

The Distributed Network of Cooperating Teams (DNCT): A Multi-Level Initiative for Organizational Change

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1) Introduction

There is a diverse literature on the general topic of organizational improvement, in which there is often a recommendation to create new groups and activities for helping the change effort. Examples include “[networked improvement communities](#)”, “[communities of transformation](#)”, and “[secondary operating systems](#)”. Generally these focus on achieving substantial overarching change. These differ significantly from the more common concept of “[communities of practice](#)” whose primary function is to provide exchange of knowledge and understanding among individuals sharing a common profession, where the emphasis is more on individual improvement than transformative collective change.

Additionally, many studies of organizational change have focused on highly hierarchical, bounded organizations that are evaluated by quantifying their benefits to society. Those approaches do not work as well in less hierarchical organizations, particularly when they lack simple and useful quantitative performance metrics that are central to their operation.

Here we address important cases in which the target of change, such as a professional culture, extends beyond the boundaries of a focal organization. The [Community Form \(C-Form\)](#) of organization is an arrangement that has been observed in these contexts. A C-Form is characterized by “(1) fluid, informal peripheral boundaries of membership; (2) significant incorporation of voluntary labor; (3) information-based product output; and (4) significantly open sharing of knowledge.” Drawing from these established ideas, which are mainly found in open-source software development communities, we introduce a modified network-based change model that is practical in diffuse organizational settings. As with previous community-building approaches, it targets distributed organizational cultures that transcend traditional organizational boundaries, employ largely subjective metrics, and lack a rigid hierarchical order.

Research universities are a good example of such organizations. They are generally composed of loosely connected academic departments with international disciplinary community identities, and are traditionally described as “[professional bureaucracies](#)” in recognition of the significant degree of autonomy many faculty members have in carrying out their research and teaching missions. Professional cultures and identities are more closely tied to academic disciplines than to any particular university, so in many ways faculty members are better described as autonomous entities providing research, teaching, and administrative services, rather than employees. Faculty members often move from university to university over the course of a career while maintaining their individual professional identities. In addition, universities are usually described as “[loosely coupled](#)” organizations, since their component parts operate quite independently from one another. Their governance and management involves diverse decentralized stakeholders grouped in intermittent tasks, rather than following organizational hierarchy and line authority. This often requires collaboration, consultation and persuasion. Generally, university research and education are carried out with a great deal of discretion and variability in what constitutes quality, which makes it very challenging to significantly change how these tasks are generally done.

For a long time, people have grappled with how best to lead change in such organizations, and there is much good work in this area that forms a rich base to which this paper contributes. To our knowledge,

this is the first attempt to explain how several of these previous approaches can synergistically combine, at multiple organizational levels, to help catalyze sustained widespread improvement. Our hope is that this explanation will help others develop widespread successful cooperative change efforts.

It is widely known that successful change efforts must pull together disparate individual contributors who often lack a shared professional culture and an overarching sense of organizational loyalty. Although the approach described here is reasonably simple and flexible, it contains several key nuances that are especially important because they are mutually reinforcing. That is, the whole is greater than the sum of the parts. We propose the term “Distributed Network of Cooperating Teams” (DNCT) for this approach - a type of C-Form designed specifically for achieving a desired culture improvement in a diffuse setting. Most of the model’s individual features also exist in previous change efforts involving research universities. We propose that they may also have application well beyond, in other interactive groups in need of distributed change. The DNCT approach does not replace, but rather *augments*, already-existing management systems. Naturally, it is very important for the efforts of a DNCT and the relevant leaders to align.

As described in detail later, a key aspect of the DNCT model is the strategic use of numerous small functional teams. The teams are largely separate from one another and may have quite different roles, but they have enough participants in common to ensure that they are significantly “cross-linked” by informal personal communication channels. These channels help maintain trust, consistent understanding, and shared motivation throughout the DNCT, thus significantly contributing to overall [performance and group cohesion](#). Likely, this works because of a cooperative spirit that many experience under the right circumstances. Many say that some of their most satisfying experiences have involved successful cooperation in small teams achieving shared worthwhile goals. (It seems plausible that this tendency for people to bond in small purposeful teams was advantageous throughout much of human evolution.) Importantly, the DNCT functional teams span multiple organizational levels in several ways. Some span multiple organizations, others span multiple administrative levels, and many do both.

In assembling the ideas presented here, we have been especially interested in two recent examples of improvement efforts that developed into a DNCT form. The first is the [Bay View Alliance](#), founded in 2012 and dedicated to improving adoption of evidence-based teaching methods in higher education. The second, currently in the formation stage, is the [HIBAR Research Alliance](#), which is dedicated to enhancing the quantity and quality of university research that integrates fundamental research with application-oriented investigations.

The key characteristic of a DNCT is that it comprises and interconnects three kinds of entities: (1) Individual Participants, (2) Partner Organizations with which the Individual Participants are associated, and (3) Functional Teams comprising subsets of the Individual Participants. Figure 1 schematically depicts the arrangement of these entities within a DNCT. (Henceforth, for clarity, we will capitalize all of the defined terms used here to name the DNCT components.)

A brief outline of this paper is as follows. Together, Sections 2 and 3 concisely outline the DNCT structure, with Section 2 presenting the features of a DNCT that we believe are essential, and Section 3 presenting additional features that can be helpful, but may not always be required or advisable. Section 4 then provides illustrative examples for some of the DNCT components. Section 5 introduces some factors to consider in forming a new DNCT and Section 6 provides concluding remarks. These are followed by an acknowledgment and a glossary of the DNCT components in their order of introduction.

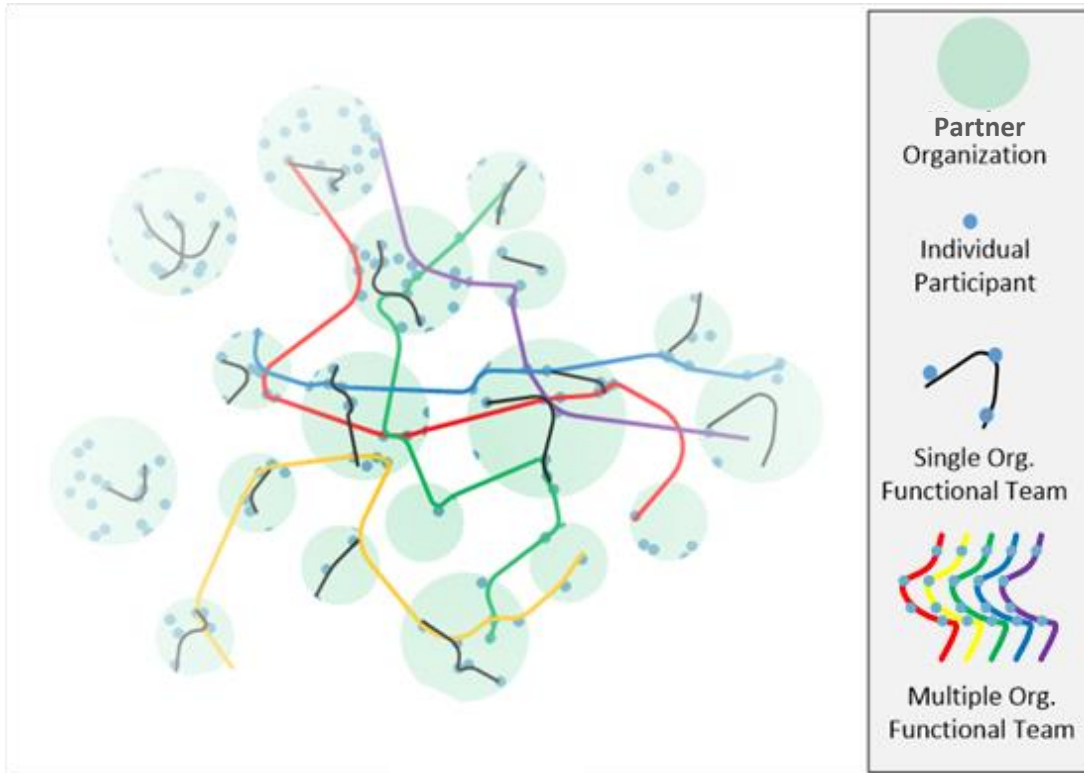


Figure 1. Schematic representation of a Distributed Network of Collaborating Teams (DNCT)

2) Essential Features of a Distributed Network of Collaborating Teams:

2.1) Improvement Goal, Overarching Strategy, Spirit of Cooperation and Theory of Change

At all times, a DNCT should uphold an Improvement Goal that is well-defined, well-communicated, and strongly endorsed by its participants. The DNCT should also have an Overarching Strategy for realistically achieving that Improvement Goal and it should also be well defined, well communicated and widely supported. An important characteristic of the Overarching Strategy is that it should help to make the DNCT attractive to excellent participants, whose discretionary contributions are essential.

The Overarching Strategy should also contain two essential features that are often either unspoken or omitted. The first is a “Spirit of Cooperation”, a group culture in which Individual Participants share the leadership characteristics of integrity, humility, cooperation and service. This is very important because organizations with a strong spirit of cooperation attract loyal, motivated participants who work well together. The second feature is a clearly articulated “Theory of Change” - a coherent evidence-based plausibility argument for how the desired culture change will realistically be achieved. As participants become involved in the work of the DNCT, they should understand and substantially agree with both the Improvement Goal and the Overarching Strategy, including its Spirit of Cooperation and Theory of Change. This is critically important and it requires thoughtful explicit discussion, especially during the initiation phase of a DNCT.

However, while the existence and clarity of the Improvement Goal and Overarching Strategy are critical, it is also important they do not need to be rigidly fixed or narrowly defined. Indeed, an important characteristic of a DNCT is that it is a flexible, adaptive, learning organization and therefore the Improvement Goal and the Overarching Strategy may gradually emerge and evolve over time as key participants join and the work proceeds. Additionally, it is acceptable and often helpful for the modest

variations to exist among the partner organizations and to have even greater diversity among the individual participants. These differences often generate important insights.

2.2) Non-hierarchical nature

A DNCT is not a hierarchical, rigidly defined structure - it is a C-Form structure with fuzzy, cloud-like boundaries. These attributes enable a DNCT to achieve needed forms of understanding and engagement that often elude functional hierarchies. This is why we proposed that DNCTs fulfil a critical role, and why, in the absence of such an arrangement, many organizational change efforts fail. This is especially important when the required change must occur across organizational boundaries, making change efforts difficult even for strong experienced leaders. Of course, it is essential for the Partner Organizations' administrations to support the intended change efforts.

2.3) Clarity of purpose

While a DNCT should be welcoming, inclusive and friendly, nevertheless it should have clear and reasonable expectations for both Partner Organizations and Individual Participants. Especially considering the cloud-like nature of a DNCT, it is important to maintain clarity of purpose. Clearly articulating the purpose, expectations and values (i.e. the culture) of a DNCT can also help to attract well-aligned participants who in turn share the culture within their individual personal networks. Throughout this paper, we address the need for processes for building clarity of vision with broad buy-in. This bootstrap process combines bottom-up and top-down thinking. In that context, the achievement of a powerful vision is an emergent phenomenon.

2.4) Professionalism, commitment

DNCT participants commit discretionary time of their own volition, and they bring appropriate professional credentials, along with strong experience in high-level team interaction, or at least significant potential for this. Importantly, they deeply believe in the Improvement Goal of their DNCT and the Overarching Strategy for achieving it.

2.5) Functional Teams, Supporting Goals

Each of the Functional Teams within the DNCT should have a well-defined, important Supporting Goal that is highly focused and motivational for its participants, and clearly supportive of the DNCT's overall Improvement Goal. In other words, it should be plausible that as each Functional Team achieves its Supporting Goal, the DNCT as a whole will move toward achieving its overall Improvement Goal.

2.6) Multiple levels of Functional Teams

It is well known that small teams are extremely powerful in at least two ways. First, in terms of wisdom, creativity, and energy, the whole is often much greater than the sum of the parts. In many situations, [effective teamwork is essential for an organization to succeed](#). Second, as previously mentioned, high performing teams play another important role in organizations, one that is critical in the DNCT structure – they can build a powerful sense of personal understanding and trust among their participants. In the context of a DNCT, the Functional Teams can be thought of as pathways of trust, understanding and cohesion. (There is an interesting analogy to composite material, in which molded polymer is strengthened by interwoven fibers of steel, glass or graphite.) Because each Functional Team has a well-defined goal that builds toward the overarching goal of the DNCT as a whole, they can help ensure that most of the Individual Participants of the DNCT share a common culture and sense of belonging. This argues for having a large number of Functional Teams, but there is a competing desire for simplicity. In a DNCT, these factors are reconciled by using two levels of Functional Teams: At a high level, there are Multi-Organization Functional Teams that have goals that concern the DNCT as a whole, with the team

participants coming from multiple Partner Organizations. At a lower level, there are Single-Organization Functional Teams that have goals that support the DNCT as a whole but are primarily concerned with activities within a single Partner Organization. As with many other aspects of a DNCT, these classifications intentionally have a reasonable amount of vagueness and flexibility. (Note that Figure 1 represents these arrangements, in which the Multi-Organization Functional Teams are depicted as curves of various colors, and the Single-Organization Functional Teams are depicted as black curves.) Clearly, it is extremely important that a DNCT have an appropriate set of Functional Teams to carry out the Overarching Strategy required to achieve the DNCT Improvement Goal. This requires a great deal of thoughtful consideration. Structure can have a stronger impact than any single individual can in many cases.

2.7) DNCT Steering Committee

For this reason, there will generally be a need for a body that can define the DNCT and determine how to make key decisions, including how the Functional Teams are formed. This body, here named the DNCT Steering Committee, should incorporate fair and balanced input from the DNCT Partner Organizations, possibly by having each provide one or more participants to its meetings. Ideally, the Steering Committee participants would have the endorsement of one or more senior officials in their Partner Organization. Endorsing this governance participation can also help signify the commitment of each Partner Organization to the DNCT. Another role of the DNCT Steering Committee could be to periodically reconsider and occasionally amend the Supporting Goals and Supporting Strategies of the Functional Teams as well as the overall DNCT Improvement Goal and its Overarching Strategy. (An important nuance is that the Steering Committee is itself one of the Functional Teams; ideally it should not be viewed as residing at a higher level of importance. Similarly, the Steering Committee and other Functional Teams might designate sub-groups to meet often for organizational purposes and such sub-groups should not be considered to be at a higher level.)

An interesting practical question is the mechanism and timeframe by which the Steering Committee participants are provided by Partner Organizations. In keeping with the general informality of the organization, it may be acceptable for the procedure to vary among the Partner Organizations, and possibly for the attendance to vary to some extent from time to time. Such variability would necessitate greater communication with the Partner Organizations, (in order to maintain continuity), but the net effect could be greater overall awareness within the DNCT and improved synergy.

2.8) Cohesion

As previously mentioned, the Functional Teams play a key role in maintaining the organizational culture of the DNCT, by virtue of the sense of cohesion people often feel in small teams that cooperatively achieve a valued goal. Importantly, since many participants will be on several Functional Teams, the overall result can be a pervasive sense of trust and belonging throughout the DNCT as a whole. In turn, this sense of connectedness can facilitate communication and coordination, thus maintaining a strong sense of overall purpose. Generally, supporting messages from the Steering Committees and organizational leaders will enhance the cohesive power of the Functional Teams. Regular supportive events to both share information and socialize further enhance cohesion and provide opportunities for informal new collaborations to emerge.

2.9) Diversity

Some of the Functional Teams will have a short-term purpose, such as for example, planning a specific meeting. Others may have an ongoing, long-term role, such as maintaining a website for the organization. Some will be needed to provide organization and governance for the DNCT as a whole,

while others will contribute more directly toward the DNCT Improvement Goal, for example by initiating and guiding specific projects. While differing in many ways, these teams all have in common the aforementioned cohesive power and collectively they have a cross-linked pattern of participation. Structures to enhance interaction across the diverse teams further enable the emergence of creative solutions to move the DNCT toward the Improvement Goal.

2.10) Dynamism

A DNCT is a dynamic, evolving organization. Since it is widely distributed, it ebbs and flows organically, with some Functional Teams disappearing over time as their goals are achieved or become unnecessary, and with new ones being launched in response to new requirements or opportunities. Individual Participants may also come and go as the work evolves.

2.11) Informality

It is important that the DNCT itself has no official “organizational role” within any of the Partner Organizations. It should not, and cannot, augment or replace any of the normal roles within their organizational hierarchies. Instead, the DNCT serves as a catalyst for helping Partner Organizations achieve the goals that they have already established through their normal processes of deliberation and decision-making.

2.12) Considerations about the optimal size of a DNCT

An important aspect of a DNCT is that the number of Partner Organizations, the number of Functional Teams, and the number of Individual Participants in those teams should be about the right size – large enough to achieve substantial progress and have substantial impact, yet small enough to maintain highly trusted personal professional relationships.

In this context, professional friends may have different areas of professional specialization, but be similar in ways that develop trust, such as a having shared views about cooperation, decision-making, considerateness, etc. The bond of professional friendship has an interesting power – when two professionals meet, if they discover that they already share a *mutual* highly trusted professional friend, they may correctly feel there is a greater chance they could collaborate effectively, which in turn makes an investment in collaboration seem more worthwhile.

As previously mentioned, the Functional Teams are a powerful way to create strong feelings of trust between participants, but realistically any one person can only develop a certain number of these significant relationships. Because of this, the overall numerical size of a DNCT matters considerably. (Of course, there are never precise ideal numbers, but instead optimal size ranges that likely depend on a variety of factors including geography, scope of activities, goals, demographic composition, etc.)

Overall, as the number of Individual Participants increases, the chances that two randomly selected DNCT Individual Participants will be linked by a mutual professional friend rapidly drops. On the other hand, a positive attribute of increased size is an increased likelihood that an Individual Participant will be able to find, within the same DNCT, another Individual Participant with highly similar interests. Generally, there will be an optimal size range, in which there is the best overall chance that an Individual Participant can find others within the DNCT with which they share *both* (a) a highly specific mutual interest *and* (b) a mutual professional friend. Figure 2 is a graphical illustration of this size-optimization idea for a simple numerical example.

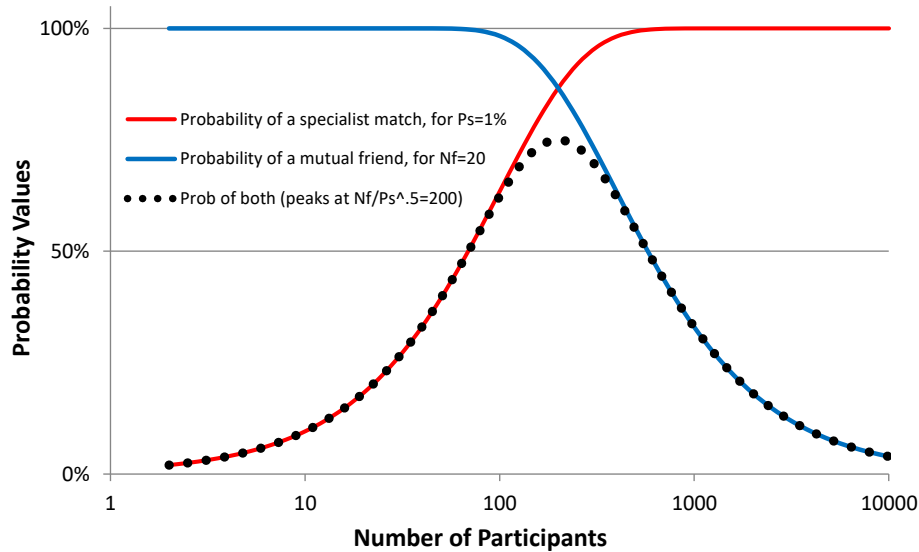


Figure 2. Probability of a DNCT Individual Participant finding another within the network who is *both* (a) a close specialist match and *also* (b) connected by a professional friend. In this simple numerical example, each participant has 20 randomly distributed professional friends within the DNCT and there is a 1% chance of a close specialist match with another randomly selected participant. The probability is graphed vs. the number of Individual Participants in the DNCT. (Note the bottom scale is logarithmic.) In this arbitrary case, there is a broad peak around 200. For smaller values, the chance an expert match is low. For larger values, the chance of their being a mutual professional friend is low.

Based on these and other related considerations, we can consider some suggested numbers for the various components: It may be good for the number of Partner Organizations to be roughly in the range of 5 to 25 and for the number of Individual Participants to be in the range 100 to 400. This suggests that the average number of Individual Participants per Partner Organization should be smaller if there are more Partner Organizations. Typically, that number, per organization, may range from about 5 to 25. Similarly, there is probably an ideal range for the average number of Single-Organizational Functional Teams in each Partner Organization and the number of Multi-Organizational Functional Teams in the DNCT as a whole. Both will likely be in the range from about 5 to 15. Having at least 5 is probably necessary to achieve sufficient impact, and having fewer than about 15 is probably helpful to maintain clarity and focus. Interestingly, even with these modest numbers, a DNCT can influence a great many people. Indeed, the number of people influenced could serve as useful early success indicator (to supplement the eventual evidence provided by achieving the DNCT Overarching Goal).

As a numerical illustration, consider a DNCT with 9 Partner Organizations, each with about 8 Single-Organizational Functional Teams comprising about 8 Individual Participants, as well as about 8 Multi-Organizational Functional Teams each also having about 8 Individual Participants. If the average Individual Participant serves on 2 Functional Teams, then there would be 320 Individual Participants. Furthermore, Individual Participants would probably discuss the work of the DNCT with several non-DNCT colleagues several times each year. Perhaps even more importantly, the work of the DNCT would also be disseminated through publication and partnership with associated larger support organizations, yielding even broader impact. Thus, the DNCT structure is remarkable in combining the power of deeply motivational small team interactions with a broad reach that can catalyze successful organizational culture change at scale.

To help put this in context, there is a considerable amount of theoretical and observational work on optimal group sizes. An interesting example is a concept called "[Dunbar's Number](#)", which arises from considerations of cognitive capacity limitations whereby maintaining strong stable relationships becomes challenging if the size of a group substantially exceeds a limiting value. The original work involved studies of primate clustering and later it was generalized to human studies where it was observed that roughly a size of 150 people is a common splitting point for growing groups such as Hutterite settlements, old farming villages, and professional army units in Roman times. The key point is that this "size optimality" is a well-known idea in other fields related to social interactions, and might find new application within the DNCT framework.

2.13) Local Sharing

While there will be significant communication *within* local Single-Organization Functional Teams, it is generally beneficial to also have meaningful communication *between* local Functional Teams, to enhance cohesion and share information and advice. One way to do this could be for each Partner Organization to host periodic meetings of all of its DNCT Individual Participants. These meetings might be a bit too large to enable effective deliberation, but they could be excellent venues for inspiring forms of dissemination that boost momentum and commitment. In particular, these gatherings can help maintain a sense of connection to the DNCT as a whole, by including discussion of issues that the DNCT Steering Committee plans to consider soon, on behalf of the DNCT Organizational Members, or to discuss recent decisions arising there. These local meetings also provide supplemental opportunities for informal new collaborations to emerge.

2.14) Widespread Sharing

Similarly, periodically there should be a mechanism for Individual Participants from each Partner Organization to learn about the work of all the Multi-Organization DNCT Functional Teams, ideally in an interactive manner. Again, a form of large group meeting could be considered. Possibly, Partner Organizations could take turns hosting such all-inclusive conferences. Professional association meetings may also be appropriate venues for topic-specific Functional Teams to convene in person when many participants would already be traveling to a common location.

2.15) Soft boundaries

An important feature of a DNCT is that its boundaries are diffuse and open. Connections extend beyond the Partner Organizations, to other organizations, teams and individuals, ideally in a flexible and evolving manner. Through these diffuse cloud-like connections, a large number of organizations and individuals will be indirectly involved, and dissemination of the results of the DNCT's successes may spread much more widely still, to other allies in the academy, government, media, etc., who are not direct participants. A key factor supporting the practicality of soft boundaries is the rapidly growing use (at the time of writing in 2017) of inexpensive, high quality, PC-based videoconferencing for small and large groups. This creates a valuable communication space that is intermediate between in-person conversation and distributed correspondence - combining much of the warmth of in-person meetings with the convenience and cost-effectiveness of telecommunication.

2.16) Autonomy

An important characteristic of DNCTs is that Partner Organizations need not relinquish any control to the DNCT in order to maintain their partner status. In particular, Single-Organization Functional Teams, which reside entirely within a Partner Organization, need not "report" to the DNCT as a whole, yet they have the opportunity to benefit from the information available through the various DNCT relationships.

2.17) Best practice

Another key aspect of a DNCT is that, in addition to its focus on an important kind of improvement, the work is informed by, and aligned as much as reasonably possible, with the best modern practices of [improvement science](#). (Although the term improvement science is most common in the field of optimization of health care, it has wide applicability wherever professional activities are in need of improvement.) The work should proceed in an accountable and professional manner, consistent with modern approaches for action-oriented high quality research. These ideas should be explicitly addressed within the DNCT's Theory of Change.

2.18) Responsibilities of Individual Participants and Partner Organizations

An important role of the DNCT Steering Committee will be to clarify the responsibilities of DNCT Individual Participants and Partner Organizations. In the case of Individual Participants, this would include carrying out the agreed-upon duties of the Functional Teams they join, and could include an expectation of participation in one or more Functional Teams. In the case of Partner Organizations, in addition to providing representatives for the DNCT Steering Committee meetings, they could be asked to provide a small annual dues payment to support essential DNCT administrative costs, and to display, within their organization, appropriate encouragement and support for the goals of the DNCT.

3) Optional Features of a Distributed Network of Collaborating Teams

As mentioned previously, there are some features for DNCT that have been found to be helpful, but may not be essential:

3.1 Administrative endorsement

By definition, the work of a DNCT cannot be in conflict with the goals of the Partner Organizations. Further, in order for organizational improvement efforts to have the best chance of success, it is very helpful for key messages from a Partner Organization's administration to acknowledge and demonstrate their strong support the DNCT.

3.2 Endorsement from respected organizations

Often, there will already be influential organizations that are supportive of the improvement goals of a DNCT. Generally, it will be helpful to obtain clear endorsement from these organizations, ideally in a form that specifies areas of mutual collaboration and support. In the absence of such arrangements, some might doubt the legitimacy of the intended change efforts. Additionally, alignment with other organizations can provide a powerful conduit for dissemination of the work of the DNCT. This can enhance impact and awareness, which in turn may assist in gathering various forms of support.

3.3) Local Steering Committee

It can be reassuring for each Partner Organization to have a DNCT Local Steering Committee, ideally with the endorsement of senior officials. It can be helpful for such Local Steering Committees to include Individual Participants from various levels within the Partner Organization, to reinforce the important point that the DNCT is not part of the organizational hierarchy. Ideally, at least one participant of each local Steering Committee should serve on the overall DNCT Steering Committee. Each local Steering Committee can help to coordinate its Single-Organization Functional Teams.

3.4) Diversity of participants

Diversity, in all forms, is beneficial in all Functional Teams. One form of diversity that is often overlooked, and can be very helpful, is for the Individual Participants of a DNCT to come from a wide range of organizational levels within the Partner Organizations. This can help to signify further the non-hierarchical nature of the DNCT structure. Another benefit of the resultant informal interaction of people from different organizational levels can be a greater overall sense of familiarity and trust.

3.5) Recruiting inspirational participants

Without detracting from diversity, it may be practical and beneficial to seek out Individual Participants that have an above average ability to inspire others in ways that support the goals of the DNCT. This can be especially important during the formative stages, when it is challenging to attain a critical mass of interest and support.

3.6) Central connection

To maintain alignment and coordination, it can be very helpful for most or all of the Multi-Organizational Functional Teams to include a participant of the DNCT Steering Committee. Correspondingly, each of the Single-Organization Functional Teams could benefit from including a participant from the Local DNCT Steering Committee.

3.7) Members in common

Sometimes, a Single-Organization Functional Team may have a similar Supporting Goal and Supporting Strategy to one of the Multi-Organization Functional Teams, in which case it may be helpful if they have some DNCT Individual Participants in common. This is one of the reasons for the fuzziness of the distinction between these two levels.

3.8) Distributed leadership

While it may often be best for a Functional Team to have a single chair or convener, sometimes it may be preferable to have two conveners who can share the job of ensuring smooth planning and operation. To maintain the non-hierarchical culture of the DNCT, in general it may be better if at least one of the conveners is not a Steering Committee participant, in part because it is an important part of the DNCT culture for conveners to be viewed as equal partners with the other participants. The conveners can also help in very practical way – rarely is it possible for all members of a Functional Team to meet simultaneously. Rather than delaying meetings, the conveners can check in, before each meeting, with those who cannot attend, to review the agenda and solicit their thoughts, with a promise to get back to them shortly after the meeting. Similarly, sometimes a single meeting can be split into two half meetings that are a few days apart, and which together can include almost all members. These approaches can help maintain cohesion while speeding progress.

4) Some illustrative examples:

4.1) Building a new DNCT

As, mentioned previously, the HIBAR Research Alliance is dedicated to improving a key type of university research. It arose from efforts that were underway within several universities to encourage research that they now describe as being “Highly Integrative Basic and Responsive” (HIBAR) – generally along the lines originally discussed by Donald Stokes in his book *Pasteur’s Quadrant*. With the generous support of the Association of Public and Land-grant Universities, a workshop was held in January 2017, and it was concluded that a DNCT-like arrangement should be considered. The overarching goal is to define what

is meant by HIBAR Research and to increase substantially the fraction of university projects so characterized, while also enhancing the strength of the underlying basic research upon which these projects rely. The strategy for doing so is to build understanding of HIBAR research within universities and throughout society, to provide advice to those carrying out HIBAR research projects, and to encourage the improvement of relevant incentive structures in order to encourage more and better HIBAR research projects. Functional Teams at the single-university level will benefit from the support and credibility arising from the DNCT as a whole, and similarly Multi-Organizational Functional Teams will derive strength from the linkages to multiple universities.

4.2) An Improvement Goal

The previously mentioned Bay View Alliance is aimed at improving teaching at universities. Its Improvement Goal is to increase substantially the adoption of known, but under-utilized, improved teaching methods at universities. Its overarching strategy is to carry out multi-university tests of interventions aimed at finding practical ways that university leaders can shift the academic culture of university departments in order to make them more conducive to the adoption of improved teaching methods, and to disseminate those findings to many university leaders, in order to accelerate their application.

4.3) Functional Teams

One of the Functional Teams in the Bay View Alliance is a Communications Committee, whose role is to ensure that the work of the Alliance becomes well known and understood. Its strategy for doing so is to develop the organization's website and newsletter, and to arrange key presentations at prestigious gatherings of university leaders. Another Functional Team has a research focus – developing test interventions in which central university support is provided to assist academic departments in curricular redesign, something that traditionally has been done by individuals with little experience in such work and without central support. Overall the Bay View Alliance currently has 9 Partner Organization and about 10 Multi-Organization Functional Teams. Each Partner Organization also contains Single-Organizational Functional Teams that are related, to some degree, to the Improvement Goal of the Bay View Alliance.

4.4) The value of support from senior administration

One part of the HIBAR Research Alliance began with a small group of faculty members at the University of British Columbia. Once critical mass was achieved through personal networks, they sought administrative buy-in. Several deans from across the campus then endorsed the initiative, lent resources, and encouraged senior individuals within their units to contribute to the organization and work of the DNCT. It was found that the combination of grass roots development and subsequent administrative buy-in was more motivating for faculty members than solely “top-down” initiatives.

4.5 Endorsement by respected organizations

The work of the Bay View Alliance benefited greatly from support from the Carnegie Foundation for the Advancement of Teaching, the STEM initiative of the Association of American Universities, and from Association of Public and Land-grant Universities. The HIBAR Research Alliance is at a much earlier stage, but has already benefited tremendously from the support of the Association of Public and Land-Grant Universities and the Government University Industry Research Roundtable of the National Academies of Science, Engineering and Medicine. These kinds of endorsements are beneficial in many ways. They help to attract extremely busy Individual Participants who are very selective in the allocation of their time and effort. They also provide valuable advice, thus boosting the success of the DNCT, and

later they can significantly amplify the net societal benefit arising from the DNCT by enhancing the dissemination of its findings.

5) Implications for starting a new DNCT and connections to other work in this general field.

As mentioned previously, the individual features within a DNCT are not new; they have been observed in a variety of successful organizations, but rarely all at the same time, which may explain why some excellent organizations have not achieved their change objectives. We suggest that the new compilation of features and relationships of a DNCT, as described here, may have practical application in designing new change efforts. The DNCT approach might help to identify problems that are well suited to it – typically, where an improvement requires culture change in numerous non-hierarchical organizations. Further, this work might help guide the implementation of the key components of a DNCT, thus speeding success. Finally, participants might feel more confident by virtue of being so guided, and this increased confidence can boost enthusiasm that in turn can help lead to success.

As previously mentioned, starting a new DNCT is necessarily a bootstrap process that combines bottom-up and top-down thinking. Achieving clarity of purpose, a powerful vision, and a practical strategy is a difficult, emergent process and success is not assured. We hope the ideas presented here will improve the chances of success. We also note that there is a growing related literature in the larger field of organizational change, which will undoubtedly be helpful.

In that regard, we especially recommend recent work concerning networked improvement methods. In particular, the [previously mentioned work on building sustainable networks](#) is helpful in summarizing many previous studies and outlining the likely timeframe for achieving a sustainable network.

In summary, the concept of the DNCT adds to such previous work by emphasizing a key mechanism for supporting organizational cultural change – the fact that interconnected Functional Teams can span administrative levels and organizational boundaries, providing communication pathways of trust and understanding. In turn, these channels facilitate the overall improvement mission, and the key findings of the Functional Teams can be broadly disseminated to increase the overall impact of the DNCT.

6) Conclusion

As discussed here, the above-listed aspects of a DNCT are not new - indeed, many of them can be found in association with many successful organizational change efforts. However, we are not aware of these ideas previously being assembled together in this way for the purpose of achieving organizational improvement in a truly distributed fashion, organized deliberately as a C-form. We note that historically, many organizational culture change efforts have not achieved their objectives, and we suggest that in at least some of those cases, adopting the DNCT approach may have led to greater success. Such distributed change efforts are akin to the growth of distributed coproduction of open source software, with the output being organizational change instead of computer operating systems.

From this perspective, we suggest that when there is a need to achieve important improvements in a powerful professional culture that spans multiple organizations, the DNCT approach may be very helpful. Of course, in any change effort, it is essential to provide sufficient intensity, for a sufficient length of time, and to ensure that the intended change, once achieved, will be perceived by most participants as a net improvement. These key requirements can readily be fulfilled within the DNCT approach, and when they are, we predict that the intended improvement will have an enhanced chance of success.

7) Acknowledgements

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8) Glossary of terms

The following Table 1 is a glossary of terms used in the preceding description, in order of appearance, and provides a brief definition with an emphasis on the key interrelationships.

TERM (in order of appearance)	DEFINITION
DNCT	Distributed Network of Collaborating Teams, an organization of Partner Organizations and Individual Participants, from those organizations, who work together within Functional Teams.
DNCT Improvement Goal	A well-defined, well-communicated overarching goal for the DNCT as a whole, which may develop and evolve over time.
DNCT Overarching Strategy	A well-defined, well-communicated strategy for achieving the Improvement Goal, which may also develop and evolve over time.
DNCT Spirit of Cooperation	A culture in which Individual Participants share the leadership characteristics of integrity, humility, cooperation and service.
DNCT Theory of Change	A clear, evidence-based, plausibility argument for how the desired culture change will be achieved.
Individual Participants	Persons contributing discretionary time to support the DNCT, and who are associated with a Partner Organization.
Partner Organizations	The organizations that provide the Individual Participants, endorse a representative for the DNCT Steering Committee, and endorse participation in a Local DNCT Steering Committee.
Single-Organization Functional Teams	Committees formed within a Partner Organization with endorsement of the Local DNCT Steering Committee.
Multi-Organization Functional Teams	Committees with participants from several Partner Organizations, with endorsement of the DNCT Steering Committee.
Functional Team Supporting Goal	Well defined goal for a functional team. Collectively, if most Functional Team Supporting Goals are achieved, they can plausibly result in the DNCT succeeding in achieving its Improvement Goal.
Functional Team Strategy	A clear strategy for achieving a Functional Team's Supporting Goal.
DNCT Steering Committee	A Multi-Organization Functional Team that makes decisions for the DNCT as a whole, such as the commencement and conclusion of other Multi-Organization Functional Teams, acceptance of new Partner Organizations, etc.
DNCT Local Steering Committee	A Single-Organization Functional Team that makes decisions for the activities associated with the DNCT within a DNCT Partner Organization, such as the commencement and conclusion of other Single-Organization Functional Teams, and facilitation of the involvement of Individual Participants.
Functional Team Convener(s)	One or more Individual Participants in a Functional Team, who lead only to the extent needed to help facilitate smooth operation.

Table 1. A glossary of terms associated with a Distributed Network of Collaborating Teams