institutions, networks, and systems allows for better responses to evolving and diverse needs. Hall, Clark, Sulaiman, & Yoganand (2003) argue that institutions and individuals are less successful in the long term when they focus only on projects and problems and miss the adaptive-capacity element. We have found that a CoP that increases the adaptive capacity of the individual members as well as groups and the community through social learning has a good balance of bridging and bonding social capital.

The CCRP Funder-Initiated CoP

The McKnight Foundation established its Collaborative Crop Research Program in 1994 with the intention of improving world food security. After a decade of funding research and development projects in food-insecure regions of the world, the foundation's leadership decided in 2004 to take an explicitly regionally based approach in its grantmaking. The program director decided to try to build regional CoPs to encourage networking, learning, and collective action among regional grants clusters.

Grantmaking and capacity strengthening are currently carried out in four geographic areas, and project teams are organized into corresponding CoPs. The program hoped that using CoPs would allow for a more horizontal form of grant support and nongrant assistance that would strengthen regional networks and place less emphasis on the grantee–grantor relationship. It was further hoped that CoPs would enable ideas, approaches, and inspiration to be shared across the diverse organizations, which

To use the Wenger-Trayners' definition of a CoP, while the domain (small-scale agriculture research for development) and community (grantees of a specific geographic area) of the CoPs were determined by McKnight, their practice, or shared repertoire, was never made explicit by the CCRP.

have a common vision for improving small-scale agriculture outcomes and enabling new ideas and linkages to emerge more efficiently.

The CCRP implemented its first CoP in 2004 when it convened representatives from research organizations, nongovernmental organizations (NGOs), and farmers from the Andean region (Bolivia, Peru, and Ecuador) to consider the design features for a proposed CoP. They were subsequently organized in southern Africa (Malawi, Mozambique, and Tanzania) in 2005, West Africa (Niger, Mali, and Burkina Faso) in 2006, and eastern Africa (Kenya, Uganda, and Ethiopia) in 2008. In each case, the CoP involved the current grantees or project teams funded by the McKnight CCRP. Each CoP meets annually and engages in a variety of activities throughout the year, such as cross-visits, training workshops, thematic efforts, and various forms of communication. All of the CoPs remain currently active, underscoring the long-term, sustained commitment to the model by the CCRP.

Willingness to Negotiate Agendas

To use the Wenger-Trayners' definition of a CoP (2015), while the domain (small-scale agriculture research for development) and community (grantees of a specific geographic area) of the CoPs were determined by McKnight, their

This research uses a case study approach to provide an understanding of the evolution of the four CoPs, which informs a theory of key relationships that can then be tested and improved by applying it to other cases.

practice, or shared repertoire, was never made explicit by the CCRP. At the inception of some of the CoPs, the CCRP intended that research around a specific crop or agriculture production system would be the unifying practice. In implementation, however, that thematic orientation has given way to a more process-oriented, shared practice around how to approach research for action. This demonstrates the CCRP's openness to letting CoPs define themselves and evolve, an approach that differs from other types of managed CoPs that are often short in duration and tightly focused on an objective (Garavan, Carbery, & Murphy, 2007).

The practice of how to do quality research for action for the CCRP has changed over the years, and remains quite broadly defined. It includes respecting different kinds of knowledge; being participatory, rigorous, and relevant; having an agroecological approach; and linking social and technical inquiry.

The contextual differences among the four CoPs have to do with their different environments, when they were organized, their socioeconomic-cultural contexts, and their portfolio compositions. While all CCRP projects are encouraged to form multiactor partnerships to engage the larger agriculture research system, the ways each region has done so are distinct and change over time.

Dedicated Resources for Convenings

Each region hosts an annual, weeklong CoP meeting attended by two to four representatives from its 12 to 16 active projects; project grants include funds for meeting-related planning and travel. The meetings are facilitated by skilled professionals who consistently engage in planning and meeting support over several years. The structure typically includes a mix of presentations, exhibition fairs, and discussion sessions. Subgroups are usually formed in these meetings around thematic, methodological, and geographic commonalities. Opportunities for informal socializing, such as shared meals, are important for forming bonding social capital.

The two or three CCRP consultants who work in each region are referred to as the regional team, and contribute to grantmaking, project support and evaluation, technical support, and such CoP maintenance as managing listservs and helping to organize meetings. Regional teams also serve as knowledge brokers. Part of their job is to bring different actors together, facilitate the exchange of knowledge, and translate knowledge between the foundation and grantees.

While the annual CoP meetings are the only mandatory event, there are other virtual and in-person encounters among members throughout the year, often in a workshop setting. Some of these events are initiated by the regional teams, some by the directors, and others by grantees, and most are funded by the CCRP. Grantees also use their own project or institutional funds to interact. Furthermore, many avenues for sharing and creating knowledge that do not require significant financial resources are used within and among the CoPs, such as WhatsApp groups, emails, webinars, and virtual meetings. The cost of all this support is approximately 20% of the annual program budget; the rest goes to grants.

The CCRP's approach to capacity strengthening often leverages aspects of social learning, in the sense of learning from the social environment (Pelling, High, Dearing, & Smith, 2008). In practice, this is accomplished through interactive capacity-strengthening methodologies,

including learning by doing, small-group work, ample discussion, and using real-world examples from the group.

Methods

This research uses a case study approach to provide an understanding of the evolution of the four CoPs, which informs a theory of key relationships that can then be tested and improved by applying it to other cases (Small, 2009). Thick description and mixed methods research are two specific approaches that were used to improve the generalizability of the research (Polit & Beck, 2010)

Because of the fluid nature of the CoPs, much of the data presented give a picture of what has happened at different moments in time that, when taken together and interpreted, constitute a body of evidence. The sources of information and data for the 12 years of CoPs in the CCRP include meeting notes and materials, participant surveys, and observations from almost all the meetings. Between 2012 and 2016, selected participants were interviewed at least biannually. Observation is an important method for determining the tacit values and beliefs of individuals.

It is important to note that this kind of research, which weaves together many types of data that are often gathered opportunistically and analyzed collectively, is only possible with a fairly sophisticated knowledge-management system. McKnight has invested in a customized database that allows the CCRP to capture and organize various types of quantitative and qualitative data in an easily searchable repository that can later be analyzed to find patterns and inform adaptive action over time.

The project's CoPs do not have hard boundaries, but 50 to 70 individuals are directly involved in each CoP in a given year. The sampling strategy for the interviews in the present study was a mix of purposeful and convenience, based on a shared language with the interviewer, willingness and availability to be interviewed, and an attempt to capture a diversity of perspectives.

In 2017, a social network analysis was done of CoP members in the Andes ($n = 56$, including both grantees and the regional team) using an online survey that asked respondents with whom they shared and received information within the CoP. The KliqueFinder software was used to analyze the information. KliqueFinder assigns people to subgroups to maximize a well-known criterion from social network models representing the concentration of network ties within subgroups. There is some graphical distortion to accentuate the subgroups in the visualizations.

Finally, three instruments were used systematically across the four CoPs to provide more comparable data. The first was an online grantee perception survey conducted by the Center for Effective Philanthropy (CEP) of all grantees in 2015 ($n = 63$; response rate 72%) and compared to the CEP's database of 250 funders. The second is an online survey of CoP members in all the regions undertaken in 2018 ($n = 72$ completed surveys). The third is a research quality rubric that has been filled out on most projects in the 2012–2017 period by CCRP leadership and will be used to explore how the CCRP CoPs contribute to project-level outcomes.

Findings

In this section, we present the evidence to address the two outlined hypotheses visualized in Figure 1: 1) whether the CCRP CoPs are legitimate CoPs and, if so, why; and 2) if they can improve the practice and adaptive capacity of the individuals and groups involved (outcome). We begin by presenting evidence on the extent to which the CCRP CoPs are sharing and creating knowledge — an important indicator of their legitimacy. Then we explore the factors that contribute to their functioning, namely, power dynamics and social capital. Finally, we present examples of how the functioning CoPs have contributed to adaptive capacity and changes in practice.

Sharing and Creating Knowledge

A 2018 grantee survey of 72 members of the four CoPs revealed that “gaining new information” received the highest number of votes as a benefit

A 2018 grantee survey of 72 members of the four CoPs revealed that “gaining new information” received the highest number of votes as a benefit of CCRP/CoP connections.

of CCRP/CoP connections. A West Africa CoP participant stated in an interview, “The CoP is a very practical way to make progress. It is rich. We immediately have answers and ideas.” This hints at the dynamic of knowledge creation or innovation, which often arises from sharing knowledge.

Further along the continuum of knowledge creation is the example of five projects in eastern Africa that are self-organizing within the CoP space around how to implement farmer research networks (FRNs) — a CCRP approach — by developing common protocols on how to collect data, which will inform research. In some cases, these collaborations have led to transformative change, such as seed projects in the Andes influencing seed-systems laws in all three countries through collective learning and action.

One CoP member reported in an interview, “With other funders, there are no meetings like this. The meetings for other projects are to present research results, not to learn or get training.” The emphasis on social learning is central to the CCRP approach, where the incentives for grantees are not to try to impress the donor, but instead to use research to learn from each other. An evaluator of the Andes annual meeting in 2015 wrote, “There were new people in the CoP mentioning that they only came to present their research, but now they realize it has been a whole sharing of experiences and knowledge.”

The importance of the social learning was also indicated in a post-workshop survey in which

60% of the participants (n = 15) indicated “having access to their colleagues” as the most valuable part of the workshop, only slightly less than “having access to an expert” (65%). Even more, 80%, chose “having time and space to work on their projects” and “strengthening their skills.” This shows the importance the participants place on research-methods support in combination with social learning and creating alternative spaces, and not just receiving instruction from an expert, as is typical of a more linear model of knowledge transmission.

Power Dynamics and Trust

Power dynamics influence the trust between and among individuals, which in turn can impede or facilitate the sharing and creation of knowledge. In the eastern Africa CoP meeting held in 2016, frequency of comments, which is an indicator of empowerment, was analyzed by type of actor. The CCRP leadership spoke the most throughout the week, making 30% to 45% of the comments despite representing just 17% of participants. The spoken contributions of newcomers were lower than their proportion of participants. The other types of participants spoke in proportion to their representation. The dominance of the funder may represent a power imbalance in the form of excessive bridging social capital, which if not balanced by bonding social capital can lead to overly top-down dynamics. (See Figure 2.) This is somewhat ameliorated by the increase in participation of more established members, which indicates that trust and confidence grow after the first year.

In an open-ended survey to participants during the same meeting about the shared “passion” of the CoP, the most frequent type of response for first-time CoP participants was the importance of sharing experiences and results. The second most common response category was farmer participation. However, for the CCRP leadership members who participated in that meeting, the most common answer was agroecological intensification (AEI). This shows that the funder’s objective, AEI, is not dominating the agenda, suggesting that their power is not being excessively exercised.

In addition to ethnicity, gender and education level were also observed to influence power dynamics. In the opening plenary session at the 2014 CoP meeting in the Andes, it was observed that the people talking were all men with more experience in the CoP. Individuals belonging to research institutions and universities expressed themselves more than those from NGOs. One participant, hinting at such dynamics, noted in the meeting evaluation: "It is important to create equitable opportunities for opinion among academic participants and development agents." This referred to the dominance of the academic participants who, because of their degrees and titles, can view themselves as having more expertise than other participants.

While these power dynamics are inevitable and constant, the facilitators and CCRP leadership use both subtle and overt tactics to shift social norms by trying to get those who are perceived as having less expertise to participate in empowered ways. Tactics include working in smaller groups, inviting those who speak less to lead special sessions, and offering critical commentary to those who use their positions to speak with more authority. For instance, in the 2014 Andes meeting in which male colleagues dominated the plenary discussion on the first day, almost half of the interventions made during smaller group discussions on the second and third days were by women. A similar trend was reported in the 2016 eastern Africa meeting. This signals the need for trust, an essential element of social capital, in order for many to feel comfortable contributing.

While the CCRP leadership often sets the agenda for the annual meetings and can dominate the conversation, mechanisms exist for grantee participants to feel ownership, such as being on the planning committee and being tasked with leading discussion or introducing new topics. For instance, during the West Africa CoP meeting in 2017, two representatives of farmer organizations were asked to lead discussions on synergies between projects. They did such a good job that participants were motivated to map out existing and potential synergies

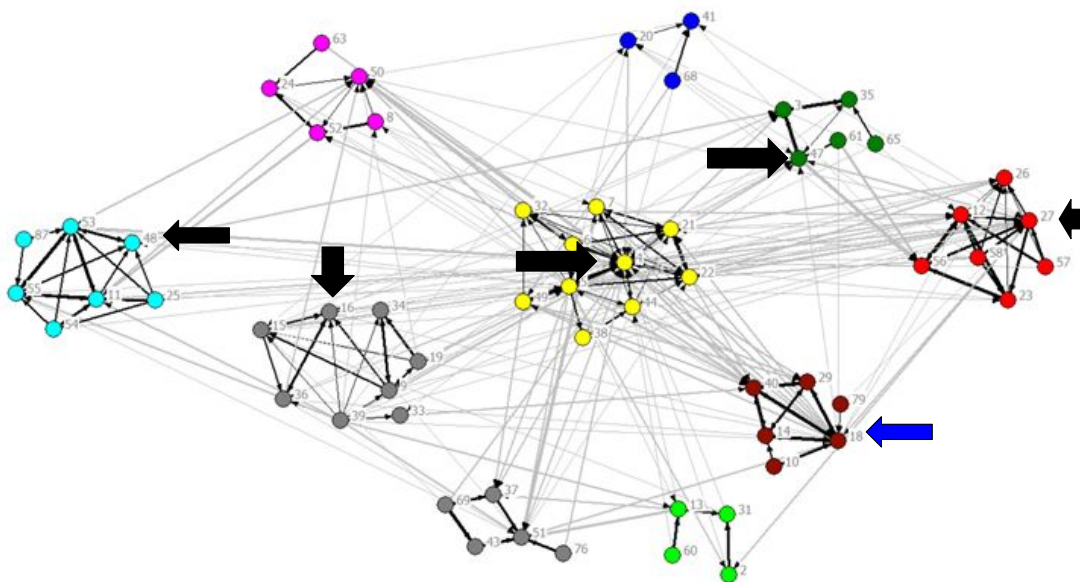
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among projects within countries and among the CoP projects.

In interviews, grantees have commented on the uniqueness of the relatively horizontal model. As one grantee observed, "The quality of the staff is very important. They allow us to work horizontally. They are not like others who come and impose ideas, conditions, and obligations. They are humble people."

In addition to top-down and horizontal movement of knowledge and practice, bottom-up innovation from CoP members has been incorporated by the CCRP. This includes cases where members came up with new knowledge and innovations and influenced the CCRP, which in turn, could share the innovation with other CoPs. For example, in the Andes, a project introduced the idea of working with a local food systems lens instead of value chains. That inspired the CCRP to further develop this area and make three more grants on the topic. In this case, the knowledge was translated into grantmaking strategy. Another example is a West Africa grantee who sponsored a farmer innovation fair, which was then copied by a grantee in the Andes using CCRP funds, but mostly bypassing the regional teams in the knowledge sharing by using a third-party network connection.

Finally, the grantee perception survey administered by the CEP in 2015 revealed that, on

FIGURE 3 Social Network Analysis of the Andes Community of Practice, 2017

KliqueFinder software was used for this analysis. Points represent individuals. Subgroups represent closer ties. Large arrows indicate bridges between the subgroups.

average, grantees rated the extent that the CCRP is open to ideas from grantees about its strategy as 5.48 on a 7-point scale. This rating is in the 83rd percentile compared to the other foundations in its database.

Bonding and Bridging Social Capital

A social network analysis done in 2017 in the Andes shows there are 10 subgroups of individuals with more bonding capital, and within these subgroups there are bridging individuals who are much more tied to other subgroups. (See Figure 3.) The subgroups are mostly, but not entirely, an outgrowth of project teams. Geography, friendships, and thematic focus are also factors in the formation of these subgroups.

For a more specific example of how bridging and bonding capital influence knowledge creation and sharing, the case of No. 18 (Figure 3, blue arrow), who we will refer to as “Maria,” is illustrative. Maria was a Bolivian student who researched climate change effects on farmer gender roles in collaboration with a CCRP

project in Bolivia. Her master’s thesis featured ethnographies of five rural women and was circulated by the regional team (i.e., knowledge brokering) to all of the projects as an example of qualitative research. An extension worker from another project said it deeply influenced her perception of women farmers, in particular how long their days are and the many risks they face.

Maria’s adviser put her in contact with a project in Ecuador. When the Ecuadorian project organized the logistics of the annual CoP meeting, they employed her as a facilitator; there, she got to better know the CCRP approach and CoP members. Later, that same project recruited her to collect interviews and ethnographies on why farmers participate in markets. Next, a CCRP-funded project on soil health, which included the Ecuador project as a partner, hired Maria to study local knowledge around soil in the same Bolivian community where she did her master’s work. Finally, Maria was so inspired by the markets work she did with the Ecuadorian project and observed at CoP meetings that she

organized a related project with the original Bolivian NGO with which she did her master's research, but this time on local markets in Bolivia. This example shows how bridgers like Maria can connect, influence, and be influenced by different subgroups to help spread and create ideas and knowledge within the CoP.

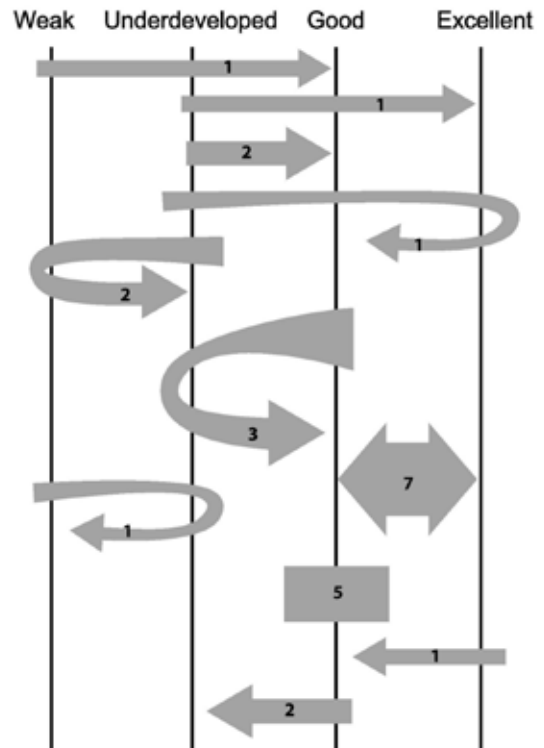
Adaptive Capacity

The response of the eastern Africa CoP to the emerging fall armyworm (FAW) epidemic provides an example of how bridging and bonding social capital can lead to sharing and creating knowledge that results in adaptive capacity. The FAW is a devastating pest that arrived in Africa from the Americas beginning in 2016, damaging maize fields across the continent. During the 2017 CoP meeting in eastern Africa, visits to field sites of a CCRP-funded FRN prompted discussion of the problem. In the context of a large-scale trial of new sorghum varieties by 800 farmer members of the FRN, the CoP members noted greater damage on maize than sorghum.

The CoP members decided they should learn more, and a rapid survey was conducted to further explore the issue. As part of the FRN, 10 young farmers, trained and equipped with mobile phones, served as enumerators and quickly interviewed 1,194 farmers who grew maize and sorghum and observed FAW damage. The farmer-enumerators captured survey responses on their mobile devices using the Open Data Kit, a technology shared with grantees over the years by CCRP leadership as part of the capacity-strengthening program, an example of the innovations bridging social capital can provide. The results were analyzed by the statistics experts in CCRP leadership, and these insights were shared among projects and farmers to inform management decisions.

The adaptive capacity of this 10-year-old CoP is on display in this example. Individuals, groups, and networks, with various degrees of bonding and bridging social capital, were able to quickly share and create knowledge that could lead to change in practices and systems. This inter-change also highlights the respect for different

FIGURE 4 Assessment of AEI Alignment of CCRP Projects Over Time



Only projects with at least two monitoring checklists filled out by the regional team (representing at least two data points) by January 2017 (n = 26) are assessed here. The arrows represent the movement between Likert scale rankings over time (1–4 years), and the width of the arrows represents the number of projects assessed.

types of knowledge — farmer, technical, statistical — within the CoP.

Change in Practice

In the Andes, an external developmental evaluation of the CoP revealed that participants from research backgrounds were being pulled toward a more farmer-centred approach because of their involvement with the CoP:

Grantees with more classic research backgrounds were introduced to and assumed a more farmer- and systems-oriented approach. This made their work more participatory and communicated their research to a wider audience and in ways that made sense for farmers. (Ambrose, 2014, p. 3)

The annual regional team assessments in all four CoPs on the dimension of AEI specifically asks, “How well does the project integrate the principles of AEI and a systems perspective?” and then provides criteria for each ranking. (See Figure 4.) “Excellent” is defined as: “Research is grounded in and leverages ecological principles and knowledge for improved productivity. Includes deep analysis of the multifunctionality and trade-offs of the research product and the adaptive potential of the proposed research products in potential farming and market systems.” Five projects got better over time, 13 projects moved over time but ended up in the same place, five projects stayed static, and three projects received lower ratings over time.

Some of these trends can be explained by the shifting definition of AEI, which was subject to the shared learning process of the CoP with different interpretations and meanings. The movement is also probably related to the point in the project cycle or to changes in project leadership or membership. However, the change also suggests that factors aside from grantmaking, such as capacity strengthening and CoP learning, influence project practice.

A specific example is a project that in 2012 was ranked as “good” for being “systems based and location based.” But in 2013 it was ranked as “weak” because, as the reviewer wrote in the comments section,

While the agenda is pushed by farmers, it tends to be very conventional and focus on one problem in isolation, such as a pest, or on one tool such as GPS. The farmers have repeatedly mentioned their interest in livestock and irrigation but the project thinks that is beyond their scope.

In 2014–2015 the project was ranked as “good” again, because they were integrating multiple dimensions in their participatory work, including soil, climate, and livestock. In large part this expansion in focus was made possible by their interactions and ability to leverage other initiatives within the CoP. Namely, they became part of a cross-cutting soils project financed by the CCRP and collaborated more with a grantee

that worked in the same geographical area on forage and climate. Thus, being a member of the CoP can lead to change in practice through social learning and collaboration.

Discussion

Returning to our main question: What are the trade-offs, or costs and benefits, involved in a funder-initiated CoP? We have learned that for a funder to successfully initiate and sustain a CoP, the funder has to relinquish a fair amount of control and power to the participants while also providing ample support, so that agendas can be negotiated in a more horizontal manner. The loosening of control is compensated for by the innovations and shared meaning and capacity that an authentic CoP provides. Since no single perspective or actor can understand the full system complexity, the CoP acts as a type of evolving crowdsourcing and social-learning platform, enhancing the value of the funder investment.

In addition to the relinquishing of some control, funder-led CoPs require significant demands for human, intellectual, and financial resources and commitment over time. The CCRP is essentially betting on the catalytic power of a portfolio of grantees brought together in a CoP as a more powerful engine of systems change than simply having a larger grant portfolio.

The second hypothesis was that CoPs, through the sharing and creation of knowledge, can improve the practice and adaptive capacity of individuals and groups that are connected through a common funder or lead organization. The 2018 programwide grantee survey on CoPs revealed that most grantees think sharing and creating knowledge is the most important benefit of being part of the CoP, so it is clearly happening. The FAW example showed the rich interplay between individual and group cognition and social learning in the CoP that leads to adaptive capacity. No one person in particular shared the knowledge or the final insight; rather, it was constructed collectively, using existing and new pieces of information to innovate insights for responding to an emerging threat. This kind of response is potentially part of a broader

systems change where institutions are learning how to do more participatory and applied research guided by agroecological principles.

Conclusions

This article provides a novel contribution to the CoP literature by showing that a funder can initiate, support, and participate in a CoP comprised of its grantees, which can succeed in sharing and creating knowledge. By building the bonding and bridging capital, the CoP can strengthen its collective adaptive capacity. The bonding social capital is important to maximize trust and flow of information, while the bridging brings in new experiences and ideas that lead to innovation. Members' external networks are essential to the sharing and innovation beyond the CoP, which can further contribute to systems change.

This kind of response is part of a broader systems change where institutions are learning how to do more participatory and applied research guided by agroecological principles. When knowledge is shared and created in ways that inform practice and lead to adaptive capacity, there is an increased possibility of long-term, sustainable systems change. In this case, the system being influenced is how agriculture research and development is done. Specifically, the CoPs provide practical insights on how to do participatory research. This is in contrast to the

dominant paradigm in many of the CoP members' home institutions, which mostly promote a top-down, technology-transfer model (e.g., research institutions), or do not use research at all (e.g., NGOs).

As funders increasingly look outside of the traditional logic of projects to explore how they can contribute to enabling long-term conditions and capacity for change and adaptation, well-supported and facilitated CoPs offer a promising approach. There are trade-offs in being less tightly focused, but ultimately the CoP becomes more relevant to participants' knowledge and relationship needs. A funder-initiated CoP has more horizontal power dynamics than a traditional funder-convened group or network of grantees, although it can tolerate more hierarchy than a completely decentralized CoP. Future research should both test and refine the theoretical model presented in this article as well as compare the CoP to other approaches to more fully explore cost, benefits, and trade-offs under varying conditions.

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