

Network Administrative Organizations:
Improving the Performance of Health Care Networks in A Developing Country Context

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**Network Administrative Organizations: Improving the Performance of Health Care
Networks in A Developing Country Context**

ABSTRACT

Network administrative organizations (NAOs) are a form of network governance where an external entity centrally manages the activities of firms participating in a network, including simultaneous management of multiple networks by the NAO. In this dissertation, I combine research on network governance with concepts adapted from literature on the resource-based view of the firm, trust, and organizational learning to theorize about how NAOs can improve network wide performance, how trust influences performance outcomes, and the effectiveness of different NAO improvement activities. I posit that, over time, a networked form of governance results in improved levels of performance under conditions where trust is initially absent and participants are unknown to one another. Further, I suggest that trust mediates this relationship in that the presence of the NAO increases levels of trust between network participants. Additionally, I show that certain improvement activities can be more effective than others at improving performance in a network, warranting a focus on those most effective activities. Overall, while NAOs act as disseminators of resources and capabilities to improve the performance of participating firms, the specific activities the network engages in and the trust amongst network participants mediate the performance of the NAO. To show this, I develop and test a series of hypotheses using a multi-method and multi-site field study of

hospital networks that were created through groups of previously independent primary care hospitals connected through management under a single NAO.

Chapter 1 of this body of work provides an introduction, reviewing the motivation behind this work and providing an overview of the hypotheses to be explored in each chapter. Following this introductory chapter, in chapter 2, I conduct a study of the perceived performance of a NAO by six different networks under its management. I compare the performance outcomes at the network level over time and use results to understand variations among networks. Results show that NAO governance can improve network performance, and differences in performance among networks can be attributed to resource munificence and the complexity of network activities as experienced by each network. Participants within networks that were well-equipped with key resources and viewed network activities as less complex perceived the NAO as performing more favorably than less financially stable networks and those who regarded activities as more complex.

Following this, in chapter 3, I use interview and meeting data from before, during, and after the implementation of each network to develop a theory around how shared activities both directly impacts network performance and mediates the effect of trust on network performance. A qualitative assessment using case studies of each of the six networks is first performed to better understand the differences in how networks developed over time. Results from a survey of hospital personnel are used to determine the network-by-network performance of the NAO in terms of implemented quality improvement policies. Results from this indicate that moderate levels of trust between network participants and the NAO were associated with high performance outcomes,

while low levels of trust between participants were associated with lower levels of network participation activities.

Chapter 4 of this dissertation explores the effectiveness of different types of quality improvement activities amongst network participants. Due to the financial constraints that are seen in the health sectors of most developing countries, certain activities should be prioritized over others when making cost-effectiveness decisions. This study explores how different features of improvement activities may be more effective than others. Data were collected from interviews and a related survey of hospital personnel, and performance was measured through the pre- and post-assessments of quality improvement activities by an external quality auditor. From a larger initial list based on improvement literature, eight quality improvement interventions were identified and implemented. Five aspects were identified as most helpful toward improvement, with the most beneficial aspects noted as particularly useful in transferring knowledge and information from the NAO to facility quality improvement teams.

Lastly, I consider the impact of these studies on the network governance and organizational learning literature and practice. When a NAO is put in place, but found to be ineffective for the needs of the network participants, the network may either avoid change and fail, or change its governance to a more shared and consensual form of governance. NAOs, given appropriate trust levels, can improve inter-organizational learning and future quality performance of hospitals in developing countries like Nigeria.

In a dynamically changing landscape, in order to improve performance, businesses often need to form groups and network ties to attain resources and capabilities

that were previously inaccessible. My dissertation seeks to shed some light on the network governance characteristics that foster effective collaboration amongst formerly independent health businesses and lead to improved individual and group performance. This work identifies the underlying mechanisms that precipitate coordination and engender mutually beneficial collaboration through the sharing of resources and capabilities. Ultimately, it showcases that improved performance can be achieved through NAOs, highlights the significance of trust in ensuring network participants achieve network goals, and pinpoints specific activities that are implementable by the NAO which may be most beneficial.

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For all the patients across the African continent,
with remembrance and hope for the future

CHAPTER 1

CHAPTER 1: Introduction

Background

The current structure of the healthcare system in Nigerian urban areas consists of mostly hospitals and clinics providing largely similar primary and secondary medical care services at multiple independently functioning sites. On any given day in Nigeria's largest city of Lagos, nearly two thousand hospitals and clinics compete for the attention of patients to provide medical services that differ little, all providing relatively high price, low quality, and haphazard care processes from site to site. Initial interviews with the Chief Medical Directors of three hospitals within a network highlight these challenges:

Hospital A: "Everybody, all of the hospitals you see in this environment, we are all doing basically the same thing. So we all are quietly fighting to get the patients to come and see us instead of another doctor down the street."

Hospital B: "Here we have the same thing that they have at [Hospital A]. I buy my equipment, and he buys his equipment. I buy my laboratory supplies, and he buys his own. We buy the same things and spend on similar staff, but neither one of us uses it even up to ten percent of the time."

Hospital C: "I know that I can probably do better if I work with the other doctors in this area. It's just that I don't know them and so I don't trust them. Bad things have happened to other people when they tried to work together without knowing each other."

Each hospital is typically relatively small in size and run by a single Chief Medical Director (CMD) who represents and acts as the owner-operator of the facility. Though many of the CMDs are aware of the potential benefits that they could harness if they were to work more collaboratively with other hospitals in their geographic area, almost none are willing to coordinate or collaborate with others. Hospitals therefore act as singular

business units, despite recognition that they could attain greater utility if they, instead, worked as a coordinated network. By organizing together, these hospitals could achieve improved outcomes through network collaboration that they could not otherwise achieve independently.

In contrast, the broader business environment in both developed and developing countries has evolved from one where firms no longer operate as independent actors within environments isolated from the activities of others, to one in which firms participate in strategic networks through joint ventures, strategic blocks, integrated supplier networks, learning alliances, business groups, and other forms of collaboration intended to increase the performance of the firm (Nohria & Garcia-Pont, 1991; Gulati, 1995; Khanna & Palepu, 1997; Kogut, 1988). In the body of previous research on this topic, “inter-organizational networks” are defined as social systems where three or more independent legal entities consistently coordinate their joint activities with the aim of attaining benefits to all members involved (Powell W. W., 1990; Grabher & Powell, 2004; Müller-Seitz, 2012). Network coordination amongst groups of independent firms has been shown to be advantageous, with goal-directed networks associated with outcomes including more efficient and more effective use of resources and capabilities, rapid diffusion of information and learning, better ability to plan for and tackle complex issues, and improved customer service provision (Brass, Galaskiewicz, Greve, & Tsai, 2004; Huxham & Vangen, 2005).

While network coordination can produce positive effects, some forms of network governance may prove to be more effective than others under different circumstances. Additionally, a single form of network governance may affect networks differently based

on differences in the networks' environment and resources. Research to this point has not adequately addressed the question of how the performance of a single network governance form can differ across networks. Also unexplored is specifically whether and how well “network administrative organizations”—an external administrative entity that is established with the explicit aim of governing network activities—can potentially improve cohesion, collaboration, and performance metrics among network participants (Provan & Kenis, 2008). This dissertation aims to assess the development of multiple networks from a single NAO, its performance as a form of network governance, the role that trust plays in mediating network performance, and the activities that are most effective for improvement amongst network participants.

Incorporating the Resource-Based View into Network Governance Theory

Early thinking on why the network structure accrues greater benefits to the firm than individual firms can achieve alone focus on knowledge benefits and value creation in inter-organizational relations. To explain why the form of network governance may impact the effectiveness of the overall network and the performance of its participants, I will first review the relevant literature on the resource-based view of the firm and network governance. Standing alone, neither of these areas of research is able to completely explain the workings behind the implementation, evolution, and performance of NAOs as a governance form. These literatures are being combined in order to develop a theory on the development and performance of NAOs.

Taking a resource-based view

The resource-based view helps to explain why a network structure may be beneficial for improving the performance of individual firms. This resource-based view (RBV) perspective elucidates how the ties a firm makes are attempts to reduce the risk it faces from the external environment.

At the core of strategic management research is a focus on the challenges organizations face in performing effectively given environmental constraints. Strategic management research has focused on understanding how firms execute and attain their objectives, as well as how they attain a competitive advantage over time. Looking internally, a firm is supported in achieving its core objectives through implementing strategies that refine its efficiency and effectiveness (Barney, 1991). Under the resource-based view of the firm, the heterogeneity of the resources available to a firm can have profound effects on the firm's ability to perform its core activities.

Early writings in strategic management discuss how firms intentionally design, redesign, and manipulate their strategies and structures to respond to uncertainty and variability in both internal firm activities and external environmental contingencies (March & Simon, 1958). Uncertain external markets force firms to be more adaptive to their environments. This need for responsiveness makes a firm's set of social ties and the strength of those ties pivotal to its success (Granovetter M. S., 1973; DiMaggio & Powell, 1983; Thompson, 1967). The uncertainty created by a firm's need to adjust to external factors is critical because it affects a firm's choice of partners, the ties it chooses, and the coordination and control mechanisms it sets in place (Podolny, 1994; Beckman, Haunschild, & Phillips, 2004).

In attempting to answer questions centered on why firms differ in their activities and profitability, researchers have moved from a focus on the individual firm and its internal functions, to assessing the firm within the context of its web of relations. Rather than looking at atomistic entities that compete for profits in the market through arms length relationships, this research recognizes that firms are embedded in complex social, technological, and trade relationships (Granovetter M. , 1984; Gulati, Nohria, & Zaheer, 2000). Networks have been analyzed as the default and most effective means of a firm's managing and controlling the internal challenges and external uncertainties they face (Podolny, 2001; Sorenson & Stuart, 2008). Assessing the intricate relationships in which firms engage has helped researchers understand why firms differ in their conduct and profitability (Gulati, Nohria, & Zaheer, 2000).

The relationships between collaborating organizations can be assessed from different approaches. Inter-organizational network issues have been explained through four broad theoretical mechanisms and at three levels of analysis (Zaheer, Gözubuyuk, & Milanoy, 2010). Networks have been studied as a source of inimitable resources and capabilities (Gulati, Nohria, & Zaheer, Strategic Networks, 2000), such as goods and services, but with particular emphasis on the sharing of information leading to learning and innovation (Cumbers, Mackinnons, & Chapman, 2003). Networks have also been assessed through the perspective of trust, where networks with stronger connections are associated with higher levels of trust and lower transaction costs (Coleman, 1988). Third, participation in a network may either increase or decrease the power and control of an actor based on the existence of dependency on an external party to accomplish part or all of the firm's core activities. Lastly, networks have been treated as a signaling mechanism since the quality

of actors a firm is linked to can be used as an indicator of the firm's quality to the broader business environment (Baum, Calabrese, & Silverman, 2000).

Findings from research on inter-organizational alliances and networks have shown that such relationships are vital for accessing key resources and capabilities, and ultimately creating sustainable competitive advantage (Dyer & Singh, 1998). The business and social ties developed between firms in inter-organizational networks are expected to attain advantageous competitive positioning, with benefits including gaining access to strategic and operational know-how, stable channels for information and supply exchange, and partner endorsement of the firm's activities due to an implicit assurance of product and service quality (Stuart, Hoang, & Hybels, 1999; Hannan & Freeman, 1984; Stinchombe, 1965; Teece D. J., 1992; Shan, Walter, & Kogut, 1994; Baum, Calabrese, & Silverman, 2000).

The existing theoretical frameworks on the resource-based view and networks help determine what is gained by the firm through network structure as compared to other hierarchical or market-based models of organizing. However, this perspective, which centers on attaining resources, considers predominantly individual firm-level management and performance outcomes. To better understand networks, the performance of the entire group of firms within the network must be addressed. Moreover, few studies currently explore the performance of network managers themselves. For these reasons, the existing network analyses are inadequate for understanding how the management of groups of firms can affect performance at the network level.

Variations in forms of network governance

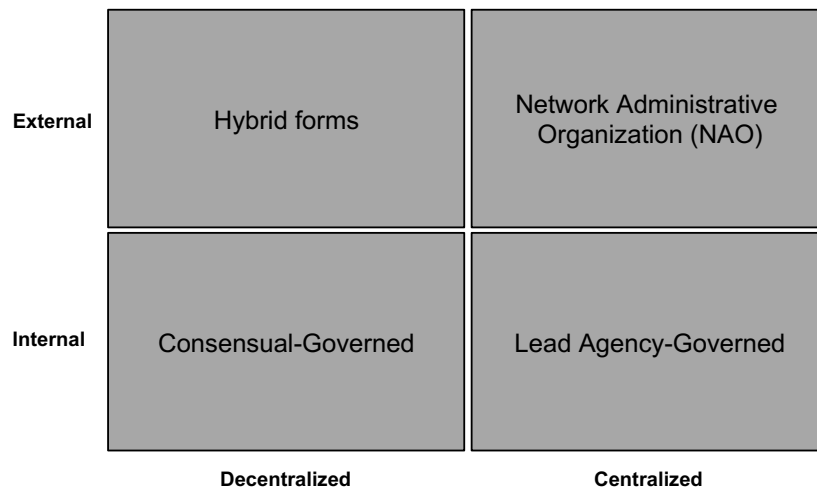
Beyond studying networks from an RBV approach, more recently research has considered the governance of entire organizational networks as a unit, rather than individual nodes and dyadic relationships. Network governance theory provides another approach for how firms that comprise a network may improve their performance. This approach looks at the “use of institutions and structures of authority and collaboration to allocate resources and to coordinate and control joint action across the network as a whole” (Provan & Kenis, 2008). This literature utilizes multi-organizational arrangements and uses data on multiple networks to assess the effectiveness of different governance mechanisms while taking the entire network configuration as the independent variable for assessment (Agranoff & McGuire, 1999; Agranoff & McGuire, 2001).

The literature on network governance forms has theorized that in order for a given form of governance to be successfully implemented or adopted, there exist four key structural and relational contingencies that will impact effectiveness (Provan & Kenis, 2008). Trust, size (number of participants or firms acting as network “nodes”), goal consensus, and network competencies play a role in engendering or hampering the effectiveness of an established network governance form. Trust has been particularly well discussed as a determinant of the performance of the network. Inter-organizational trust is shown to be strongly related to the ease of dyadic relationships, as it effects the costs of negotiations and the level of conflict between two network nodes (Zaheer, McEvily, & Perrone, 1998).

Network form and network leadership have been studied as key determinants of network performance (Müller-Seitz, 2012). Three distinct forms of network governance have been identified, with distinctions between the different forms of governance lying

along two axes: internal-external and decentralized-centralized, and a final hybrid form existing through less distinct combinations of others (Milward & Provan, 2006; Provan & Kenis, 2008). Internal vs. external refers to whether a network is created and managed internally by existing network participants, or externally by an outside entity whose specific task is to ensure network participants achieve the objectives of the network. Decentralized vs. centralized refers to whether the majority of network participants actively participate in the management of the network, or if few members or a single entity is in charge of network activities. The interaction of these two dimensions results in distinct forms of governing networks, each of which, under certain conditions, may be more effective than others in achieving the aims set by the network (see Figure 1) (Drazin & Van de Ven, 1985).

Figure 1.1 Forms of network governance



Source: Author interpretation based on network governance literature

Each form of governance is associated with specific conditions for effective management of network members. Under consensual governance, the most common form of network governance, members from within the network govern themselves

formally through regularly scheduled meetings and coordinated methods of communication, or more informally through periodic or sporadic meetings and uncoordinated means of communicating. This highly decentralized way of coordinating promotes a flat hierarchical structure, where all network participants are included in the decision making process. Conditions for the successful development of participant governance include the agreement and commitment of all, or a vast majority, of the network members. It is the responsibility of the network members to ensure that the activities of the combined firms are executed sufficiently and result in the forward movement and attainment of the goals and aims of the network. While still internal, the lead agency-governed form of network governance uses a core number of internal participants to coordinate activities and execute the mandates of the larger network body. The lead agency-governed form of network governance reduces some of the inefficiencies inherent in the consensual-governed form by minimizing the number of members that need to be included on all decisions and creating a streamlined set of processes.

For purposes of this study, I combine consensual-governed and lead agency-governed forms of governance into one umbrella form of internal governance. Although the two forms of internal governance are distinct, they both represent internal, relatively decentralized forms of governance as compared to the fully external and highly centralized network administrative organization form of governance. This distinction between internal vs. external governing structures creates a clear delineation between NAOs and other forms of governance, which simplifies the task of identifying differences in performance and evolution of networks. External hybrid forms of governance are not

commonly seen, therefore the focus here will be on NAOs as the primary form of external governance.

The network administrative organization (NAO) form of governance occurs when a completely separate and external administrative entity is established, with the explicit purpose of managing and coordinating the network's activities. The most centralized form of governance, the NAO takes on major decision-making activities for the network and ensures that organizational goals are achieved, one dimension through which their performance can be assessed. NAOs manage the network at the discretion of an external party, which may or may not include key network participants. Though NAOs are seen in both the public and private sectors, government-run NAOs in the public sector are sometimes established where consensual networks already exist to facilitate the achievement of organizational goals through formalizing and expediting processes that may be hampered by the complexities of decentralized planning (Goldsmith & Eggers, 2004). Such examples of engineered networks (i.e. organizations brought together by an external coordinating entity that is responsible for setting up and managing the network) differ in their origin from emergent networks (i.e. internal organizations that exist in similar market or environmental conditions and join resources and capabilities together), which may help explain differences in the evolution of governance structures in each type of network (Müller-Seitz, 2012; Herranz, 2010).

By assessing network-level formal and informal leadership outcomes, network governance theory has attempted to explain differences in the performance of networks of firms. However, network governance is assessed as a static variable, with no adjustments

made for changes in trust amongst network members over time or assessments of the most effective network governance features.

Networks of firms are beneficial for gaining access to additional resources and improving the performance of individual firms. Both the resource-based view and network governance theory consider ways in which the performance of the firm is affected by the inter-organizational ties it engages in. The resource-based view primarily examines the individual firm and determines effective strategies in creating ties that will better prepare and protect the firm from the uncertainty of the external environment. However, the performance of the firm is not limited only to activities of its network of ties, but is also determined by the management of the collective group of firms joined together in a network, cluster, group, or business alliance (Milward, Provan, Fish, Isett, & Huang, 2009; Willem & Lucidarme, 2014; Raab, Mannak, & Cambre, 2013). Network governance theory looks at the performance of the collective of firms and their management, taking account the differences in forms of how networks are managed and the origins of network creation (Saz-Carranza & Ospina, 2010; Zander, Trang, & Kolbe, 2015; Willem & Gemmel, 2013). Nevertheless, current network governance theory fails to consider the conditions under which network governance structure is ineffective and network members evolve into a new governance form. Neither the resource based view nor network governance theory fully explains the performance of network participants under one management form, such as a NAO. The RBV does not account for how group management impacts performance, and network governance theory assumes static network governance throughout a network's lifetime.

I use an approach that combines the RBV and network governance features to address the question of network performance, relative effectiveness of management approaches, and trust within network governance over time. Rather than assessing network governance as a stable variable that is unchanging over the lifetime of the network, I consider the impact of a NAO across multiple networks created using similar strategies and activities, and determine the NAO's impact on performance. NAOs are a highly suitable governance mechanism for studying performance and change amongst different networks since they can be developed uniformly across different geographical networks and allow for the application of both network governance and resource-based theories. The strong centralized and externally mandated nature of NAOs position them as the most top-down implemented and enforced forms of governance (McDermott, 2007; Provan & Kenis, 2008; Kim, 2008). Thus, NAOs are well suited to address rapid changes in network cohesion and respond to participants' needs, potentially determining the success or failure of the network. Current assessments of network governance literature has noted that the analysis of NAOs has to date been understudied (Milward, Provan, Fish, Isett, & Huang, 2009; Saz-Carranza & Ospina, 2010). This presents an opportunity to add to the field of knowledge by advancing the concepts of network evolution and governance-performance.

Contemplating the Effects of NAO-Governance on Resources and Knowledge

This section presents the premise for my argument on why NAOs increase the amount of learning/knowledge within, and expand the scope of resources available to members of, a network. The resource-based view (RBV) of the firm highlights the idea

that inimitable resources controlled by the firm can be sources of competitive advantage and profitability (Peteraf, 1993). I argue that NAOs can be a source of resources and information that are otherwise inaccessible to network participants' firms. Through the engineering of a network governed by an NAO, network participants can acquire resources and knowledge that enhance capabilities and lead to improved performance.

NAOs as generators of resources

Combining the network model together with the RBV approach suggests the firm/organization must frequently negotiate and adapt to its external environment in order to attain information and resources that will enable it to perform its activities optimally. Firms are embedded in a set of relationships that are strategically significant for success. Resources, in this setting, are thus defined as stocks of available elements that are controlled by the firm and turned into final products or services (Amit & Schoemaker, 1993). On the other hand, capabilities are a firm's capacity to deploy said resources through organizational processes with the aim of producing an intended outcome (Teece, Pisano, & Shuen, 1997). In this manner, a firm's set of capabilities allows it to utilize resources effectively, the objective being to increase service output and profitability (Grant, 1991; Akio, 2005; Grant & Baden-Fuller, 2004). Hence, strategic networks have the potential to give a firm access to information, markets, resources, and capabilities that better enable it to achieve its strategic objectives (Gulati, Nohria, & Zaheer, 2000). The bundle of necessary resources and capabilities that a firm needs to develop a sustained competitive advantage is internal to a whole network, but external to any single firm within the network (Marafioti, Mariani, & Martini, 2014).

Since NAOs are externally engineered, the effect of the NAO on resources and learning can be at the dyadic level and at the network level. An external, centralized network administrator is capable of expanding the scope of resources for individual firms, increasing each firm's capabilities through the top-down transfer of information from the NAO to the member firms. The prior literature has given examples from different industries of central coordinators that provide increased access to supplies and goods, physical infrastructure, and financial capital to network participants. Inter-organizational learning and knowledge transfer seen in joint ventures, business groups, and other strategic alliances have showcased the importance of ties to a resource rich partner in firms' acquisition of research and development capabilities (Powell & Koput, 1996). Biotechnology firms' ties to resource rich partners can enhance access to financial capital, helping to ensure the purchase of supplies, equipment, and human capital that drives successful research and development (Mahmood, Zhu, & Zajac, 2011). The relationship between a franchisor and its franchisees is also akin to that of NAOs and the member firms they govern. Franchisees are direct recipients of brand reputation, operational knowledge, and financial capital provided from franchisors, enabling them to develop capabilities and take on activities that they otherwise could not (Sorenson & Sørensen, 2001; Davis & Mentzer, 2008; Combs & Ketchen, 2003; Combs & Ketchen, 2003). In this way, an individual firm can, through the creation of ties to a NAO, acquire new resources that were previously inaccessible.

NAOs as initiators of learning

Closely related to how dyadic, alliance, and network ties can increase the available resources of a firm is the increase in knowledge that can also occur through

network ties. Looking at firms' networking as a window into the creation of new organizational capabilities, learning plays a central role in the competitive advantage of firms by increasing their proficiency at producing a good or service. Under the knowledge-based view of inter-organizational collaboration, members of collaborations can share knowledge and coproduce new products and services that either enhance their own knowledge base or create value that is jointly shared between partnering firms (Capaldo, 2014; Muller & Zenker, 2001; Grant & Baden-Fuller, 2004). Evidence suggests that firms partnering on research and development activities experience increased levels of knowledge transfer (Mowery, Oxley, & Silverman, 1996).

Brokering knowledge sharing and learning between organizations presents the potential for a "race to learn", in which alliance partners seek to acquire information opportunistically from the others through exploitation and maximization of individual appropriation of joint learning (Larsson, Bengtsson, Henriksson, & Sparks, 1998). Limiting opportunistic behavior is regarded as a central requirement for successful collaborations (Zaheer, McEvily, & Perrone, 1998; Capaldo, 2014). However, this protection of the firm's resources from exploitation by partners is less applicable in the case of firms within NAO-created networks, given the aim of the NAO is explicitly to improve the activities of the network and the firms within the network. NAOs seek to improve the performance of the network at-large, and therefore make attempts to expand the knowledge base and information available to its managed firms. The engineering of NAOs can therefore reduce the competition perceived between firms in the same industry and, through direct NAO-to-firm activities, increase the amount of knowledge and information accruing to a particular firm.

The process of knowledge acquisition and learning is particularly significant for service and knowledge-based industries such as health care delivery. Though the few existing health care delivery networks in many developing countries largely do not engage in the sharing of physical assets and goods, their network activities often encourage the sharing of information and operational know-how to improve service delivery. Through successful inter-organizational learning, networks in health care can diffuse knowledge on how to deliver quality care and provide other benefits by improving health outcomes (Mittman, Where can capabilities come from? Network ties and capability acquisition in business groups, 2011). Studies on quality improvement collaboratives have focused attention on the impact of inter-organizational learning activities (inter-OLAs) on organizational performance (Nembhard I. M., 2009). Exchange and sharing of resources in the form of information and physical assets through the network model has shown many positive results in health delivery organizations (Fattore & Salvatore, 2010). The success of many of these partnerships has been seen through the improved health outcomes that many of their patients experience. Nevertheless, studies on health care delivery networks have focused on the relationships between network members, and little is understood about the impact and effectiveness of centralized network administrative organizations for health care.

Toward a Theoretical Model of NAO-Governance Effects on Performance

The arguments above establish how an externally engineered centralized network administrative organization may increase the number of resources and knowledge-information to each of the firms it manages. In this section, I provide a theoretical model

for how NAOs increase resources and information sharing, thereby improving network participant's perception of NAO performance. Previous research has shown that the form of network governance can determine better or worse performance of the entire network of firms (Provan & Sebastian, 1998). Prior work on network governance and its effect on the performance of the managed firms has made it clear that different approaches to managing networks—centralized v. decentralized, internal v. external—have an impact on the performance outcomes of its member firms, beyond the effect of how individual firms are managed (Provan, Huang, & Milward, 2009; Capaldo, 2014).

The NAO-form of governance we utilize here diverges from the traditional academic literature on business governance. The traditional approach centers on the role of boards of directors in denoting and protecting shareholder interests (Fama & Jensen, 1983; Provan K. G., 1980). Instead, network governance in other studies has examined the monitoring and controlling of management behavior (Hill & Lynn, 2005). This alternative approach largely stems from public management and administration industry, which looks primarily at relational structures between managers and their collective activities in running the organization (Eisenhardt, 1989). Network governance has often studied the dynamics of network characteristics such as embeddedness and structural relations, with some focus being taken on the effectiveness of network governance activities (Grandori, 1997; Reuer, Zollo, & Singh, 2002). However, an analysis of the effect of a single network governance approach on multiple networks will expand existing literature on network performance.

The four different forms of network governance set forth by Provan & Kenis (2008) and accepted in the current literature define how different governance forms may

result in different levels of performance. As the most highly centralized form of governance and the only purely external mode of governance, the network administrative organization (NAO) stands apart as the most engineered and imposing form of governance upon network members. Since NAOs originate with the explicit intention of ensuring the network achieves its aim, this form of governance has more of an incentive than others to develop as many of the key predictors of network effectiveness. Building trust, achieving goal consensus, and attaining network-level competencies across all the members of the network aim to improve the effectiveness of NAO governance, and thereby the performance of the network. It can, therefore, be argued that the NAO governance form will engage in activities that foster centrality, reduce disagreements at the periphery, and foster ties between network members to attain improvements above and beyond what can be achieved amongst member firms alone. Earlier, I argued that NAOs can increase the number of resources available to each firm and the uptake of knowledge-information from the NAO to each firm. This argument suggests that although resources and knowledge-information alone from NAOs can foster improvements, the sharing amongst members of NAO-governed networks will be greater than that of other governance models.

The sharing of resources between firms of a common network or between businesses of a common business group can improve the performance of the entire group. Increased network ties lead to higher levels of inter-organizational activities such as sharing of physical assets, exchange of information, and cross-organizational learning. Hence, as the resource and information sharing increases between members of a NAO-governed network, the ability of the network member firm to produce more or an

expanded scope of goods and services increases. As firms translate their newly acquired resources and information into their current activities, new capabilities that were previously unattainable are developed. In this manner, firms are able to become more competitive, giving rise to the potential for a sustainable advantage and increased performance.

Increased inter-organizational ties and can result in increased financial performance through improvements in the quality and the availability of services provided. Through successful inter-organizational learning, learning networks in health care can diffuse knowledge on how to deliver quality care, and provide other benefits to the process of improving health outcomes (Mittman, Creating the evidence base for quality improvement collaboratives, 2004). A number of studies on organizations, learning, and performance have shown evidence of a positive impact of management support and inter-organizational culture on quality and performance, while other studies have shown little or no evidence, leaving the results mixed (Bradley, Holmboe, Mattera, Roumanis, Radford, & Krumbolz, 2003; Edmondson, 2003). Little information is available on how characteristics of a health facility's participation in a network may affect its financial performance outcomes. Nembhard's study on the characteristics of care collaboratives that are most valued by network members gave a glimpse into those shared activities amongst health firms that may ultimately improve their financial bottom line (Nembhard I. M., 2012). Such activities would also be features of collaboratives that NAOs should focus on when designing their activities. These results support the idea that improved quality and increased patient referrals lead to expanded capabilities and improved financial performance for health facilities. However, prior research has not

explored ways that quality improvement activities from a NAO to multiple networks affects each network's performance outcomes.

Overlaying Trust onto NAO Governance Effectiveness

Trust in nearly any relationship is critical to the successful execution of joint aims and activities. Many organizational studies have shown that greater trust is able to reduce uncertainty, foster knowledge and information sharing, and increase levels of learning, which each stimulate organizational performance (Lane & Bachman, 1998; Deakin & Michie, 1997; Ring & van der Ven, 1992). Within network research, evidence has pointed toward the benefits of trust for enhanced network performance, but few such studies have been performed (Klijin, Edelenbos, & Steijn, 2010; Provan, Huang, & Milward, 2009). Moreover, the levels of trust amongst members entering into a networked organization may have an impact on levels of information sharing, and therefore performance of the network. The implications of trust on network performance need closer inspection.

I use a composite definition of trust as “actors’ more or less stable, positive perception of intentions of the other actors; that is, the perception that other actors will refrain from opportunistic behavior” (Klijin, Sierra, Ysa, Berman, Edelenbos, & Chen, 2016; Deakin & Michie, 1997). Since trust cultivates the exchange of information-knowledge and learning between network members, the ability of network governance administrators to foster trustful ties impacts the effectiveness of their governance. In one direction, the activities of network managers in producing trust directly influences their effectiveness as network governors. However, the reverse influence is also critical, as ex-

ante levels of trust among subsequent network members impacts the governance of the network. Ex-ante levels of trust among network members, meaning perceived levels of trust before and during engineering of a network governance organization, will impact whether or not the network will remain intact under an NAO-form of governance, break apart, or evolve into a potentially more effective form of governance.

Compared to other forms of governance, NAOs are best positioned to create network ties and hold together engineered networks of firms through managed network activities that increase trust levels amongst participants. Through acting as an entity that lowers the risk and transaction costs of working with groups of previously unrelated firms, together with increasing the number and frequency of interactions between firms, NAOs can increase the levels of trust felt between network participants. Nevertheless, different levels of trust prior to the creation of a NAO may impact the cohesion of a network (Greve, Baum, Mitsuhashi, & Rowley, 2010; Beckett & Jones, 2012). For example, under consensual networks, high trust density is a key predictor of effectiveness of that network governance form (Provan & Kenis, 2008). Therefore, without high initial and continued levels of trust, network members may choose to discontinue participation. In the absence of a network administrative organization, those at the periphery may either be lost or seek increased levels of direct involvement.

NAO Facilitation of Quality Improvement and Learning for Better Performance

NAOs are well structured to successfully implement quality improvement activities that can lead to improved performance, similar to the benefits seen from care collaboratives (Horbar, et al., 2001; Howard, Siminoff, McBride, & Lin, 2007). NAOs

share information and physical assets for the purpose of achieving network aims. In the healthcare setting, positive results such as greater efficiency with using resources and adaptability of knowledge-intensive activities have been seen when hospitals and clinics work collaboratively to improve care quality outcomes (Plsek, 1997; Fattore & Salvatore, 2010).

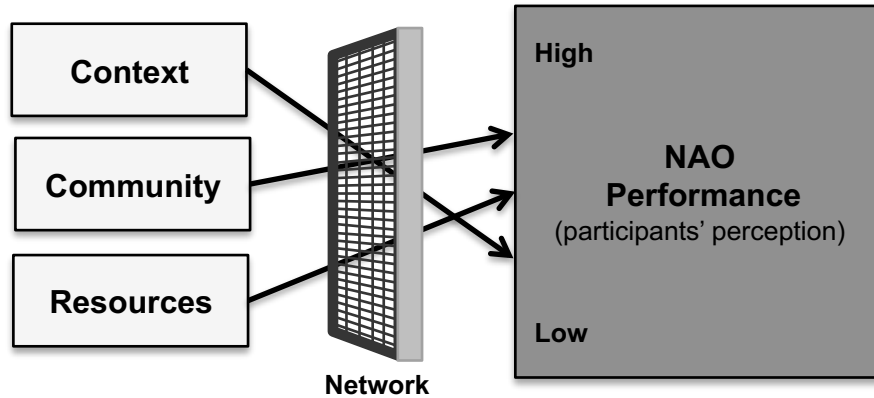
When executing improvement activities in low-income settings, some activities may be more cost-effective, and therefore would be beneficial if prioritized before others. It is therefore important to understand which improvement activities are most helpful for facilities to implement and improve performance. While this information is available for groups of health facilities that have participated in care collaboratives, scarce information is available for facilities under management whose focus goes beyond only quality improvement to include aims such as financial performance or data reporting. Additionally, network participants may have different preferred learning styles that best suit their comprehension of quality improvement knowledge and information. Based on their preferred learning styles, different types of facilities may respond best to different improvement activities and require different learning approaches in order to improve their performance.

Dissertation Research Overview

In this dissertation, I theorize why network administrative organizations can improve whole network and individual participant performance above other forms of governance. In this first chapter, I have developed arguments that relate the network administration organizational form of governance to levels of knowledge uptake and the

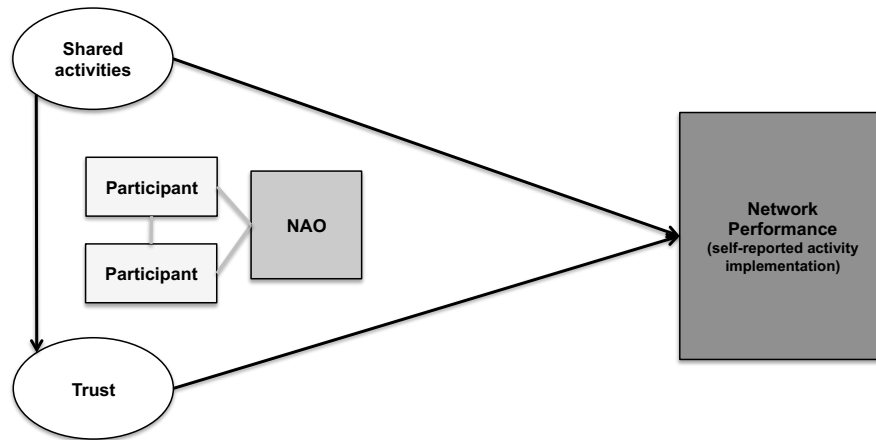
scope of resources available to individual participating firms, the sharing of information and performance of each network, and the ex-ante levels of trust and evolution of network forms.

Figure 1.2: Chapter 2 Exploratory study of NAO performance as perceived by each network



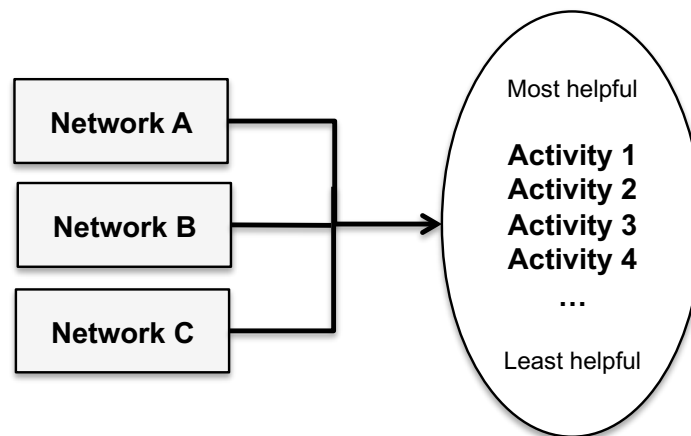
Chapter 2 presents the first paper, where I use survey data of network participants' perspectives and qualitative data from interviews and meetings to explore differences in perceived performance of NAO-governance from the perspective of facility leaders and clinical staff within each of six networks managed through a common NAO. I give specific insight on how the NAO created six networks, together comprising ~60 hospitals in Lagos state, Nigeria and explore the effect that contextual characteristics, community cohesion, and resource munificence each have on network performance.

Figure 1.3: Chapter 3 Influence of trust and shared activities on network performance



Chapter 3 assesses how trust influences performance outcomes of NAO network management activities. Individual interviews, group discussions, hospital performance metrics, and other information were used to develop an understanding of how an NAO improves network performance, deepening our understanding of the relationships between trust, shared network activities, and knowledge.

Figure 1.4: Chapter 4 Effectiveness of network improvement activities



Chapter 4 gives information on the specific impact of the network administration organization on individual health facilities' knowledge uptake and learning. It gives

details on the helpfulness of NAO-enforced quality improvement activities, as measured by their relative performance improvement against one another and implementation of quality improvement measures.

Following this, Chapter 5 briefly discusses the implications of this dissertation results for the on-ground implementation of work in developing countries. Immediate and extended findings are discussed in relation to application and modification of current health care practices in specific regions, with a focus on how governments, donors, implementing partners, and private health players can utilize the network administrative organization strategy to improve the performance of health interventions and health facilities.

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CHAPTER 2

CHAPTER 2. The Performance of a Network Administrative Organization: NAO implementation across multiple networks

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The Performance of a Network Administrative Organization: NAO implementation across multiple networks

Abstract

Context: Understanding the effect of different forms of network governance on networks of hospitals can be beneficial toward improving how care is delivered. The network administrative organization (NAO) form of governance shows promise for improving the cumulative performance of hospitals participating in a network, but better knowledge of the characteristics of networks that affect the performance of an NAO is needed.

Objective: To determine the perceived performance of the NAO governance form amongst network participants and to understand how contextual and environmental variations between networks being governed by the same NAO affect NAO performance.

Design, Setting, and Participants: Network performance was determined by collecting and aggregating survey data on network performance from hospital internal stakeholders (chief medical directors, nurses, and network facilitators). A total of 171 surveys of these hospital personnel (April 2014-October 2015) were obtained from a representative sample of 55 Nigerian hospitals and from the NAO administrators overseeing each of six networks.

Main Outcome Measures: Quantitative responses show NAO performance for five factor scores from survey dimensions and qualitative case studies of network development to strengthen understanding of quantitative results.

Results: Using exploratory factor analysis of the questionnaire items, the study identified five factors that arose in relation to network performance and contextual characteristics—appropriateness of service delivery, participant interaction, environmental diversity, NAO resource support, and lack of local financial resources. Qualitative data was used to assess testable propositions and help develop theory for future network performance research. Data collected at the levels of individual personnel, firms, and networks indicate that differences in NAO performance can be explained by the contextual characteristics of resource availability and community cohesion. These results are consistent with previous studies, yet expand on current literature in two ways: First, community cohesion and resource munificence have been previously been studied theoretically, but the magnitude of correlations have yet to been examined empirically. Secondly, findings indicate that greater scarcity of local resources (lower resource munificence) is generally associated with higher NAO performance, and higher levels of community cohesion of networks is associated with higher NAO performance.

Conclusions: Network participants that are better equipped to engage in network activities and who were within localities with minimal diversity perceived the performance of the network administrative organization more favorably than those who were not, even given equal levels of NAO directed engagement in performing network activities. The relative difficulty of participating in network activities may further hinder those networks with limited resources from achieving network objectives. Patterns of performance perception did not vary by management level, but were consistent within networks. Future efforts at NAO implementation should address a network's availability of resources to better determine, before network engagement, participants' ability to

achieve network objectives and the relative uniformity or diversity of each network's community, as both factors may affect policy implementation.

Keywords: Networks, network governance, management, performance, effectiveness

The performance of a Network Administrative Organization: Single NAO implementation across multiple networks

Background

The ties between multiple firms entering into inter-organizational relationships has been an area of focus for management strategy researchers, with many recognizing the significance of business groups, strategic alliances, and other dyadic relationships in various settings. Given the shift in study from individual dyadic relationships to multi-organizational relationships, there has developed a need to better understand the management of networks of firms (Gulati, 1998; Stuart, 1998; Borgatti & Halgin, 2011). As the study of groups of organizations at the network level has taken shape, the different manners of governing such relationships has been increasingly studied.

Few studies have been performed on the effectiveness of networks at the network level rather than the individual organization or two-firm dyadic relationship levels. Moreover, the governance of multiple networks under the same management entity has yet to be assessed. Since governance is necessary to ensure that network participants engage in collective and mutually supportive action and that network objectives are being met, a single network management entity can provide governance services to multiple networks. However little is known about the possible impact of this type of multi-network governance approach, providing an area in need of clarity within the network governance literature.

This paper seeks to develop theory and expand knowledge concerning the effectiveness of a single form of network governance across multiple different networks.

The focus here is on the network administrative organization (NAO) as a centralized and external form of governance. This study is organized around a central research question: What is the relationship between the contextual characteristics of a health network and its performance, holding network structure constant under a common NAO? To address this question, I implemented a quantitative analysis of performance and draw conclusions about how network characteristics such as resource munificence and community cohesion can impact the NAO's performance for each network. Anecdotal evidence from case studies of the six separate networks engineered via the NAO will provide further support for why differences in network characteristics lead to differences in NAO performance.

I operationalize performance primarily as the achievement of stated network objectives, and use a multi-trait, multi-perspective method similar to that utilized by Provan & Milward (1995) to determine network performance as perceived by hospital personnel within 6 NAO-governed networks in a large Nigerian city. This study provides insight into the mediating effect of context under which a network operates on network performance, and provides guidance for future theory development and empirical research on the effect of resource availability and community cohesion on network performance.

Literature Review & Hypothesis Development

A significant portion of the prior research on networks has focused on the advantages of the networked business structure and on developing theory around how to assess such relationships (Granovetter, 1984; Provan & Sebastian, 1998; Podolny, 2001). Two theoretical approaches have been taken in much of the work on networks: the resource-dependence view (Provan, Sebastian, & Milward, 1996; Casanueva, Gallego, &

Revilla, 2015; Gillis, Combs, & Ketchen, 2014) and transaction cost economics (Grandori & Soda, 1995; Jessen & Nybakk, 2013). However, these dominant approaches focus on the process of network development and individual firm performance and outcomes. Though assessing the performance of individual firms within their network of suppliers, buyers, and partners presents insight on how firms compete for resources and capabilities (Teece, Pisano, & Shuen, 1997; Powell, Koput, & Smith-Doerr, 1996), assessments of network-level performance attempt to provide clarity on how networks developed for a specific purpose achieve their inter-organizational aims amongst all network participants (Agranoff & McGuire, Managing in network settings, 1999; Holm & Eriksson, 1999). Only recently has work been performed on the governance of networks and outcomes for the network as a whole.

A focus on entire networks is warranted, particularly in settings where more integration or collaboration of activities can lead to improved outcomes. In the public administration literature, the creation of networks has been studied as a way to increase the effectiveness of coordination amongst multiple government agencies where client outcomes depend on joint activities and increased integration (O'Toole, 2015; Lecy, Mergel, & Schmitz, 2014). The field of health care has seen increased numbers of studies on network development, integration, and governance. Since collaboration amongst multiple parties is often required for success in health care delivery, integrated network care models have become more and more attractive to researchers. Network assessments, particularly those performed in the health care and public administration settings, focus on achieving the objectives of the network as a whole, as opposed to the aims of individual firms within the network. These studies explore the attainment of network-

level outcomes that cannot be attained by individual firms acting independently. This distinction can also be seen in studies that “focus on correlating the formal network structure of a collection of organizations with a particular performance measure” (Lecy, Mergel, & Schmitz, 2014), with examples such as mental health networks, where multiple health organizations collaborate to provide comprehensive care for communities of patients, as opposed to individual mental health clinics, which may only be able to provide partial care for patients (Provan & Kenis, 2007).

Much of the research on networks has focused on topics such as network formation, network structure, and network functionality (Stuart & Sorenson, 2007; Lusher & Robins, 2013; Zaheer & Soda, 2009), but an increasing number of investigations are being performed on the concept of overall network performance and its determinants (Turrini, Cristofoli, Frosini, & Nasi, 2010). Little focus has been given to the idea of network effectiveness or network performance due to the difficulties in determining network-level outcomes, since these are based on the coordinated activities of multiple firms as opposed to outcomes of the individual organization. Moreover, few opportunities exist to study network-level performance outcomes for a sufficient number of networks to permit accurate prediction of network variables and performance measures. Because little network-level data is available, network researchers have focused much of their efforts on exploratory studies that present models and theories of the relationship between network structure, context, and performance to guide research in a future when additional information is available.

Few studies in the literature focus on the effectiveness of inter-organizational networks since measuring network performance is a difficult task, and none are yet to

look at the effectiveness of the NAO governance form on multiple networks. Much of this lack of attention on network performance stems from the problematic nature of measuring performance. One approach for assessing performance is by unit of analysis: some network researchers have examined the organizational perspective (O'Toole & Meier, 2004; Meier & O'Toole, 2007) others have focused on the entire network (Provan & Milward, 1999; Herranz, 2010), and another group has evaluated performance by looking at its effect on the local community (Provan & Sebastian, 1998; Conrad, et al., 2003). Another approach has been by the measures used for assessment: structural measures such as network governance centralization have been used (Provan & Kenis, 2007), in other instances procedural measures have been employed (Keast, Mandell, Brown, & Woolcock, 2004; van Raaij, 2006), and outcome measures have also been utilized to assess performance (Guthrie, et al., 2010; Ferlie, Fitzgerald, McGivern, Dopson, & Exworthy, 2010; O'Toole & Meier, 2004). The majority of work in this field has centered on achievement of pre-determined tasks or goals for the entire network as the performance measure (Bazzoli, et al., 2003; Hasnin-Wynia, et al., 2003). Other research has demonstrated an association between network structure and network performance using measures that explore client outcomes (Provan & Milward, 1995; Provan & Sebastian, 1998) and network sustainability. Recent studies examining the effectiveness of networks have focused on performance measurement as how well networks are able to meet their agreed-upon or mandated objectives, easing the study of network effectiveness by having network-level key performance indicators and outcomes measures (Kickert, Klijn, & Koppenjan, 1997; Herranz, 2010).

The use of different approaches to operationalize network performance is unsurprising, as networks are multidimensional and evaluation of networks is an inherently subjective process. Based on past efforts to assess network-level performance, this study follows the performance definition set forth by Kenis and Provan (2009) and evaluates networks based on “network capacity to achieve stated goals”. Adding to this, more recent studies have attempted to evaluate network effectiveness from the perspective of a broad range of stakeholders in networks of cooperative service providers (Provan & Milward, 1991; O'Toole, 1997). In these attempts, questions have arisen concerning how to assess and weight the needs of different constituents relative to one another. In this study, I take a multi-measure approach to determine the performance of the NAO governance structure across multiple networks. Network performance is operationalized as how well network administrators achieve stated network goals, with supplemental measures of performance provided through case studies of how network were developed.

Prior work on networks in the healthcare setting has tied performance to patient outcomes, population outcomes, and inter-organizational learning, (Provan & Sebastian, 1998; Nembhard, 2008; Turrini, Cristofoli, Frosini, & Nasi, 2010). Though it is recognized that patient outcomes and community health are frequently the best measure of a health network’s effectiveness, for this study, it would be difficult to retrieve accurate patient-level outcome measurements due to patient records in the region often being inaccurate or missing. Moreover, since the level of analysis sought is the performance of the network, aggregated facility operational measures and participant perspectives of the network’s ability to achieve its goals are more appropriate measures.

Facility operational measures examine the service provision processes, quality improvement policies, and administrative procedures upheld at each hospital. This measure reflects processes and indicators that are proxies for future improvements in patient outcomes, but are the immediate concerns of hospital owners, operators, and lead staff.

Though network researchers still face a limited understanding of all the variables that may affect network performance, there is wide agreement among scholars that a network's structural characteristics impacts its performance outcomes (Burt, 2005; Cross, Parker, Prusak, & Borgatti, 2001). Provan and Milward's (1995) seminal work on network performance established a basic model of the relationship between network structure, context, and performance. Marafioti et al. (2014) built on that theory and culled information from subsequent studies on networks to develop a model where network performance is affected by network structural characteristics, but moderated by contextual factors that modify the effect of network structure on performance.

A number of studies have used that basic model of network performance, looking at different aspects of network structural characteristics (such as interconnectedness and centrality) and network contextual factors (such as resource munificence and system stability) and their implications for network performance (such as client outcomes and achieving stated objectives) (Turrini, Cristofoli, Frosini, & Nasi, 2010; Provan, Huang, & Milward, 2009). Reviews of studies on network performance have also shown some of the same characteristics are the central determinants effecting network performance: network management; resource munificence; centralization of network structures; and complexity of coordination mechanism (Cristofoli & Markovic, 2016). While it is known

that these determinants impact the performance of networks, existing studies have assessed network structural characteristics as inconstant, performing exploratory investigations into multiple network structures and several governance forms simultaneously. Such a multi-dimensional approach makes it difficult to tease out how any single variable may impact performance since multiple structural and contextual characteristics are being examined at a time.

In this study, I leverage the Provan & Milward (1995) and Marafioti et al. (2014) model previously provided and hold network structural characteristics constant through network management via an NAO. I first explore the network participants' views on network performance using survey data to develop measures of network performance and contextual characteristics. Following this, I assess the relationship between network context and network performance by looking specifically at measures of resource availability and community cohesion, and use qualitative evidence from cases to discuss propositions on how they may account for performance differences of the NAO between different networks.

From the existing literature on networks, this study will focus on resource munificence and community cohesion as the key contextual factors that moderate network performance. Studies on health care networks have shown that resource munificence, defined as the amount of resources available to the network from its environment and reflecting the degree of uncertainty a network may face in executing activities, has a positive effect on network performance (Conrad, et al., 2003; Marafioti, Mariani, & Marini, 2014). Qualitative evidence from network participants' interviews have noted that without sufficient resources, the effectiveness or performance of the

network may be jeopardized and the network objectives are less likely to be met (Provan & Milward, 1995; Raab, Mannak, & Cambre, 2013). Building on the literature on network performance and its determinants, a central hypothesis for this study proposes that higher levels of network performance are achieved when network participants' environment provides adequate resources to perform activities.

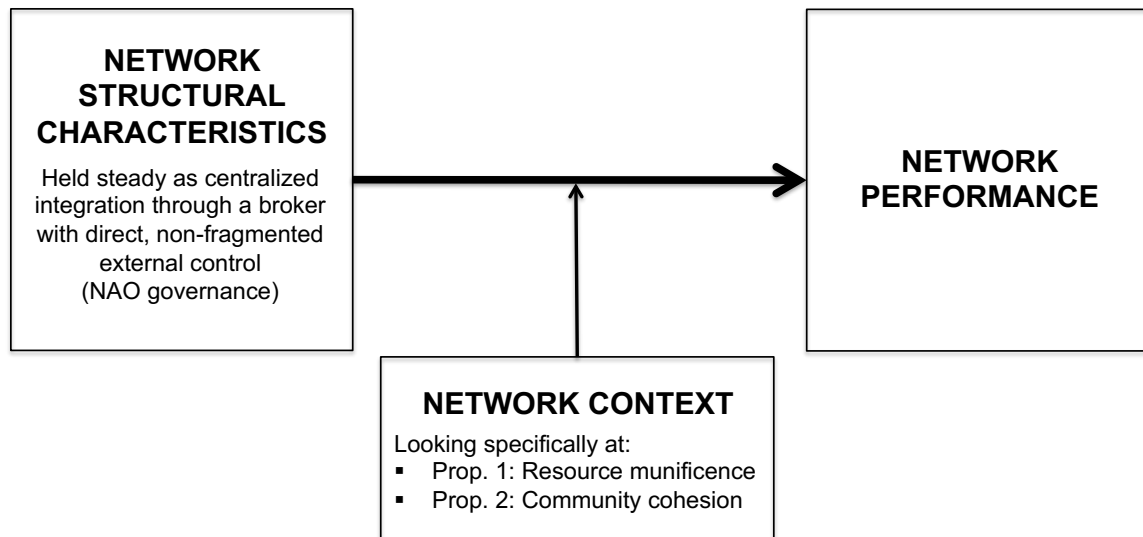
Hypothesis 1: Higher levels of network resources(lower levels of resource scarcity) will relate to higher NAO performance ratings.

Communities that have previously experienced collaboration amongst various members and whose members have exposure to the benefits of collaboration and joint participation in activities are frequently considered better environments for networking activity (Weiner, Alexander, & Zuckerman, 2000; Hasnin-Wynia, et al., 2003). Additionally, social capital that has been previously developed through previous collaborations can impact the amount of trust between network participants and, over time, affect the success of the network (O'Toole, 1997). Although the precise reasons why community cohesion in areas where networks form has an impact on network performance is still uncertain, the significance of cooperation and collaboration within a network's broader community has been supported by studies showing that diversity in the network's operating community can create obstacles to successful network performance (Hasnin-Wynia, et al., 2003). The relationship may involve community diversity hindering network managers' ability to influence participants or successfully engage key actors in network activities.

Hypothesis 2: The more cohesive and uniform a network's community is, the higher the NAO performance scores will be.

Lack of support for these hypotheses would suggest that rather than resource munificence and community cohesion mediating the effect of the NAO's management on network performance, other contextual aspects such as system longevity may play a larger role on network performance or, alternatively, that contextual characteristics do not have a mediating effect on network performance. Due to the relatively small number of aggregated network-level observations, this study cannot conclusively estimate the relationships between performance variables and predictors of performance, therefore findings supporting the proposed hypotheses are not meant to be definitive. Rather, study outcomes are largely exploratory and meant to present initial propositions for theory development and influence further studies on the relationship between network context and network performance.

Figure 2.1. Study hypotheses of specific network contextual factors on performance



Methods, Empirical Setting, and Data

Study Preparation

Preparation for this study occurred over a one-year period in the southern region of Nigeria in order to have a sufficient understanding of the operational activities that take place in health networks in developing countries.

Following an introductory overview of the health care system through participation in international donor strategy summits, I met with and interviewed health actors from different parts of the Nigerian health care system. These included leaders at the federal, state, and local government levels, representatives from NGOs, not-for-profits, donors and other such partners in the health system development, and members of the private sector spanning private health organizations as well as private non-health institutions engaged in health-related corporate social responsibility. After identifying the Nigerian private health sector as a system both in need of improvement and amenable to changes, I performed a rapid assessment of the issues pertaining to this segment of the health system to gain greater insight on its functioning. A review was performed of supplementary materials including over 50 key articles and reports on the private health sector in Nigeria, Sub-Saharan Africa, and emerging markets. Interviews with over 60 public officials, partner organizations, and private sector stakeholders were also performed to identify areas of impact and feasibility within a reasonable time frame. These individuals were a mixture of clinical and non-clinical health care professionals, identified as key individuals in the field by holding positions in top government offices, leading private institutions, and the most impactful donor and partner organizations in health care within Nigeria.

The outcome of this preparatory period was a wealth of knowledge on the activities of individual hospitals and clinics in developing countries. It showcased the progress in collaborative efforts and collective operational efficiency within Indian health facilities, some of which could be translated to the Nigerian setting. Ultimately, these years of initial preparation highlighted the paucity of academic and practitioner-translatable work in the developing-country health space, and suggested that deep fragmentation in the Nigerian health sector could potentially be ameliorated through more coordinated, collaborative, and networked initiatives. Specific to this arm of research, the on-ground work performed exposed the cost of having an uncoordinated private health care system. The existing fragmented management system in Nigerian health facilities causes extensive duplication of resources in an already resource-constrained environment, leading, in part, to the system's poor outcomes. With fewer resources at their disposal, performing activities required for quality care delivery becomes comparatively more complex and less likely to be successfully achieved. Hence, assessments made in the preparatory phase became the catalyst for the specific research questions on how NAO governance impacts network performance, why context matters, as well as the effect resource munificence and community cohesion have on that relationship.

Research Setting

I examine my research questions in 55 urban health care facilities (clinics and hospitals) located in the western part of Nigeria's largest city, Lagos. These health facilities were previously unaffiliated and had minimal, if any, informal links to one another. All the facilities were established in the lower-income parts of the city of Lagos,

being on what is commonly known as the Mainland, as opposed to the more affluent area known as the Island that is located across a body of water. The participant facilities provide care to some of the lowest-income populations in the world, with the average community income of less than \$3/day, placing many of their patients in the bottom-of-the-pyramid category. The typical facility structure contains one Chief Medical Director (lead doctor), a staff of two or three nurses, and a part time laboratory technician and/or pharmacist. With just one doctor at a facility, many CMDs identify as general practitioners and attempt to care for the full spectrum of known ailments and conditions.

Facilities have limited resources available to them individually. Rather than establishing a dense web of partnerships and alliances, many CMDs choose to set up facilities as one-man islands, under a structure that does not leverage the resources or knowledge of other potential partners in their locality. For this reason, they serve as optimal sites in which to study the performance of a single network administrative organization, the effect of context, and the network development process this governance form may enact for different networks.

While performing assessments of multiple networks and study sites can be truly insightful, results from such studies may not provide the depth of nuance and understanding that is necessary to fully theorize about network context and NAO-governed network performance. Gaining a more in-depth understanding of the mechanisms behind NAO governance and its effect on network effectiveness required an objective analysis of individual network participants' perception of network performance. Since the health facilities were engineered together from previously unrelated health facilities, it was critical to understand the effect of the NAO governance structure on the

networks as a whole. This assisted in determining what improvements were fostered through the resources and capabilities directly transferred by the NAO itself and those differences in NAO performance attributable to other network contextual characteristics. The focus here is to test the relationship between variables associated with NAO performance such resource provision and cost of participation, and determine what differences are seen across networks.

This assessment looks at multiple hospital networks over a period of time. All engineered networks, Networks A through F, were created through the same network NAO. Multiple network sites for the study were undertaken for several reasons. This research endeavors to assess potential differences in the impact of the NAO governance model when used across several networks exposed to different contextual characteristics. The acting NAO in this instance, “Not-For-Profit” (NFP), is a not-for-profit organization that possessed an organizational arm dedicated to the improvement of the private sector. This allowed for an external party already embedded in the field of public health and engaged in programs specific to the private health sector in Nigeria to act as the external coordinating entity to provide uniform engineering of a NAO-governed network of health facilities across multiple sites. Examining multiple networks within the same state allows for a clear comparison of the governance system during and after engineering of networks took place since the majority of macro- and micro- economic changes affected each network similarly. Moreover, examining the engineering of multiple networks allowed me to get a deep understanding of the complexities of multiple health facilities, the nuances of multiple network relationship dynamics, and to be aware of the potential changes that could take place over the course of NAO governance.

Qualitative and quantitative data were collected during the course of this study. Both types of information gave insight to the workings of each network, and allowed the corroboration of information in specific areas for deeper understandings. Qualitative data gave insight on the social interactions and inter-relationships that occurred within network participants, detailing network members' perception of the NAO and each other. Quantitative data gave statistical understanding of the performance of the NAO on overall network performance. This information on multiple networks therefore presents a detailed analysis that compares and contrasts the social dynamics and the performance effects of multiple health networks engineered through the same network administrative organization.

Site Selection

The knowledge gained through the preparatory period was critical to study design and site selection. Since selection of case studies and research cases is vital to theory development, the process through which sites were selected is discussed here. Over 60 facilities were initially contacted for participation in this study, as an intervention that brought together previously independent health facilities into networks of between 5-12 facilities, with the aim of inducing the sharing of physical resources such as diagnostic or laboratory equipment, and transfer of knowledge capabilities such as best-practice for malaria case management.

A different industry or work setting could have been chosen as the site to explore the phenomena of network governance, performance, and development, such as franchise chains in the food industry. I could also have alternatively chosen health facilities that differed greatly in the types of services provided and the socio-economic segment of the

population served, or included more rural facilities in these assessments. Rather, I chose to focus on health facilities that were fairly similar within networks with variations of specialties, geographic location, and other characteristics differing across networks. This design helps to control for extraneous factors while keeping NAO governance identical across networks.

Network administration was managed by a local health systems improvement not-for-profit (“NFP”) through a unit within NFP focused exclusively on the private health sector. NFP acted as the network administrative organization that created and managed the networks throughout the study period. NFP has a history of health systems development in Nigeria, with established ties to governments, donors, development partner, and the private sector. NFP’s past work in health development and position in the Nigerian health system makes it a strong organization to act as the NAO.

Selection of facilities occurred with the help of a local medical association (LMA) composed of the majority of private health facility owners and operators at the state and national levels. Members of the LMA interact primarily as a social club, meeting periodically to discuss the general state of health care in the region and ways to address political and economic changes that occur. The LMA does not have a strong influence on the day-to-day activities of member hospitals. A total of over 3,000 medical facilities exist in Lagos state, with nearly 2,500 of those being private facilities, therefore some guidance was needed on how to attain the target number of facilities. Investigators attended meetings of the LMA, identified key executive supporters for the networks project, and with the insight of those supporters identified a small number of key facilities that were well suited for participation in the project. Based on those

introductions, initial interviews and discussions were conducted with a core group of facilities. From those facilities, a referral system was employed where CMDs identified other facilities in their geographic location and made recommendations on the preparedness of recommended facilities to work with others, based on their clinical service provision and patient population. In the referral process, facility selection was influenced by geographic and economic considerations for the local community population, specifically the referent population of other facilities in the geographic network based on the type and number of services provided. Aside from two, all facilities identified through this referral system were willing participants. Of the 63 CMDs identified and contacted, one declined participation due to “unpreparedness” of his facility, one declined for “legal reasons”, one facility was closed by government authorizes due to a questionable iatrogenic event, and two facilities simply lost interest. Early in network implementation, three additional facilities consistently did not attempt to perform network activities, given the time needed for the study’s interviews, surveys, and data collection requirements. Fifty-five facilities were ultimately included in the networks coordination. The resulting survey sample is composed of 171 respondents across executive, operational, and front-line staff members.

All health facilities selected:

- Were private hospitals. Private hospitals in Nigeria’s Lagos state receive less support than comparable public hospitals, yet heavily compete with one another and public hospitals. This public v. private dynamic leaves private hospitals more amenable to external support. Additionally, there are multiple layers of administration overseeing

public hospitals under the domain of state of federal governments from participation in certain studies and non-NGO or donor-based activities.

- Were urban or semi-urban in geography. Health facilities serving urban populations see a significantly higher number of patients per day than their rural counterparts and see marginally more financially empowered patients (Kombe, et al., 2009). It was important to ensure similarity of geographic areas and patients to guard against such factors impacting the effectiveness of the network administrative organization.
- Were registered with the state and local authorities. There exist hundreds of unregistered health facilities that, on the surface, look similar to registered facilities. This requirement was meant to provide legal protection to the NAO and ensure that only valid medical practitioners were providing care within the study.
- Were composed mainly of primary care centers. Large medical centers or teaching hospitals are frequently staffed with a variety of physicians with multiple subunits and various modes of delivering care across numerous services. Private primary care centers all typically provide the same services in nearly the same manner, which reduces the variation between hospitals and networks, thereby showing a common effect from NAOs across other characteristics.
- Were each within a 45-minute driving radius of every other facility for each geographical network. For an engineered network of private

health facilities to work, there needs to be a patient catchment area that defined the confines of the network. Due to traffic irregularities in the city of Lagos, a geographic area measured by standard land mass alone can take vary in travel time from 20 minutes to 2 hours depending on location. This characteristic standardized the travel time within each network.

Facilities for Networks

Chief Medical Directors drive the day-to-day operations of each facility. Due to the influence that CMDs have, it was important to determine any significant differences amongst CMDs. A typical CMD was a male, over the age of 50, having held their positions for 5-20 years or more. Summary statistics for all CMDs and facilities are found in Tables 2.1 and 2.2 below. Differences between CMDs were minor and had no effect on study outcomes.

Table 2.1. Characteristics of Facility Chief Medical Directors

Characteristic	Net. 1 (5)	Net. 2 (11)	Net. 3 (10)	Net. 4 (9)	Net. 5 (13)	Net. 6 (7)
Age						
<18-30	0%	0%	0%	0%	0%	0%
31-50	11%	14%	18%	0%	15%	10%
51-60	33%	43%	36%	80%	31%	60%
>60	56%	43%	45%	20%	54%	30%
Gender						
Female	11%	0%	0%	0%	8%	0%
Male	89%	100%	100%	100%	92%	100%
Time as CMD						
<1 year	0%	0%	9%	0%	8%	0%
1-5 years	11%	0%	18%	20%	15%	10%
5-10 years	22%	43%	9%	40%	31%	30%
10-20 years	44%	43%	36%	20%	23%	40%
>20 years	22%	14%	27%	20%	23%	20%

Table 2.2. Summary Statistics of Network Facilities (N=55)

	Average	Min	Max	Median
Total No. doctors	2.54	1	5	2
Minimum doctors per shift	1.39	1	5	1
Total No. registered nurses	2.52	0	5	2
Total beds	17.49	4	50	15
No. of outpatients (daily)	20.36	4	100	13.5
No. of admissions (daily)	2.64	0.7	7	2

Quantitative Assessment

The case survey approach utilized in this study ensured that multiple levels of analysis—individual, firm, and network—were triangulated to gain a multidimensional picture of each case. For each of the six NAO-governed networks, similar data and data collection methods were used based on the methodology of past network effectiveness assessment studies (Provan & Milward, 1991; Provan & Milward, 1995). Under this comparative case design for each of the six networks, qualitative interview and quantitative questionnaire data were collected from individuals and firms and aggregated by network to first show summary characteristics of each system and second compare across all systems. Data were collected from late Q1 2014 to early Q4 2015.

Central to this analysis was the questionnaire used to determine performance by individual personnel at the hospitals and the six network facilitators (one facilitator per network). Questionnaires were handed to each of the personnel at each hospital, as in-country email and telephone communications are often unreliable. The Chief Medical Director (CMD) and two head nurses at each hospital received questionnaires. A network facilitator for each network, the individual from the NAO in charge of day-to-day management activities, also received questionnaires. Prior to receiving the

questionnaire, hospital CMDs and nurses were notified of the coming questionnaire at network meetings and one-on-one interviews. The survey was presented together with a letter of support from the lead of the Not-For-Profit (NFP) to reiterate the purpose of the survey and ensure confidentiality of information. Respondents were not expected to fill out surveys immediately upon receiving them but rather were given time to review the information before an interview session was held to verbally answer questions. This was done because previous interactions indicated some difficulty with respondents' ability to accurately understand and answer written materials. The largest obstacles to accurate response to questionnaires were the slight differences in written and spoken language, resulting in some participants' hesitation to the use of printed documents. Although English is the country's primary language, the type of English spoken in many areas more closely resembles broken English—"Pidgin"—than it does the formal English language. Additionally, although hospital staff members are by and large more educated than the national average, local survey implementers were advised to use verbal delivery of questions during early testing of survey materials. This approach resulted in consistency of understanding, accuracy of interpretation, and precision of responses, decreasing the potential for biased results.

Questionnaires were collected after each interview and responses were checked by study investigators. Investigators worked closely with two local clinically trained medical doctors who hold backgrounds in hospital administration to review the data and discuss any inconsistencies in participants' responses. If any information was found missing or data seemed inaccurate, follow-up interviews were held between the participants, the NAO network facilitator who performed the initial survey, and one of

the local doctors. Field notes from network meetings were also used to cross-reference any questionable information received and follow-ups with other members from the same hospital were occasionally performed to triangulate information. The full data collection process took 18 months to complete, with final response rates of 93% amongst all contacted facilities with few missing points of data, aside from those facilities that dropped out of the study. The core survey data retrieved was part of a larger body of work on the creation of networks. Data collectors thus visited each site several times over the course of the collection period, up to four visits per hospital per month.

Operationalizing Network Performance

Network performance was analyzed through the use of data from one lead and two front-line staff members at each hospital: 16 participants from Network A, 34 in Network B, 31 in Network C, 28 in Network D, 40 in Network E, and 22 in Network F. These staff members were composed of one Chief Medical Director (CMD) and two lead nursing staff member from each facility. CMDs were chosen because of their senior leadership status as owner-operators of facilities, who nearly always had the final decision on all actions taken at their respective hospitals. Lead nurses were chosen due to their central role in day-to-day clinical care at each hospital. Given the relatively small size of these hospitals compared to their developed-country counterparts, retrieving information from these two key informants gave a nearly full view of the activities of a hospital. To supplement the information received from CMDs and nurses, the one network facilitator from each of the six networks was also presented with the same questions on their perception of the NAO's effectiveness, resulting in six total facilitators as respondents.

To measure network performance and network context, I reviewed several previous studies on network performance and effectiveness (Agranoff & McGuire, 2001; Provan & Kenis, 2007; Provan & Milward, 1999). Few other studies have developed surveys to measure network performance and contextual characteristics. I used methods of assessing networks at the organizational level to create a survey that measures the perceived facility outcomes along multiple dimensions. The survey instrument includes constructs that are designed to capture measures of network performance, and items adapted for the health care (Turrini, Cristofoli, Frosini, & Nasi, 2010; Ferlie, Fitzgerald, McGivern, Dopson, & Exworthy, 2010; Guthrie, et al., 2010; Bravi, et al., 2013). Items that were not initially created for the health care setting were reviewed and modified for application to hospitals. Specific measures included those identified as key elements for network development and performance, namely: administrative structure, service delivery, quality improvement, resource acquisition, impact, and cost, among other measures. Items that are correlated with future patient outcomes were captured through questions regarding development and implementation of patient safety and quality improvement policies and processes. Survey items also touched on perceptions of operational obstacles and the impact of activities. These key factors of effectiveness, administrative structure, resource acquisition, cost, and quality policy implementation, were the main focus. The dependent variable, perceived performance, was captured in the survey through items focusing on member perception that the partnership is effective in accomplishing highly valued objectives, as originally presented in existing definitions of performance within the Partnership Self-Assessment Survey (PSAS I) and the Coalition Self-Assessment Survey I, developed in previous studies of health network and

partnership performance (Hasnin-Wynia, et al., 2003; Kenney & Sofaer, 2000). Items forming the core of the questionnaire were verified and strengthened during meetings held with a small team of local medical practitioners and members of international hospital improvement organizations, including the Institute for Healthcare Improvement.

The initial survey instrument consisted of 131 items, measured using a five-point Likert response scale from 1=strongly disagree to 5 = strongly agree, with a midpoint of 3=neutral. Fewer than ten of these original items used a frequency scale, with responses in the form of always, frequently, sometimes, rarely, never, and one open-ended area was available for respondents with additional comments. This initial questionnaire was tested by three pilot groups in early 2014, resulting in adjustments in wording for questions deemed ambiguous as well as a substantial reduction of included items due to strong intercorrelations or redundancy of questions. This process produced a 36-item questionnaire that was administered to network participants and reflected the elements from the initial version.

Results

Following data collection, results from all subjects were pooled and factor analyses were performed to test for similarities in perspectives within and across the groups. An exploratory factor analysis using Principal Component Analysis (PCA) (Fabrigar, Wegener, MacCallum, & Strahan, 1999; de Winter & Dodou, 2016) was performed to determine the factors that reflected network participants' perspectives of NAO performance. The sample size was adequate for this method following guidelines set by Kass and Tinsley (1979), and the KMO measure of 0.750 reflected adequate sampling to yield distinct and reliable factors. To account for the possible correlation

among factors, promax oblique rotation was used, and the number of factors extracted under Kaiser normalization where the number of eigenvalues > 1 . The PCA based on Kaiser criterion and with oblique rotation resulted in 11 factors being identified that explained 68.4% of the total variance. These factors were examined for their correspondence to identified network characteristics; the first five were recognizable elements of network performance. An initial scree plot also showed an inflection on five components. Thus a follow-up analysis was performed where the number of factors was restricted to five. All factors with loadings < 0.4 were excluded from the final analysis to guarantee factor convergence and assist interpretation. Statistical analyses were performed primarily using SPSS v.23.

Analysis indicated that perspectives on network performance fell primarily into five factors (Table 2.3.). The first factor included measures relating to the appropriateness of services, accounting for 21.1% of variance in all the client-reported items. A second factor comprised items related to perceptions of participant interactions, while a third centered on homogeneity of facilities' external environment. Both of these factors address participants' perception of diversity and cohesion within their immediate community. Together, they explained 26.7% of the variance in all the client-reported items. A fourth factor related to participants' perception of resource assistance from the NAO, and the fifth to availability of local financial resources. The five factors together explained 65.9% of item variance.

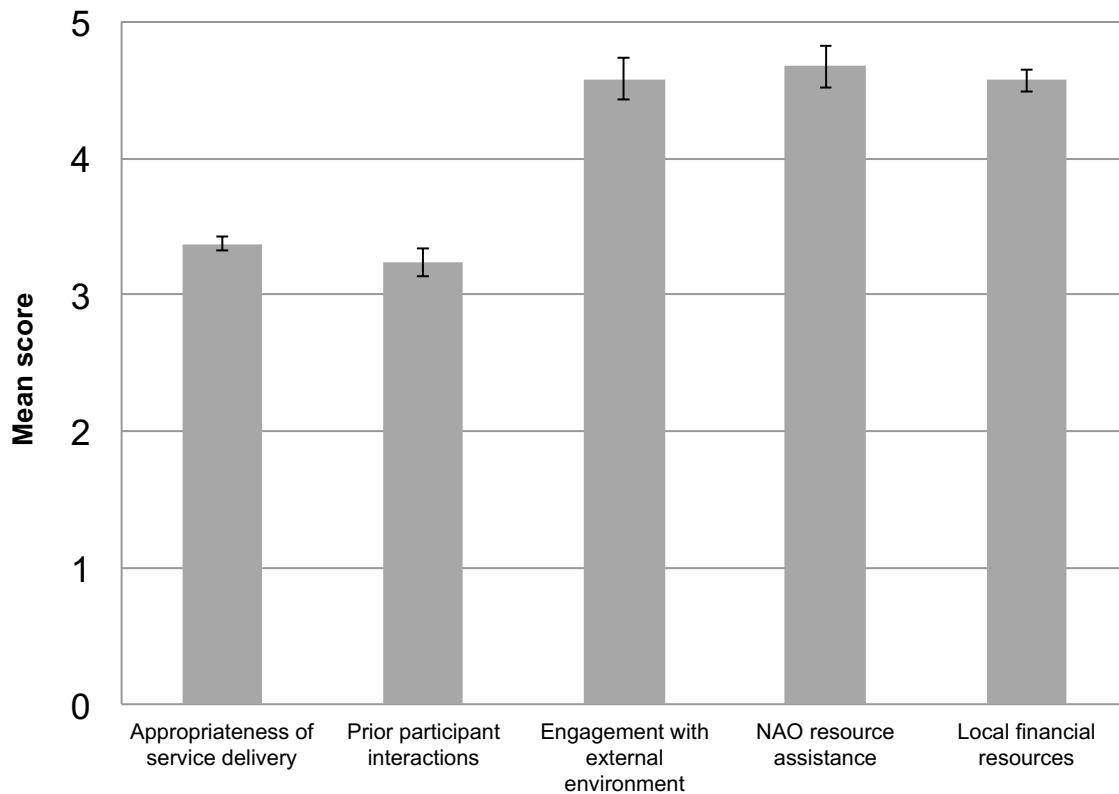
Table 2.3. Five-factor model obtained with EFA (N=171)

(items, mean score, std. dev., loadings, Cronbach's alpha/Cronbach's alpha if item not included)

Item	Mean	Std. Dev.	Loading	α
Factor 1: Appropriateness of Service Delivery; Policy Development & Implementation (8 items)				
“The network with the NAO is effective in that...”				
Care provision is carefully coordinated among care units	3.30	1.133	0.939	0.813
Helps lower the cost for health care or reduce growth in costs	3.30	1.107	0.925	0.814
Medical practice is evidence based and care is excellent from a technical point of view	3.36	1.136	0.914	0.817
Care is delivered in a manner that is best for patients	3.39	1.145	0.903	0.818
Contributes to provision of more efficient, high-quality health services	3.38	1.117	0.871	0.813
Contributes to offering basic services to improve the health of the population	3.37	1.085	0.853	0.813
Contributes to offering advanced services to improve the health of the population	3.43	1.079	0.846	0.815
The NAO takes account of our point of view when developing policies; Clearly and strongly represents the interests of its member facilities	3.43	1.090	0.832	0.815
Factor 2: Participant interaction; Previous collaboration (6 items)				
I am familiar with the other hospitals in this environment	3.08	0.942	0.933	0.820
The other hospitals in this environment are fine to work with	3.12	0.977	0.909	0.821
The other hospitals in this environment will not cheat me if we work together	3.30	0.988	0.906	0.821
The other hospitals in this environment are comfortable with each other	3.32	1.004	0.894	0.821
I have heard good things about working with other people from this environment	3.30	1.034	0.891	0.821
It is good to work with people from this environment because we are all from the same place	3.29	1.009	0.873	0.822
Factor 3: Uniformity of external environment; Network diversity (8 items)				
People in this environment are very similar in customs and manner	4.63	0.484	0.843	0.826
People in this environment understand each other when they are talking	4.57	0.508	0.812	0.827
We receive patients mostly from only this environment	4.53	0.500	0.809	0.826
This environment has been with the same type of people for some time	4.59	0.516	0.756	0.827
People in this environment are not very different from people in other environments that are close	4.58	0.518	0.755	0.828
It is difficult for us to see and treat patients from other environments that are very different	4.55	0.511	0.742	0.826
The key leaders in this environment reflect the majority of people here	4.60	0.504	0.733	0.826
There are plenty of people in this environment who frequently work together	4.57	0.509	0.668	0.826
Factor 4: Resource Assistance from NAO (8 items)				
The hospital should receive some informational resources from the NAO	4.85	0.354	0.794	0.828
The NAO should provide supplies to improve the hospital	4.74	0.452	0.792	0.831
The hospital should receive some physical resources from the NAO	4.73	0.461	0.771	0.829
It is difficult to make plans for the future without currently having enough resources	4.73	0.461	0.722	0.832
I like the support we currently receive from the NAO	4.81	0.396	0.691	0.828
Support from the NAO has improved our likelihood of accessing funds	4.64	0.506	0.622	0.830
The NAO should provide funds to the hospital	4.45	0.737	0.488	0.834
Activities through the NAO has built our capacity to better deliver services	4.44	0.737	0.463	0.836
Factor 5: Lack of Local Financial Resources (6 items)				
The high cost of quality improvement prevents us from implementation	4.63	0.532	0.860	0.832
Not enough financing is available locally to support improving the hospital	4.60	0.549	0.820	0.832
Quality improvement is financial costly	4.52	0.697	0.754	0.835
The cost of implementing improvements is high	4.61	0.524	0.728	0.834
Lack of financing affects the hospital's ability to properly perform activities	4.51	0.698	0.726	0.835
The hospital will perform better once it has adequate financing	4.57	0.541	0.663	0.833

The third, fourth, and fifth factors (*Uniformity of external environment; NAO resource assistance, Lack of local financial resources*) had the highest mean scores (\pm SD), 4.58 ± 0.05 , 4.67 ± 0.15 , and 4.57 ± 0.08 , respectively. This indicates that these factors may be considered as the most important NAO performance characteristics from the network participants' perspectives (Fig. 2.2.). Paired t-sample tests between pairs of factors showed that all differences in average scores were significant at the $p < 0.01$ level.

Figure 2.2. Mean and standard deviation of scores for the five factors



To determine network-by-network differences in perception of NAO performance, factor scores for each of the five factors were again calculated and survey participants were categorized by network. The different networks were compared based on each of their respective factors scores for the five network performance measures. The ultimate factor scores are reported in Table 2.4. and used as the measures for network performance.

Broadly, network facilitators, CMDs, and hospital staff perceived the NAO at being most effective at achieving performance objectives in Network F and least effective in Network A. However, each measure of effectiveness was perceived differently by the networks, with no consistent pattern of “best” or “worst” performance across the board. *Appropriateness of service delivery* and *uniformity of external environment* were polarizing measures, where participants in Network F indicated high performance of the NAO on these measures, while those in Network C indicated poor performance. Also polarizing was the *lack of local financial resources* factor, where participants in Networks A, C, and E viewed significant financial obstacles to undertaking network activities, while Networks B and F did not perceive a preventatively high cost.

Table 2.4. Network-by-Network Performance

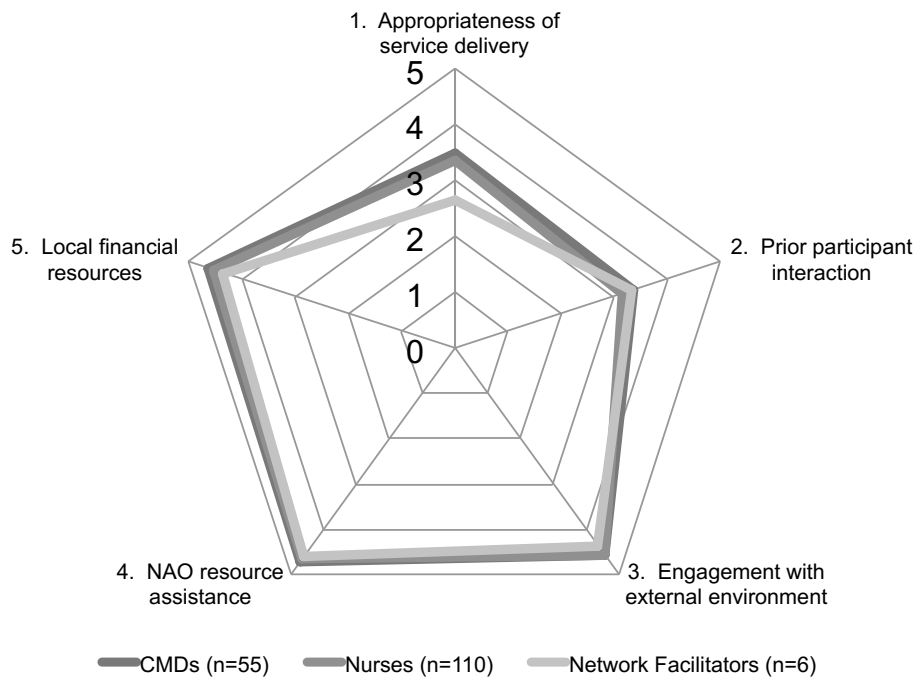
Responses: Factor Scores of Participant Network Scales (N=171)*						
Measure	Net. A (N=16)	Net. B (N=34)	Net. C (N=31)	Net. D (N=28)	Net. E (N=40)	Net. F (N=22)
Appropriateness of service delivery	-.703 (B,D,F)	.424 (A,C,D,E)	-.635 (B,D,F)	1.042 (A,B,C,D)	-.796 (B,D,F)	.871 (A,C,E)
Participant interaction	-.179 (D+)	-.256 (D)	-.071 (D+)	.556 (A+,B,C,E)	-.190 (D)	.252
Uniformity of external environment	-.021 (F)	-.370 (D,F)	-.456 (D,F)	.448 (B,C,E)	-.037 (D,F)	.726 (A,B,C,E)
NAO resource assistance	-.062	-.012	.210	-.154	.023	-.077
Lack of local financial resources	.354 (B,F)	-.729 (A,C,D,E)	.442 (B,D,F)	-.091 (B,C,E)	.404 (B,D,F)	-.371 (A,C,E)

*Sample size indicates the total number of participants from and whom performance data were retrieved within each network.
When a mean factor score for specific network is significantly different ($p < .01$) from the score from other networks, the network number follows the score, indicating the significantly different network (i.e. B = Network B). A number with + indicates $p < .05$.

Primary analyses showed that there was much overlap in the perceptions given by each group—CMDs, nurses, and network facilitators—typically showing no group having a perspective distinctly different from the others. Comparisons among these three stakeholder groups showed that NAO performance was largely perceived similarly across all groups. CMDs tended to report the highest mean score and NAO facilitators the lowest. A significant difference between groups was seen on the factor score *appropriateness of service delivery*, with network facilitators reporting much lower scores on average than CMDs and nurses (Figure 2.3.). While the original aspiration was

to combine different aspects of network performance into a single composite score, reflecting the cumulative performance of all measures from all perspectives, the approach taken showed that there were slight differences in the views from CMDs, nurses, and network facilitators. The similarity in perspectives from CMDs and nurses is in line with what would be expected due to the similarities between their experiences with the NAO. With only one facilitator per network in the data sample, the small number of network facilitators represented in the study may obstruct a true reflection of the group’s perspective. However, due their position as representatives of the NAO, an overestimation of the performance of the network would be understandable if expressed, but that was not seen and no statistically significant differences in the responses of NAO representatives as compared to other respondents was seen.

Figure 2.3. Radar graph showing the scores for five measures by professional group



The findings across the networks made it possible to compare networks and draw conclusions on their perceptions of NAO performance. Some of the factors showed some similarities and were related enough to be merged into a combined dimension of network performance. *Participant interaction* and *uniformity of external environment* factors suggested aspects of network contextual characteristics reflecting community cohesion. These two factors were, therefore, combined into a single dimension. *NAO resource assistance* and *lack of local financial resources* factors displayed characteristics of resource scarcity as a contextual factor, and these two were also combined into a single dimension. The pattern of the *appropriateness of service delivery* was distinct from the other factors, and remained in a category of its own. Averages of the two sets of two factor scores were computed and placed along a spectrum to determine relative effectiveness (Table 2.5.). Results from this approach indicate that NAO performance in Network C is perceived the worst by those participants, followed by Network A and Network E. NAO performance in Network F was perceived the best, closely followed by NAO performance for Network D.

Table 2.5. NAO Performance by Composite Network Contextual Measures

Relative Performance: Average Factor Scores of Specific Dimensions (N=171)						
	Net. A (N=16)	Net. B (N=34)	Net. C (N=31)	Net. D (N=28)	Net. E (N=40)	Net. F (N=22)
Appropriateness of service delivery	-.703	.424	-.635	1.042	-.796	.871
Composite: Community cohesion	-.100	-.313	-.264	.502	-.114	.489
Composite: Resource scarcity	.146	-.371	.326	-.123	.214	-.224

The results of network performance are aggregated from hospitals across networks. The aggregated “overall” score for each variable is calculated by determining the average across all ratings of network participants within a network. With networks as the unit for analysis (N=6), this relatively small sample size is better suited for descriptive analyses of relationships between variables and bivariate analyses.

Table 2.6. Means of Measures, Total

Means: Dependent and Explanatory Variables (N=6)		
Dependent Variable	Mean	SD
Appropriateness of service delivery	3.372	0.994
Contextual Characteristics		
Participant interaction	3.235	0.895
Uniformity of external environment	4.577	0.388
NAO resource assistance	4.673	0.341
Lack of local financial resources	4.572	0.455

Table 2.7. Means of Measures, by Network

Relative Performance: Average Raw Scores of Specific Dimensions													
Dependent Variable	Network A		Network B		Network C		Network D		Network E		Network F		
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
Appropriateness of service delivery	2.62	0.48	3.78	0.88	2.76	0.42	4.75	0.30	2.59	0.46	4.26	0.87	
Contextual Characteristics													
Participant interaction	3.12	0.76	3.00	0.93	3.18	0.83	3.71	0.96	3.06	0.77	3.48	0.96	
Uniformity of external environment	4.57	0.39	4.44	0.40	4.40	0.42	4.75	0.30	4.56	0.38	4.85	0.15	
NAO resource assistance	4.61	0.37	4.65	0.33	4.78	0.30	4.58	0.41	4.73	0.31	4.61	0.33	
Lack of local financial resources	4.74	0.33	4.22	0.51	4.79	0.24	4.52	0.47	4.77	0.33	4.41	0.47	

Table 2.8. Relationship between Perceived Performance & Network Context

Relationship Correlations and Significance		
Variable	Corr.	p <
Participant interaction	0.79	0.06
Uniformity of external environment	0.67	0.15
NAO resource assistance	-0.66	0.15
Lack of local financial resources	-0.72	0.12

The outcome of network engagement is different across each network, raising the question of why and how a singular NAO is perceived as performing differently under different network characteristics. To determine this, in-depth case studies of each network were performed and qualitative data was extracted to shed light on the differences experienced across networks. The results of these cases studies are included in the discussion below.

Details from cases of each network's development provide needed insight on phenomena taking place across the different networks and driving results. First, the raw factor scores and the average survey scores on *appropriateness of service delivery*, serving as our performance measure, indicated that Networks D and F are the two highest performing networks as perceived by their participants, while Networks A, C and E were the worst performing. This is in line with what was seen on-ground as the NAO was engaging in network activities with each network. Facilities in Networks D and F consistently executed on quality improvement activities more thoroughly and in a faster time frame than other networks seen to be low performing. In weekly reports and team meetings with NAO staff, facilities in those networks were viewed as better at implementing network activities that increased the coordination of care among hospital

units and between network facilities. Networks shown to be high performers in this study were also reported as having facilities that more actively engaged with the NAO to leverage each other's resources and capabilities to bring down the cost of care delivery, as well as more frequently providing input and feedback to the NAO.

Low-performing networks A, C, and E displayed low levels of community cohesion and high levels of resource scarcity. Coded reports from board meetings of these networks showed higher usage of words and phrases describing the high cost of implementing NAO activities and the need to retrieve high profits from participation in the network. This focus on lack of resources was also seen through economic assessment of the local environment, where a slightly higher rate of borehole use (as opposed to piped water) was seen compared to other networks. The higher rate of requests for resource support from the NAO indicates that the lack of resources is a major impediment to network performance for participants.

A result of interest and is that of Network B, where despite very low levels of community cohesion and high levels of resource scarcity, the network has moderate performance. One would expect that with lower community cohesion, lower overall network performance would be seen. Though Network B's performance is lower than others with similar levels of cohesion, its moderate performance seems to indicate a stronger influence of resource munificence on performance than community cohesion. To explain this result, the social and cultural dynamics within Network B must be further explained. Network B was located in an area of the city where the rate of facility specialization was slightly higher than other areas, resulting in slightly above average profitability of individual facilities before the NAO created a network. Due to

specialization, facilities were more inclined to share and refer patients amongst each other. However, there still existed negative perceptions of inter-facility interactions, which were potentially related to the low uniformity (high diversity) of the external environment in Network B. Despite its community diversity, results indicate that Network B performed moderately well because it was well-equipped and had sufficient resources to undertake the activities and objectives sought by the NAO. Notably, approximately 12 months into the 18-month study, a drop in attendance of board meetings between network facilities and the NAO was seen amongst Network B members. NAO facilitators noted that CMDs from Network B were meeting on their own, without the NAO present, to discuss how to execute activities learned from the NAO and implement quality improvement activities to serve their own purposes. In team meetings, study investigators discussed the dynamics of Network B and concluded that, due to the additional resources made available locally within the network and its environment, CMDs from Network B were attempting to use the NAO for learning early-on, and subsequently attempting to detach from the NAO and apply those learned improvement activities on their own. For such hospitals, one result of higher resource munificence is being able to benefit from the knowledge and learning capabilities provided through the NAO, but not having to rely on the NAO for financial resources or goods/supplies.

Discussion

As previously stated, the central question driving this study is whether network context, specifically community cohesion and resource munificence, is related to network performance, keeping network structure constant under the NAO governance form. To

date, no other studies have explored the impact of contextual characteristics on performance while keeping the structure of the network constant. This study provided a preliminary assessment of perceived performance of the network based on participants' responses aggregated at the network level. Although there are simply not enough network-level data points to isolate definitive relationships, the low significance of some of the correlations at such a small sample size can still shed some light on the dynamics taking place. Results indicate that there may be a positive relationship between community cohesion and network performance—the more positively participants view collaborating with others in their network, the better the performance of the network, and similarly, the more uniform the facility's external environment, the higher the network performance. Conversely, results also pointed to a negative relationship between resource scarcity and network performance.

Significance levels of the relationships between performance and contextual characteristics were largely low, varying from 0.06 to 0.15. This is unsurprising due to the small sample of networks available for assessment. The most statistically significant explanatory variable in this analysis related to the perceived *participant interaction*, which also had the highest correlation coefficient. This was followed by *lack of local financial resources*, which also had the second strongest absolute correlation coefficient. This may suggest that these two variables have the strongest and most important relationship to performance.

This pattern of relationships is expected based on what has been seen in previous studies that developed models for network performance and its relationship to structural and contextual network characteristics. These findings shed light on how network

performance relates to network characteristics in the health care setting, and can inform future work with larger sample sizes by showing which variables may need closer examination. We see that though sub-measures of each community cohesion and resource munificence have been historically grouped together, there may be aspects of each contextual factor that are more salient than others.

Creating networks of health facilities does, undoubtedly, require both resources for execution and a supportive community environment to perform successfully. While it was already known that different network structural characteristics of a network can result in different performance outcomes (Cristofoli & Markovic, 2016; Marafioti, Mariani, & Marini, 2014; Provan & Milward, 2001), the impact of a single network governance structure across multiple networks had not been previously explored until now. Moreover, the effect of specific contextual characteristics had not been previously derived. Moving forward, a better understanding these relationships from a larger number of networks is necessary. Additionally, other underlying social dynamics may be affecting network contextual characteristics. Although not contextual characteristics, non-structural forces like frequency of interaction through the NAO and development of trust amongst network participants may strongly influence the performance of networks and, therefore, need to be studied alongside network contextual characteristics.

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CHAPTER 3

CHAPTER 3. The Influence of Shared Activities and Trust on Network Performance: Differences across network administrative organization-governed networks

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The influence of shared activities and trust on network performance: Differences across network administrative organization-governed networks

Abstract

Context: Similar forms of network governance can result in different outcomes for each network. Differences in the effect of network governance activities on network participants may depend on network characteristics that are out of the control of network managers. In the healthcare setting, understanding why a network administrative organization may be successful in one network and perform poorly in another is important for improving management approaches and having more successful patient outcomes. Trust, both trust among network participants and trust between participants and the NAO, is viewed as an important condition in inter-organizational relationships since it fosters information exchange and increases learning amongst network participants. Since trust amongst facility leaders is a key aspect of network relations that may explain differences in network performance, the relationship between trust and performance needs to be explored.

Objective: To describe the creation and development of multiple networks by one single network administrative organization, to identify the relationship between shared activities, trust, and network performance amongst health facilities, and to determine whether the effect of shared activities—defined as network management activities initiated by the NAO for the purpose of achieving network objectives—is mediated by trust levels in networks.

Data sources, Setting, and Participants: Primary data was collected between April 2014 and October 2015. In-depth case studies of the 6 networks created from local Nigerian hospitals provided interview, meeting, and observation data from the field. 165 staff members from 55 Nigerian private hospitals and clinics completed a survey through verbal interviews for accuracy of responses. Structural equation modeling was performed to identify the relationship between trust, shared activities, and performance amongst health care facilities in NAO-governed networks.

Principal Results: Networks with higher frequency of interaction and participation at shared network management activities showed significant, positive relationships with indicators of performance. This relationship is partially mediated by trust. However, structural visualization of shared activity relationships indicate that very low levels of trust and low performance results in complete network breakdown, whereas relatively high levels of trust with high performance can lead to network self-governing.

Conclusions: Results indicate that moderate to high levels of trust between participants is optimal for NAO activity implementation and improves network performance in terms of executing network activities and achieving network aims. Low engagement in shared activities can lead to low levels of trust amongst participants, resulting in poor network performance. Findings also suggest that very high levels of trust amongst participants can result in a network self-governing and no longer utilizing the NAO, while low levels of trust amongst participants results in network collapse.

Keywords: Networks, network governance, management, performance, trust

The influence of trust on network performance: Differences across network administrative organization governed networks

Background

Despite potential financial and social benefits to working collaboratively, many organizations continue to operate as independently detached silos rather than engage with others. Particularly in developing countries, the advantages of being a member of business groups or other inter-organizational relationships can be profound for companies, in many instances leading to increased profitability and performance (Carney, Gedajlovic, Heugens, Van Essen, & Oosterhout, 2011; Khanna & Rivkin, 2001). Networks of organizations have been increasingly studied with regard to their performance, and the impact that the network's governance form may have on measures of performance is increasingly being explored. Network governance ranges from decentralized and internally managed forms to highly centralized and externally managed network administrative organizations (NAOs).

A NAO is "a separate administrative entity set up specifically to govern the network and its activities" (Provan & Kenis, 2008) and focuses on driving and supporting network participants to achieve the aim of the network. While it is clear that the performance of networked organizations often improves when compared to stand-alone firms, what is less clear is the impact that different network governance forms may have on performance (Agranoff & McGuire, 2001; Holm, Eriksson, & Johanson, 1999). Based on lessons drawn from other industries, managers in healthcare networks have sought governance strategies to improve the performance of networks of interconnected health delivery organizations. Network managers often engage participants in collaborative network activities, aiming to increase the connections between health

facilities in order to leverage the resources and capabilities of the combined group to improve the cost and quality of care delivery. However, mediating factors, such as trust amongst network participants, can limit the effectiveness of inter-organizational networks (Adler, 2001; Klijn, Edelenbos, & Steijn, 2010).

Given the complexity of network relationships, it is presumed that higher levels of inter-organizational collaboration will be associated with improved trust, and thereby better performance of individual firms. Literature on trust has indicated that trust reduces uncertainty, fosters the exchange of information and transfer of knowledge, and stabilizes relationships between firms (McEvily & Zaheer, 1999; Connelly, Miller, & Devers, 2012). However, though there is some evidence in network studies to indicate that trust is beneficial for network performance, empirical studies on the subject are still in short supply (Klijn, Edelenbos, & Steijn, 2010; Willem & Lucidarme, 2014). Increasing the body of knowledge on the relationship between trust and network performance will be beneficial for developing effective organizations and fostering beneficial network relationships that are best positioned for success. Managers of networks would be able to use such information to make decisions on network activities and increase successful implementation of network activities.

In this study, I examine the association between measures of collaboration, participant trust amongst each other, and measures of hospital performance. This study was performed by combining data from surveys that measured perceptions of trust among Chief Medical Directors (CMDs) and nurses from network facilities with measures of network management strategies and network performance. Shared activities between members of the same network measure the number of network management strategies

employed by the NAO for each network. As quality improvement (QI) is a key objective of the NAO, shared activities specifically include actions which develop the norms of the network around implementing QI exercises and measures that help network participants collaborate to produce QI goods and services. As network members engage in more of these shared activities, the levels of trust are thought to heighten, and performance of the network is assumed to increase.

Literature Review and Hypothesis Development

Theoretical Framework of Trust

The complexity of interactions in networks and the obstacles to coordination between organizations makes trust a relational characteristic that potentially improves the performance of networks of firms. Trust has been defined in a number of different ways in the literature. Common characteristics of trust have been identified as vulnerability to opportunistic behavior, risk, and expectations (Rousseau, Sitkin, Burt, & Camerer, 1998). Central to the concept of trust is that when trust arises between two actors, involved parties expect each other to eschew opportunistic behavior, even in instances when it may be beneficial to them (Luhmann, 2000). These aspects of trust are particularly important when actors face risk or uncertainty. For instance, management literature pays special attention to trust in international alliances, research and development, and innovation relationships between firms (Krishnan, Martin, & Noorderhaven, 2006; Gulati & Nickerson, 2008), which are inherently unpredictable situations with unknown results. Firms in such industries undertake activities where actors are in search of potentially profitable new products or innovative processes, but cannot foresee the outcomes. Since the future is unknown, agreements are difficult to navigate ex-ante, so trust plays a large

role in attaining successful outcomes. Trust is thus defined here under the commonly accepted literary definition as “actors’ more or less stable, positive perception of the intentions of other actors; that is, the perception that other actors will refrain from opportunistic behavior” (Rousseau, Sitkin, Burt, & Camerer, 1998; Klijn, Sierra, Ysa, Berman, Edelenbos, & Chen, 2016). Trust, therefore, is a facilitator for making risky choices and encourages actors to take actions they may otherwise resist if trust were lacking, particularly in high-uncertainty situations (Gambetta, 1988). Similar to other industries where inter-organizational trust is important, health care delivery is performed within a high-risk environment with substantial uncertainty. Trust is critical amongst networks of health care organizations attempting to collaborate due to the lack of clarity of outcomes. Trust amongst actors is even more important for firms in developing countries due to poorly functioning institutions and lack of information on other actors (Carney, Gedajlovic, Heugens, Van Essen, & Oosterhout, 2011; Khanna & Palepu, 2000). Developing and sustaining trust is thus a key aspect of successful performance for networks of health care organizations in developing countries.

Hypotheses and conceptual model

Work from previous studies supports the idea that trust plays a critical role in the performance outcomes of networks of organizations. Increased levels of trust between actors engaging in collaborative activities have been shown to stimulate the exchange of information and knowledge (Barney & Hansen, 1994; Parker & Vaidya, 2001). Since the presence of trust creates greater predictability amongst actors, networks with more trust experience reduced costs related to the development and execution of contracts (Kramer & Tyler, 1995; Sako, 1998). It has also been argued that trust can increase the

likelihood of actors investing their resources, such as financial capital, intellectual capital, and human capital, into collaborative efforts, thereby increasing the strength of such relationships (Ring & Van De Ven, 1992; Phelps, 2010). With increased trust, both the amount of investment and the effort actors place into relationships are increased.

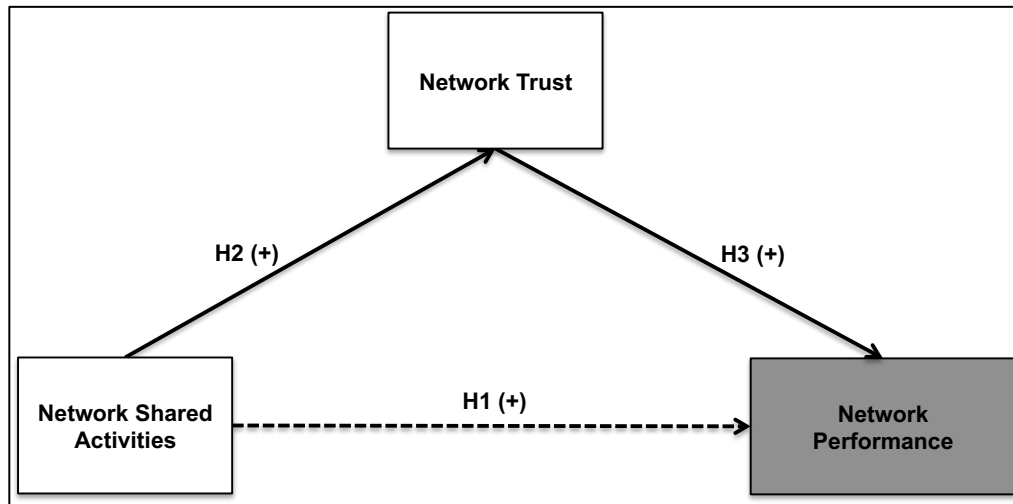
Another argument made relating trust to network performance is its ability to motivate learning, knowledge, and information exchange. While explicit knowledge can be easily replicated and transferred to other parties, the tacit part of knowledge is difficult to reproduce and often only accessible in the form of human capital through collaboration and exchange (Spender, 1996; Leonard & Sensiper, 1998). With multiple organizations involved in the creation and dissemination of knowledge, networks can generate more information and better address issues, which increases the performance of firms involved. Trust strengthens the ties amongst network organizations and enables them to exchange such information more easily and directly. Through mechanisms of reducing transaction costs, fostering investment, increasing the production of knowledge and cultivating the sharing of information, trust can improve the performance of actors entered in inter-organizational relationships.

Both network participants and network managers play roles in increasing trust through engaging in activities that support trust. NAOs have the explicit purpose of ensuring network aims are met and they achieve these aims primarily through network management activities. As compared to when they operate alone in silos, a web of networked participants will be involved in a higher number of collaborative engagements and activities that require repeated interaction between participants and organizations. Network participants interact with each other and with the NAO, with increased

frequency of interaction leading to higher levels of trust based on reciprocal familiarity and mutual investment of resources. Thus, network activities that increase the number of shared connections amongst network participants are likely to generate more predictability in interactions and set expectations of good outcomes. The NAO attempts to initiate and facilitate interaction amongst network participants, with increased frequency of interaction leading to the development of more trust.

From previous work studying trust in inter-organizational networks, it is expected that a positive relationship exists between trust and network performance. In this study, network participants under the NAO are concurrently engaged in the same supportive services and provided similar supportive resources. The NAO attempts to achieve its primary objectives through network management activities and by engaging all network participants. Improving quality of care, better coordination of care, and creating efficient processes are vital to the NAO's network-wide goals. Getting participants to work more collaboratively, as opposed to independently, is a large aspect of the NAO's network management activities. The number of network participants' shared activities acts as an indicator of the intensity of network management effort by the NAO. Given the need for trust in interpersonal and inter-organizational engagements, a positive relationship between the level of network participants' shared activities and the level of trust amongst network participants is also expected.

Figure 3.1. Relationship of trust and shared activities on network performance



This study has three hypotheses:

- (H1) Networks showing higher scores on measures of shared activities will be more strongly associated with higher levels of performance than those with low shared activities
- (H2) Networks with a higher score on shared activities will be associated with higher levels of trust than those with low scores on shared activities
- (H3) Networks showing higher scores on measures of trust will be more strongly associated with high levels of performance than those with low network trust

Figure 3.1. presents the conceptual model with the three hypotheses and their underlying relationships.

Two approaches were taken to gain insight on the influence of trust on network performance—a qualitative in-depth case analysis to help develop theory around the

phenomenon, and a quantitative study of measures of trust and network performance. For case analyses, utilizing multiple sites to support theory development has been seen in the literature through the assessment of multi-network case studies in various industries (Ysa, Sierra, & Esteve, 2014; Müller-Seitz, 2012). Specific to the health care industry, Milward et al. (2009) used two mental health networks as settings for their comparative analysis for governance mechanisms (Milward, Provan, Fish, Isett, & Huang, 2009). Marafioti, Mariani, and Martini (2014) also opted for a multi-network governance assessment using case studies in the health care setting to determine the relationship between network governance models and performance. Following these examples, and addressing the need for more multi-network assessments on governance, this study builds on previous theories and shifts the focus to the impact of a single governance model applied to several sites. Therefore, multiple in-depth case study assessments of several networks under the same NAO-governance entity can provide a meaningful addition to current knowledge on health care specific network governance, trust, and performance.

To develop an understanding of how trust and performance interact under NAO-governed networks, a qualitative comparative case study of all six networks was performed. While the results of assessments of the performance of individual units and entire networks provides insight into the structures and processes across both single and multiple organizations, they are unable to provide clarity on how networks may adapt and redesign their governance structures in response to existing trust relationships. To examine the differences in trust between networks, multiple networks were used and multiple sites analyzed through comparative case analysis and social network analysis visualizations (Vargo, O'Brien, & Griffith, 2003; Sato, 2016; Borgatti & Everett, 1997).

While analysis of all six network in this study examines the effect of the NAO-governance and trust on network performance, outcomes from two networks that moved away from the NAO governance provide a more complete understanding of variations in the persistence, change, or failure of NAO-governance across different networks. The motivating question behind this particular stream of analysis is, “What conditions of trust account for the rejection of the NAO-governance model and cause networks to evolve into a different form of governance?” Answering this question will relate the assessments being performed to existing studies in the literature that show that the form of network governance is dynamic rather than static, and is therefore subject to possible changes over time (Provan & Kenis, 2008; Huggins, Izushi, Prokop, & Thompson, 2015). However, though this is an important area of research with significant outcomes for the practice of network governance, this assessment of network governance evolution should be viewed as “nascent research” due to it being open-ended exploration of an area of interest (Valentine & Edmondson, 2015; Edmondson & McManus, 2007). Much of the qualitative data used to develop these theories were open-ended and rather exploratory in nature, to best support the development of theory around the evolution of networks. The open-ended assessment in combination with the multi-site approach taken for these case studies therefore both helps and hinders the generalizability of the theory derived here (Sato, 2016; Wilson & Vlosky, 1997). To this end, the contribution made by this particular stream of work on network governance should be taken as a strong suggestion the relationship between trust and performance and a means of prompting further work into the area.

Network development

The networks studied were formed by a not-for-profit organization focused on health systems improvement. The not-for-profit acted as the network administrative organization that created and managed the networks over the study period of 18 months. This not-for-profit was well suited to act as the NAO due to its position within the country's health care system and simultaneous top-down and bottom-up approach to system development. From the top, the not-for-profit interfaces with federal, state, and local governments as well as the majority of donors and development partners to support the development and implementation of health policies and interventions. Approaching from the bottom, the not-for-profit engages with individual public and private health facilities to ensure sufficient supply of health goods and information.

Literature on the creation and development of networks of health facilities has shown a basic series of activities that are required of network managers. Agranoff and McGuire (2001) identified four behaviors most frequently utilized by network managers: activation, framing, mobilizing, and synthesizing. *Activation* begins the network development process by identifying network participants and key stakeholders. The activation period also consists of accumulating resources such as financial support, knowledge and information, and expertise from both participants and network managers themselves. *Framing* is the process by which network rules, procedures, norms, and values are established amongst network participants. This includes the institution of a shared vision and the development of "group think" among members. In order for the network to achieve its aims, network managers must engage in *mobilization* activities that encourage network members and potential members to be engaged in the network's objectives. Lastly, *synthesizing* requires network managers to foster cooperation and

mitigate conflict between network participants. All four activities are stages and tasks that determine the successful creation and establishment of networks (Holfund, 2012).

A parallel model for network creation is proposed in Goodwin’s (2004) framework for network management (Goodwin, 6, Peck, Freeman, & Posaner, 2004). Under this framework, network management is structured in the following sequence of steps: initiation, objective negotiation, design, environment management, joint production, adjustment, and termination. It is acknowledged that the stages are unlikely to neatly follow one another in a linear manner but rather may have overlaps and occur simultaneously in practice (Guthrie, et al., Delivering health care through managed clinical networks (MCNs): lessons from the North, 2010).

Table 3.1. Overlaps between network management frameworks

Agranoff & McGuire (2001)	Goodwin (2004)	NAO Management Activities (Those related to trust)
Activation	Initiation—selection and recruitment of potential network participants	
	Environment Management— securing legitimacy and resources amongst external stakeholders	
Framing	Object Negotiation—developing aims, norms, and values	One-on-one meetings, Group/board meetings
	Design—establishing network structures and rules	Learning lectures, On-site facilitation, Improvement Manual
Mobilizing	Joint Production—collaborating to produce goods or services	Phone facilitation, Site visits
Synthesizing	Adjustment—making changes in the course of the life of the group	
	Termination, transfer, or fundamental change—ending the network, moving its functions elsewhere, or transforming its nature	

In describing the process the NAO used to develop networks and foster trust, I primarily use the Goodwin (2004) framework. This approach is more recent and more

detailed than that of Agranoff & McGuire, as it gives specific consideration to making necessary adjustments and the potential for termination of networks. Coding from interview material showed trust was a critical factor in the object negotiation, design, and joint production periods of network management. The NAO framed much of its management activities based on the literature from collaborative learning quality improvement mechanisms, and included a few of their own unique network interventions. The activities related to increasing collaboration and coordination included one-on-one meetings, group/board meetings, learning lectures, on-site facilitation, phone facilitation, site visits, and an improvement manual. Interviews and meetings showed the relationship between constructs of trust and network management activities. Participants discussed good intentions, fairness, predictability, and reliability of trust more frequently as the number of shared activities undertaken by the network increased.

Empirical Setting, Data, and Methods

Following the framework established through reviewing the literature on network performance and trust, and in line with what was indicated through interview and meeting data, the rest of this study focuses attention on measuring and assessing three types of variables: the level of trust, the number of shared activities, and network performance as the dependent variable. Variables were determined through surveys to 174 facility staff members at 58 facilities. A response rate of 94% resulted in results from 165 personnel representing 55 health facilities. The surveys assessed provider's perspectives using a five-point Likert scale from 1 = strongly disagree to 5 = strongly agree. Shared activities and implementation of improvement policies and tasks were also monitored at each facility. Visualizations of network activity relationships and results from structural

equation modeling of our original hypotheses will be provided after the variables are described here.

Trust amongst network participants

Literature from general management studies and public administration studies on trust have operationalized survey trust items in terms of the intentions of actors on the inter-organizational and the interpersonal levels (Wicks & Berman, 2004; Eisenberger, Huntington, Hutchison, & Sowa, 1996; Klijn, Edelenbos, & Steijn, 2010). Where appropriate and available, measurement instruments from the literature were used to develop survey constructs. Measurement instruments created and validated by Rempel et al. (1985) and Zhaeer et al. (1998) were the primary resources used to develop survey measures of trust. These scales were chosen since their trust measures are designed to assess trust in close, personal relationships as opposed to general trusting orientation. Trust measures from those scales had also been adapted for use in an inter-organizational context and were consistent with the conceptualization of trust in this study (Table 3.2.). Items for both interpersonal and inter-organizational trust related to predictability, fairness, good intentions, and reliability elements of trust.

Trust was measured qualitatively based on the coding of data from interviews with hospital personnel. Information was gathered from interviews and meetings involving one chief medical director (CMD) and two nurses from each network participant hospital. A vignette was first written describing the broad history of the geographic area and hospitals of each network, the motivation for developing facilities into collaborative networks, the network management activities that took place, and characteristics of the relationship changes that took place. The descriptive case studies

that came from these initial observations indicated that substantial effort was being put forth by the NAO to foster collaboration amongst the facilities. In light of this, a theoretical framework was adopted, consistent with what is seen in literature, suggesting that the performance of networks is influenced by the existing levels of trust between network participants (Willem & Lucidarme, 2014; Whitener, Brodt, Korsgaard, & Werner, 1998; Zaheer, Gözubuyuk, & Milanoy, 2010). Sentences from interviews were coded into one or more of five broad themes found in the framework. Themes include: good intentions, meaning that each party does not seek to harm the other; fairness, meaning that actions are just and free from discrimination; reliability; predictability, and demonstration of concern. Common ideas and characterizations of trust were then derived from analysis of lines within interview quotes.

To determine the role that trust played in network development and the performance outcomes of each network, an in-depth understanding of the NAO's network development and management processes was necessary. Much of the qualitative data collection was centered on capturing information on network management activities, incidences of interaction or collaboration, and achievement of quality improvement goals for each network from the perspectives of the network participants.

Shared activities

Shared activities act as network management strategies employed by the NAO in its attempt to improve the implementation of quality improvement measures. These activities focus on two areas of network management: objective negotiation/design and joint production. The number of shared activities was determined by monitoring the monthly number of instances of each type of activity between all pairs of facilities in

each network at the beginning of the study period, at the onset of network creation, and again toward the end of the study period.

Table 3.2. Provider Trust Measurement Items

STATEMENTS					
INTERORGANIZATIONAL TRUST (Internal consistency, $\alpha = 0.7664$)	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
NAO has always been evenhanded in its activities with us					
Other facilities have always been evenhanded in activities with us					
NAO may use opportunities that arise to profit at our expense					
Based on past experience, we cannot with complete confidence rely on NAO to keep promises made to us					
Based on past experience, we cannot with complete confidence rely on other facilities to keep promises made to us					
We are hesitant to work with NAO when specifications are vague					
We are hesitant to work with other facilities when specifications are vague					
NAO is trustworthy					
Other facilities are trustworthy					
INTERPERSONAL TRUST (Internal consistency, $\alpha = 0.8799$)	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
My NAO contact person has always been evenhanded in negotiations with me					
My contact person at other facilities has always been evenhanded in negotiations with me					
I know my NAO contact person is going to act. S/he can always be counted on to act as I expect					
My NAO contact person is trustworthy					
My contact person at other facilities is trustworthy					
I have faith in my NAO contact person to look out for my interest even when it is costly to do so					
I have faith in my contact person at other facilities to look out for my interest even when it is costly to do so					
I would feel a sense of betrayal if my NAO contact person's performance was below my expectations					
I would feel a sense of betrayal if my contact person at other facilities' performance was below my expectations					
Source: Adapted from Rempel et al. (1985) and Zhaeer et al. (1998)					

Activities taking place between facilities are monitored through patient and staff records, and data collected 1-2 times a week by NAO facilitators. All shared activities are treated with equal weight and counted once toward the cumulative score for shared activities (Table 3.3.). For example, if in the month of November, Facility A and Facility B both attended one group/board meeting, one learning lecture, twice referred patients between themselves, and once transferred a nurse from A to B to assist with a heavy clinical load, then the shared activity score between them would be five. As another example, if Facility A had five on-on-one meetings with the NAO, attended one group/board meeting, and participated in two site visits, then the shared activity score between the NAO and facility A would be eight.

Network performance

Measuring network performance is a complex task due to the difficulty operationalizing performance at the network level. A number of different approaches have been taken toward accurately operationalizing performance. Some network studies have assessed network performance by unit of analysis at either the organizational, whole network, or local community perspectives (O'Toole & Meier, Desperately seeking Selenick: Cooptation and the dark side of public management in networks, 2004; Provan & Milward, 1999; Conrad, et al., 2003).

Table 3.3.: Description of Shared Activities

Shared Activities (Network Management Activities)	
Activity	Description
Objective negotiation/design	
One-on-one meetings	Meetings held between NAO facilitators and the staff of the network participants. Similar to BTS collaborative faculty features, these meetings sought teach individuals from teams at each hospital improvement techniques and provide guidance as needed, including responding to the needs of network participants and how best to achieve those aims.
Group/board meetings	Meetings held with chief medical directors (CMDs) of all facilities in each network with the aim of discussing areas of mutual concern and potential collaboration opportunities.
Learning lectures	All-day (6-8 hour) learning events for facility staff to teach key elements of administrative and care quality. Modeled after IHI's Break Through Series learning sessions, participants are first given information on the elements, then provided with the opportunity to discuss amongst one another about the particular ways they each uniquely address them.
Site visits	Visits by facility staff to a facility that is not their own, to showcase examples of best or worst practice and determine potential ways of improving processes.
Joint Production	
Patient referrals; Second opinions	Diagnosis of patients originating from one health facility and/or treatment of patient conditions is performed collaboratively or partially with another health facility within the network.
Staff/physical resource sharing	The sharing of nurses and administrative support staff members and/or medical space and medical equipment between hospitals to increase utilization rates and decrease downtime. The aim being to reduce redundancies and decrease overhead costs.
Financial resource sharing	The sharing of costs for supplies/goods, services, or human capital between facilities within the same network. The aim being to reduce the financial burden of any single transaction and spread costs over multiple facilities.

Other studies have operationalized network performance based on the structural measures being employed, such as centralization and procedural aspects of governance (Provan & Kenis, 2007; Keast, Mandell, Brown, & Woolcock, 2004). Most work on network performance has focused on performance as the achievement of pre-determined tasks of goals for the entire network, as driven by its managers (Bazzoli, et al., 2003; Hasnin-Wynia, et al., 2003). This study follows the performance definition set forth by

Kenis and Provan (2009) and assesses networks based on “network capacity to achieve stated goals”.

To measure performance, the 36-item survey was developed and administered to 171 network participants including 6 network facilitators from the NAO, each responsible for one network. Data was collected from all subjects, pooled together by network, and factor analyses performed to determine network performance scores across all networks. Details of this process and the outcomes have been discussed in Chapter 2 of this dissertation.

Results

Results show differences in trust relationships based on the shared activities taking place between network participants. Figures 3.1 through 3.6 depict the network relationships for each of the six networks and provides descriptive statistics of performance, trust, and shared activities before and after governance through the NAO. Each figure shows the NAO (the blue node) in relation to the network facilities (red nodes) it governs. The linking ties between the nodes represent the number of shared activities that took place over the course of a month between each node.

The raw number of shared activity links are represented in network adjacency matrices. Each matrix shows the individual relationships between each pair of actors in the network. This is reflected in the matrix by the symmetry of shared activity count in corresponding rows and columns. For example, the first column will have the same order of shared activity count as the first row. The second column will have the same as the second row.

Each network's adjacency matrix is used to create a visual depiction of the network participants' shared activity relationships. The visualizations are represented using a circular layout that is indexed by degree of centrality. The centrality score refers to the number of ties a node has to other nodes. Actors who have more ties are more prominent and influential in the network, therefore a higher NAO degree centrality score reflects more dependence on the NAO to disperse information and resources, while a lower NAO degree centrality score indicates stronger ties between network participants. The density of each network represents the proportion of potential connections in a network that are actual connections, with higher density numbers indicating stronger and more frequent linkages from network participants to all other participants.

Social Network Analysis Visualizations

Generally, all networks began with the NAO as the strongest network actor at a 50% degree centrality. This shows the complete dependence on the NAO that all network participants began with. Changes over time to lower percentages reflect decreased dependency on the NAO as the sole connection between network participants. At the onset of the study, few interactions, if any, were taking place between network participants. At the before stage, when the NAO is beginning to establish the networks, the average number of shared activities comes primarily from the number of shared activities taking place between the NAO and each participant facility.

After showing each of the six networks across social network affiliation relationships, I will indicate variables that influence network performance within each network, highlighting patterns and discrepancies between networks. Lastly, variables

that are associated with improved performance are reported in order to identify relational patterns that influence network performance.

A description of one of the network shared activity visualizations will provide an interpretation of the dynamics being depicted in the diagrams. Figure 3.1.a. shows the before and after network shared activity patterns for network A. As noted earlier, the networks all began with nearly no inter-organizational contact, the NAO acted as the primary connector, and the NAO used the same network management strategies when developing all networks. In the initial 6-month before facilities were interconnected, the average number of shared activities for network A stood at an average of 5.6 each month, with only 33.3% of activities occurring collaboratively between more than one participant. In the 12 month after period, though the average number of shared activities increased only slightly to 11.4 monthly, the majority of participants are tied to one another with 86.6% of potential connections being realized. However, whereas the NAO was the most centrally tied node in the network before engagement in the activities, its after degree centrality scores is 20.455% and it is only the second most central node and no longer the primary connector. This shared activities number indicates that in network A, for the marginal increase in shared activities that it experienced, the majority of connections did not take place through the NAO. These outcomes suggest that a low amount of shared activities, as mediated by trust, may be associated with low performance.

Figure 3.2.a Before and after network shared activity patterns, Network A

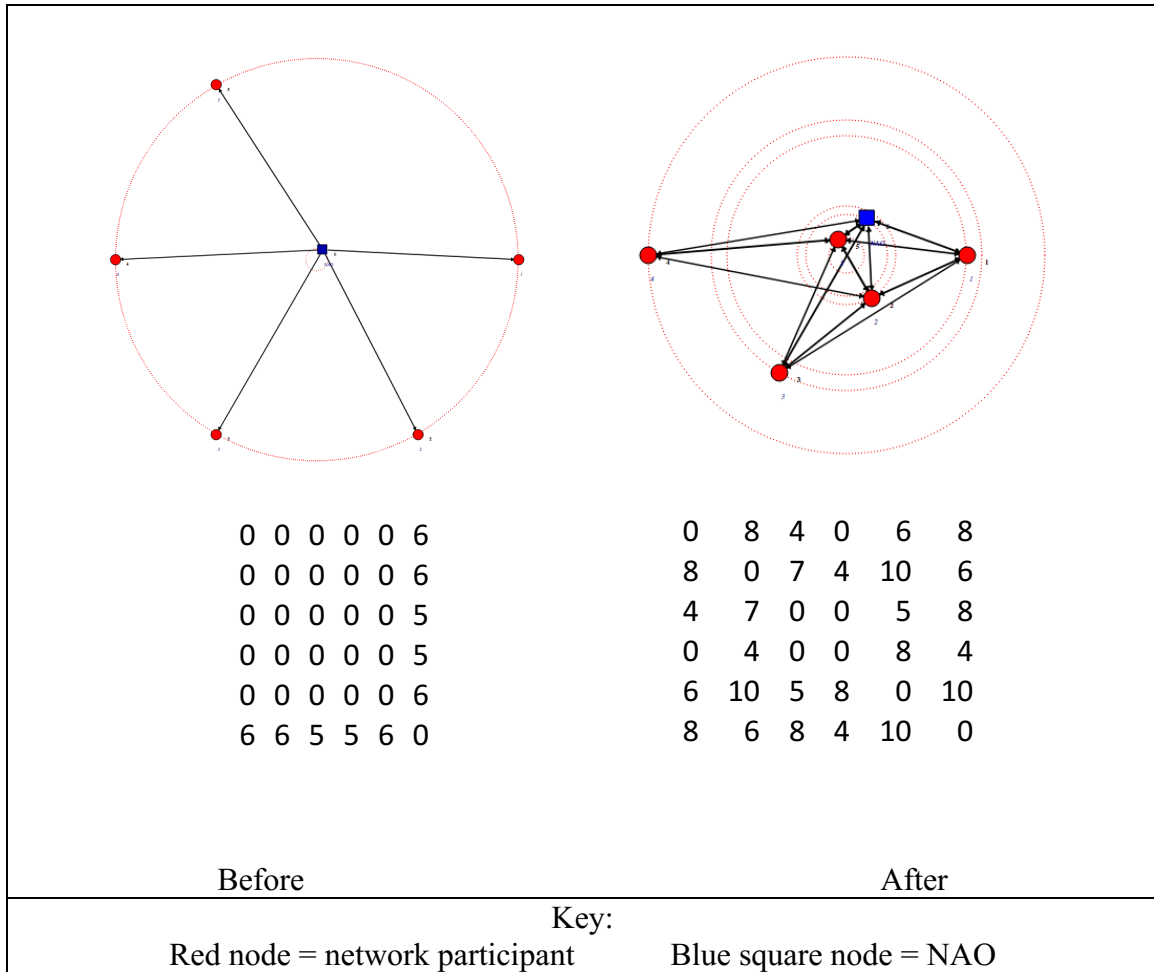


Table 3.4.a Descriptive statistics for Network A

NETWORK A	Before	After
Performance		
Average quality policies implemented	0	11
Appropriateness of service delivery	-	2.62
Trust		
Inter-organizational trust	2.33	2.60
Interpersonal trust	2.16	2.47
Shared Activities		
Avg. Facility No. shared activities	5.6	28.00
Network density (proxy for trust)	0.333	0.87
NAO degree centrality score (participant-participant trust)	50%	20.455%
Most central node	Y	N, Node 5

Figure 3.2.b Before and after network shared activity patterns, Network B

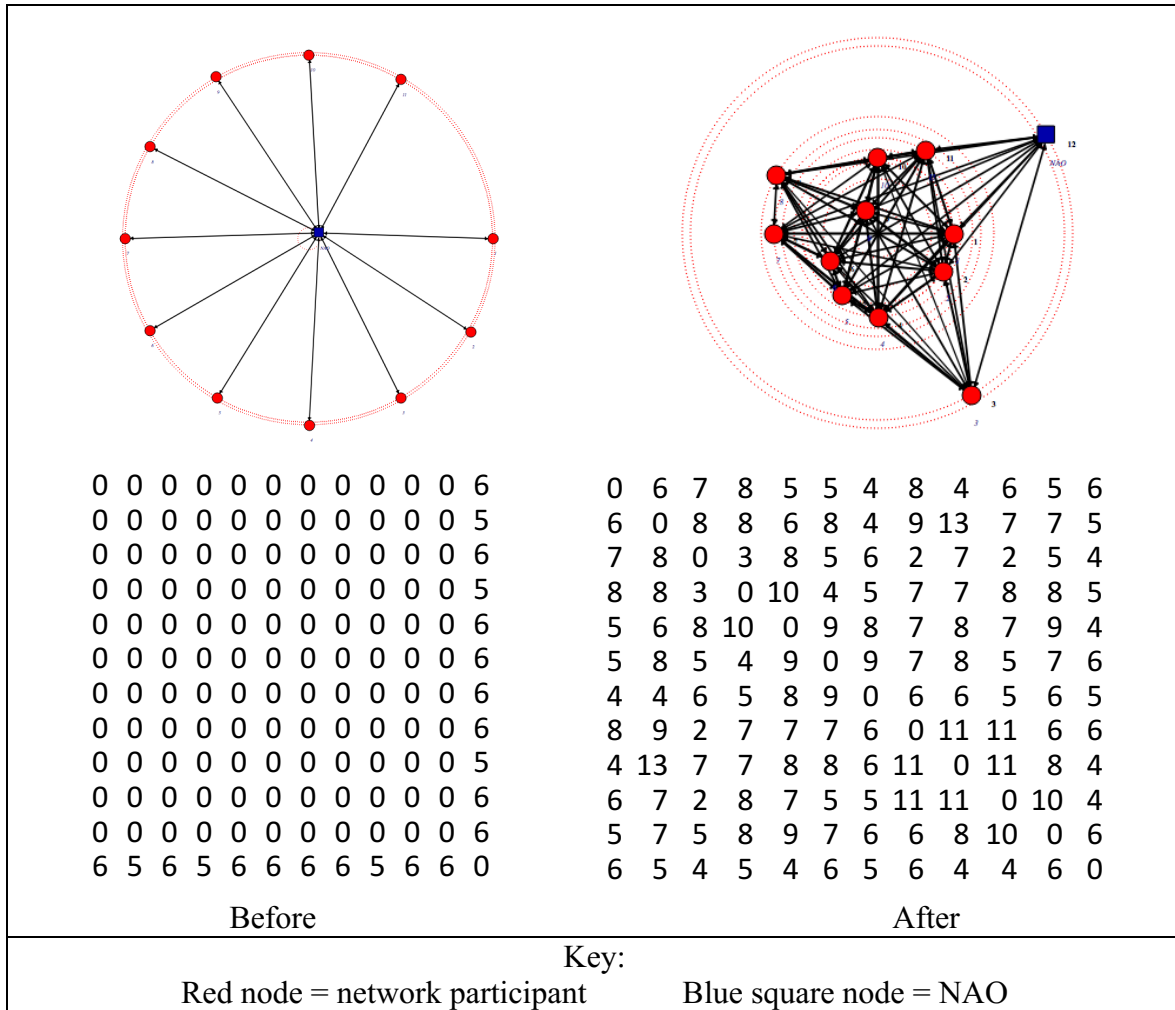


Table 3.4.b Descriptive statistics for Network B

NETWORK B	Before	After
Performance		
Average quality policies	0	21
Appropriateness of service delivery	-	3.78
Trust		
Inter-organizational trust	2.63	3.82
Interpersonal trust	2.37	3.73
Shared Activities		
Avg. Facility No. shared activities	5.8	73.9
Network density (proxy for trust)	0.167	1
NAO degree centrality score (participant-participant trust)	50%	6.34%
Most central node	Y	N, Node 9

Figure 3.2.c Before and after network shared activity patterns, Network C

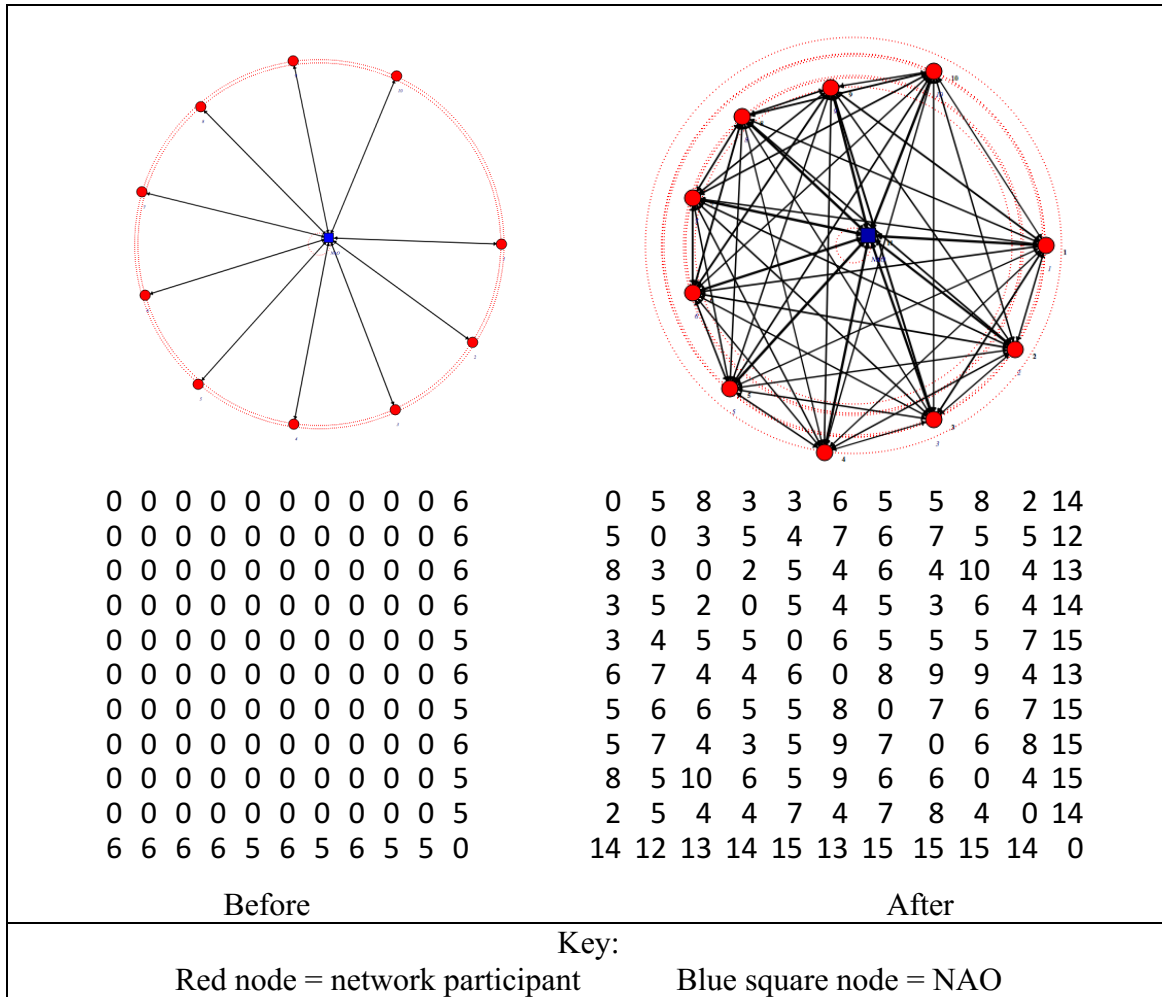


Table 3.4.c Descriptive statistics for Network C

NETWORK C	Before	After
Performance		
Average quality policies	0	16
Appropriateness of service delivery	-	2.76
Trust		
Inter-organizational trust	2.23	3.30
Interpersonal trust	2.09	3.17
Shared Activities		
Avg. Facility No. shared activities	5.6	63
Network density (proxy for trust)	0.182	1
NAO degree centrality score (participant-participant trust)	50%	18.18%
Most central node	Y	Y

Figure 3.2.d Before and after network shared activity patterns, Network D

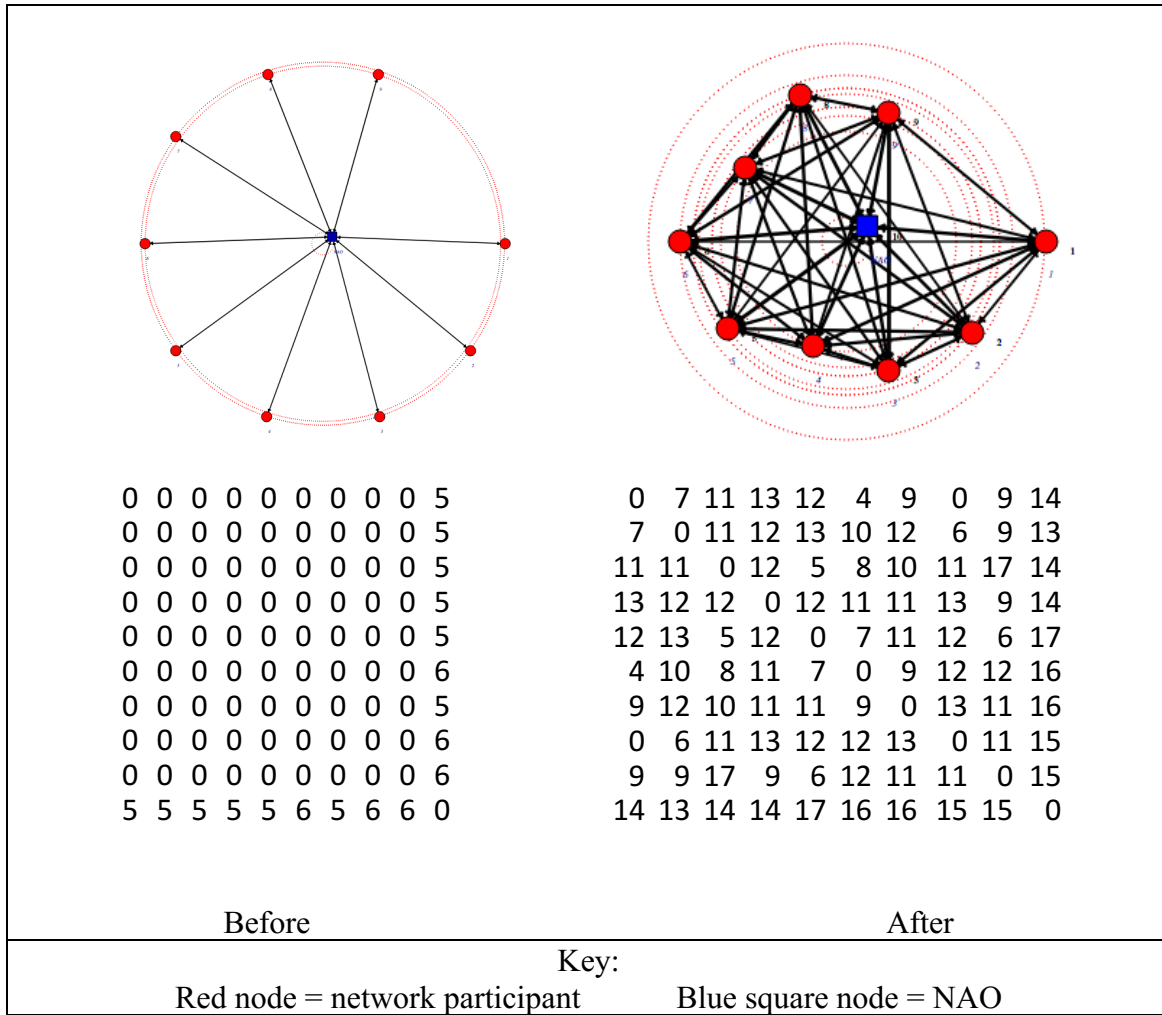


Table 3.4.d Descriptive statistics for Network D

NETWORK D	Before	After
Performance		
Average quality policies	0	28
Appropriateness of service delivery	-	4.75
Trust		
Inter-organizational trust	2.59	4.70
Interpersonal trust	2.21	4.59
Shared Activities		
Avg. Facility No. shared activities	5.3	95.11
Network density (proxy for trust)	0.2	0.97
NAO degree centrality score (participant-participant trust)	50%	13.54%
Most central node	Y	Y

Figure 3.2.e Before and after network shared activity patterns, Network E

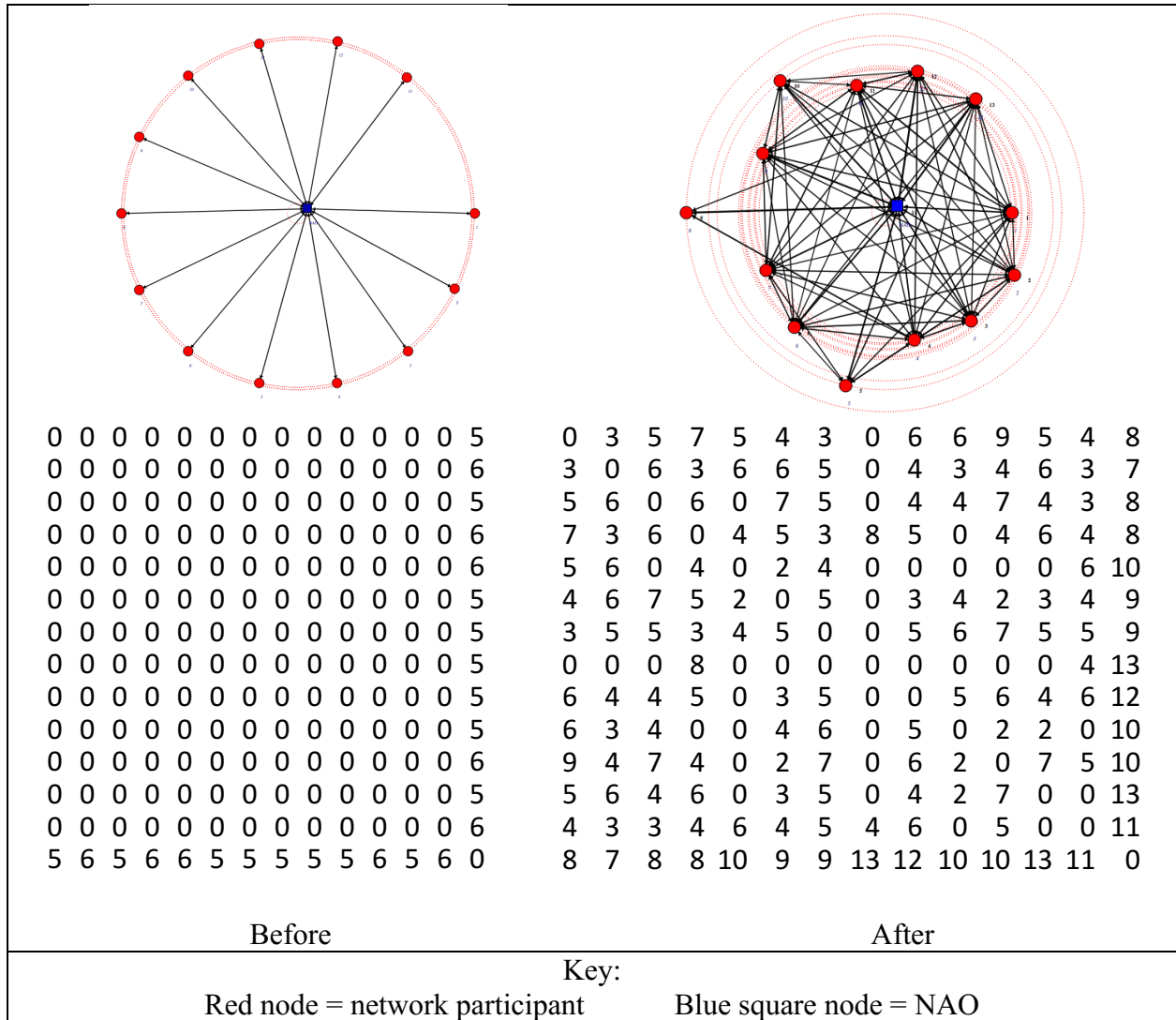


Table 3.4.e Descriptive statistics for Network E

NETWORK E	Before	After
Performance		
Average quality policies	0	18
Appropriateness of service delivery	-	2.59
Trust		
Inter-organizational trust	2.48	3.13
Interpersonal trust	2.27	3.05
Shared Activities		
Avg. Facility No. shared activities	5.38	53.52
Network density (proxy for trust)	0.14	0.80
NAO degree centrality score (participant-participant trust)	50%	15.53%
Most central node	Y	Y

Figure 3.2.f Before and after network shared activity patterns, Network F

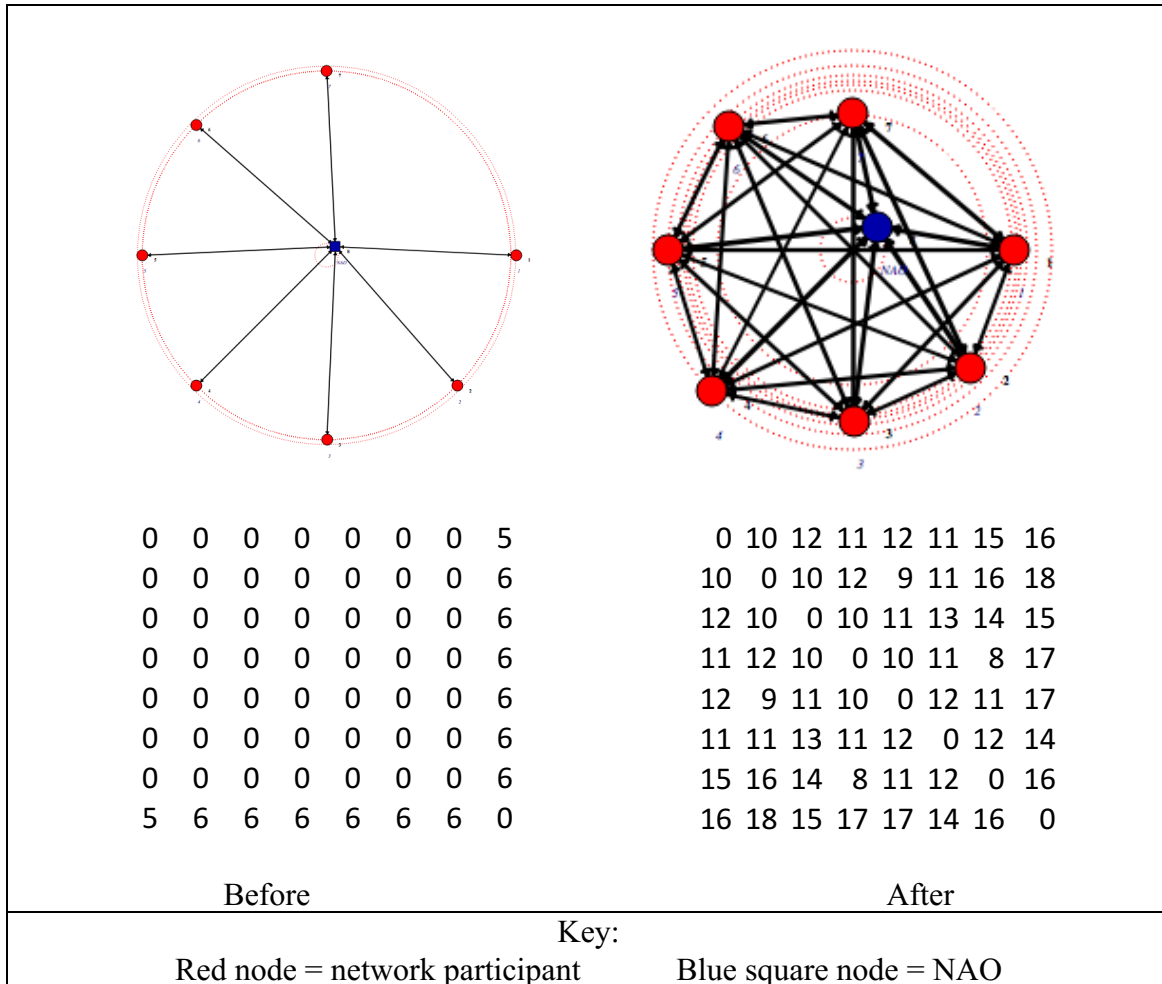


Table 3.4.f Descriptive statistics for Network F

NETWORK F	Before	After
Performance		
Average quality policies	0	23
Appropriateness of service delivery	-	4.26
Trust		
Inter-organizational trust	2.08	4.38
Interpersonal trust	2.02	4.29
Shared Activities		
Avg. Facility No. shared activities	5.86	85.00
Network density (proxy for trust)	0.14	1
NAO degree centrality score (participant-participant trust)	50%	15.96%
Most central node	Y	Y

An analysis of the social network visualizations and a description of observed facility relationships are provided in the results section. Generally, the figures show that networks with high levels of shared activities and trust also tend to have high levels of performance. Conversely, the same is seen for low levels of shared activities and trust being associated with low levels of performance. This visual each network and its social interactions suggest that a more thorough assessment of the relationships is warranted.

Structural Equation Modeling

Given the mediation model of the relationship between shared activities, trust, and performance, I employed the Partial Least Squares (PLS) approach for structural equation modeling using SmartPLS 3.2.4 (Lowry & Gaskin, 2014). PLS analysis helps measure the direct effect of shared activities on performance, as well as the indirect effect of shared activities on trust and trust on network performance. This soft modeling approach involves running a series of regression analyses for all the causal pathways and an estimation of the change in the direct effect with and without the mediator (Wong, 2013). Figures 3.3. and 3.4 show the results of each the path analysis and the bootstrapping of the original model where trust mediates the relationship between shared activities and network performance. Figure 3.5 shows analysis of a non-mediated model without the indirect influence of trust on network performance. The circles in these figures represent the variables under analysis, where trust mediates the relationship between shared activities and performance. Numbers inside each circle show the R^2 , the percent of variance explained by the variables. Each rectangle represents the indicators that were used to measure the connected variable. The numbered arrows between variables display the effects, or the standardized regression weights.

Figure 3.3. Path analysis of original model

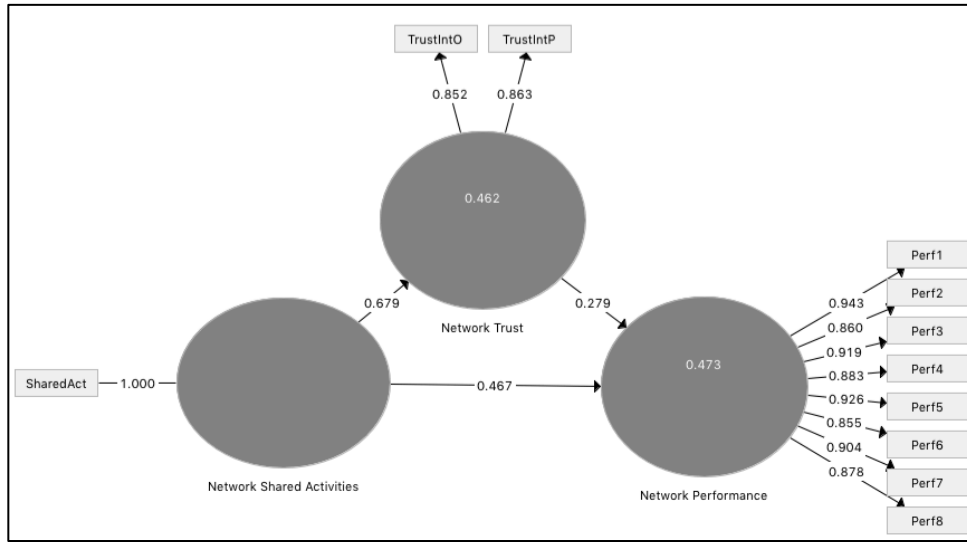


Figure 3.4. Bootstrap of original model with T-statistics

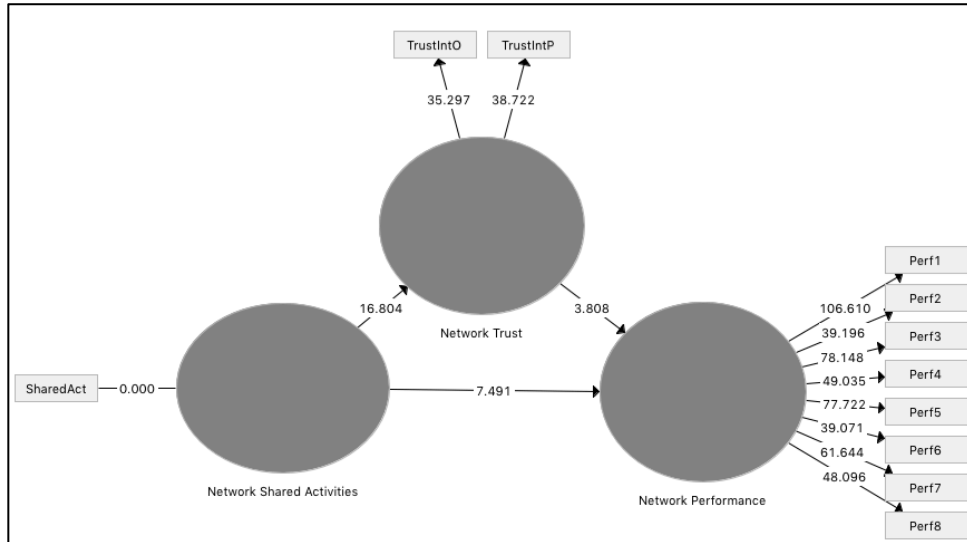
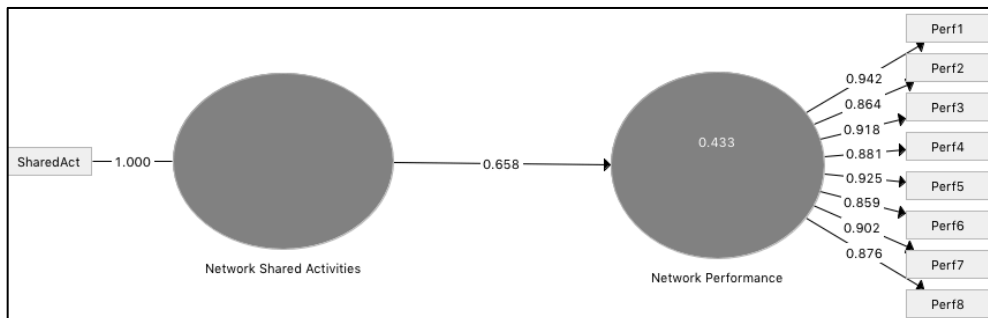


Figure 3.5. Path analysis of non-mediated model



Discussion

Comparing the before and after network visualizations across all networks provides a number of insights into the potential relationship between network performance, trust, and shared activities. These visualizations generally show a positive relationship between the number of shared activities a network engages in, and the performance of the network. The best performing networks, networks D and F, each have a performance score between 4.2 and 4.7. Both of these networks also have the highest number of shared activities at 95 for network D and 85 for network F. On the opposite end of the performance spectrum, networks E and A are the worst performing networks with scores of 2.59 and 2.62 respectively. These two networks also both show the worst scores on their measurements of shared activities, with scores of 28 and 53 that stand far below the all-facility average of 67.8. For these best and worst performing networks, the level of trust is also seen to be moving positively with shared activities and performance. Networks with higher levels of shared activities display high levels of trust and higher levels of network performance. In comparison, networks with lower levels of shared activities display low levels of trust and experience lower levels of network performance. A statistically significant increase in trust was seen for all networks except Network A when comparing before-and-after trust levels. Most networks report after-trust levels above the “neutral” 3, indicating that the majority of participants hold at least a moderate level of trust of others in their network.

Though this visual assessment is not empirically strong enough to be conclusive about the nature of the relationship between network performance, trust, and shared activities, it provides a basis for deeper analysis of these relationships. The visual representations show that, for the majority of networks, the NAO is the connector

between participants before implementation of network activities by serving as a second party through which information can be transferred, and after implementation by fostering direct interaction between facilities.

However, based on the expected direction of movement for performance, shared activities, and trust, the visual outcomes for networks A and B notably diverged from expectations. Network A showed remarkably low scores on all measures of performance, trust, and shared activities. In practice, this network was smaller than all other networks with the smallest number of facilities that worked with the NAO when the network was created. Although facilities in this network were provided the same number and type of engagement that facilities in other networks did, the NAO was not received as warmly as it was in other networks. This lower reliance on the NAO is reflected in Figure 3.1, where the NAO is not central to the network's social dynamics (as is the case in nearly all the other networks). Overall, a much lower than average number of shared activities took place amongst participants in network A, regardless of the NAO's attempts to engage in either objective negotiation or joint production activities to bring facilities together. In our discussions, the study team discussed how this may have happened for reasons related to the local context in which network A facilities were embedded and the type of physicians that were found in network A's geographic area. The area where network A facilities are located is further away from the heart of the larger city than the locations for the majority of facilities in other networks, making the location slightly less profitable and having fewer resources relative to city-dwelling networks. These facilities were also led by Chief Medical Directors who are primary care doctors providing a specific set of low-margin services. This high level of perceived competition seems to have been more

powerful than the NAO's ability to instill trust and create ties amongst participants in network A, causing lower involvement in activities initiated by the NAO. Network A's performance in terms of both the perceived performance by participants and the number of quality improvement policies implemented was much lower than the all-network average. These problems that network A faced caused it to break apart shortly after the end of the study period. With few participants engaging in shared activities and low levels of trust between them, members in network A were unable to adequately collaborate and, therefore, regressed to isolated ways of operating.

Network B also showed interesting outcomes in its shared activity visualization. Although the network experienced high levels of shared activities, trust, and performance, the NAO had relatively low degree centrality compared to other participants. Specifically, the number of shared activities that the NAO engaged in was much lower for network B than for other networks, taking the NAO to the periphery of the network in terms of centrality. The context under which network B operates plays a large part in this outcome. The CMDs of network B are slightly more educated than those of other networks and are also more likely to specialize in a particular area of medicine rather than primary care. This specialization seems to decrease the perceived competitiveness between participants and enables them to more readily collaborate with one another. Increasingly over the course of the study, network B participants would meet independent of the NAO and discuss potential ways of improving collaboration amongst themselves. Over time, they were able to engage one another directly and only minimally used the NAO as a means of facilitating collaborative connections. Effectively, network B evolved from its initial state of each member being independent

without connections to others, to the network form under NAO-governance, to an interconnected self-governing form. At their self-governing stage, participants in network B used the NAO primarily as a knowledge resource to get information on ways to benefit from collaboration, but not as a means of fostering the collaborative ties.

Table 3.5. SEM results of relationship between model variables

List of test model relationships				
Hypothesis path	Hypothesis correlation	Standardized estimated parameters	T-value	Hypothesis verification
(H1) Shared activities → performance	+	0.467	7.491	Established
(H2) Shared activities → trust	+	0.679	16.804	Established
(H3) Trust → performance	+	0.279	3.808	Established
Sobel test for significance of mediation				
Sobel test stat	3.778	One-tailed probability	0.000079	
		Two-tailed probability	0.000158	

The structural equation model of this study was composed of three main variables—shared activities, trust, and performance. The validity and reliability of the survey measures were tested to avoid any biases in the empirical results. The results of the structural equation model, shown in Table 3.5, correspond with the expected signs of the

hypotheses from the theoretical model and pass the t-test for significance. The normed fit index (NFI) of the model, at 0.88, indicates that the proportion in the improvement of the overall fit of the hypothesized model as compared to the independent model is acceptable and the model has a reasonable fit (Lance, Butts, & Michels, 2006).

SEM was used to analyze the causal relationships among the factors and variables by calculating their total effects. The direct and indirect effects of shared activities and trust on performance were of particular interest. Based on results, the direct effect of shared activities on performance has a standardized coefficient of 0.467, indicating that increasing shared activities by one unit can enhance the network's performance by about 0.47 units. Additionally, increasing trust between network participants by one unit can increase the performance by about 0.28 units. Interpretation of these results indicate that each additional 21 shared activities experienced by participants is associated with a 10 percent increase in performance, and each additional point of trust reported by an entire network is associated with a 28 percent increase in its performance. An analysis of the mediation effect of trust on the relationship between shared activities and performance results in a significant Sobel test statistic of 3.778, which is greater than the commonly accepted value of $> |1.96|$, and significant at the 95% confidence interval for the two-tailed test. This indicates that the mediator, trust, does mediate the effect between shared activities and network performance. Although the strength of the effect of shared activities on performance decreases in strength with the presence of trust as a mediator, the t-statistics in the mediated model remains significant, meaning that in this model trust only partially mediates the effect of shared activities on network performance.

The results indicate that shared activities between network participants can improve the performance of the network to achieve its defined aims. However, this relationship is not fully direct. It is partially mediated by the formation of trust. Lack of engaging in shared activities and developing trust may have played a role in the breakdown of a network with insufficient levels of trust. Conversely, the significance of shared activities and trust for high performance was also seen through the ability of a trusting and highly collaborative network to govern itself independent of the NAO. These outcomes indicate that trust is critical for the establishment of a collaborative environment for NAO success. Particularly in a developing country context, the establishment of trust is vital to diminish perceptions of competition and reduce the transaction costs of health service delivery collaboration.

There are a number of potential limitations of this study. First, the model is only as good as the measurement of the variables it is trying to explain. The data that was provided may be limited in its ability to fully capture the latent variables that make up shared activities, trust, and performance. Because the stream of research on trust and performance is nascent, this early model likely doesn't capture all of the different variables that may help to explain the relationship between shared activities, trust, and performance in NAO-governed networks. Ideally, a variable like shared activities would be captured through multiple methods that measure collaboration from data sources such as electronic medical records, patient exit surveys, and facility staff interviews to increase confidence in the information provided. However, given the resource-constrained context within which these hospitals operate, advanced data from electronic records were not readily available at the time of the study as many facilities were still being instructed

and monitored on proper data collection through paper records. In the future, as the use of more sophisticated data gathering methods is installed in these facilities and as the network development engagement matures through the NAO, a more complex model of relationships will be able to be developed.

Collaboration between health facilities has become an important business strategy for improving the scope of services, increasing learning and knowledge sharing, and lowering the cost of care delivery through the sharing of overhead costs. Attempts to increase collaboration of health care organization through the network structure makes management strategies such as engaging in shared activities vital to increasing trust and ultimately performance of the entire network of facilities. This study focuses on network development and collaboration on service delivery in the health care industry of a developing country. It specifically looks at collaboration with the aim of creating efficiencies between health organizations with poor quality of care and high overhead costs. Collaboration and engaging in shared activities for reasons outside of quality improvement and maximization of resources may result in different performance outcomes and place different value on trust. Therefore, future studies may need to study the model of shared activities, trust, and performance with respect to other types of collaborative relationships and in setting with fewer constraints on resources.

Appendix

Exhibit 1: Implementation Survey and Interview Guide

QI IMPLEMENTATION SURVEY

NAME OF HOSPITAL: _____ DATE: _____

NETWORK: _____ INTERVIEWEE NAME: _____

QUESTIONNAIRE RESPONDENT: _____

QUESTIONNAIRE RESPONDENT POSITION: _____

WELCOME PROCEDURES:

- a) WELCOME AND INTRODUCTION
- b) PURPOSE OF INTERVIEW AND SURVEY QUESTIONS
- c) CONFIDENTIALITY ISSUES

STATEMENTS					
GENERAL KNOWLEDGE	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I have sufficient knowledge about the engagement process					
Implementation of the QIPs helps me run an efficient/successful facility					
The QIPs are relevant for my facility operations					
The resources put toward QIP implementation is worth the cost					
The resources required for implementation will give ultimately produce the desired outcome in terms of patient patronage and increased revenue					
EASE OF IMPLEMENTATION	Cannot be Impl.	Can be Impl. but Difficult	Can be Impl. but Mod. Eff.	Can be Impl. Easily	Has been Impl.
Infection Control					
Provision of running water					
Provision of single use towel					
Provision of liquid soap					
Development of policies					
Printing of policies					
Provision of colour coded bins					
Provision of colour coded mops					
Patients' Rights					
Development of Policies					
Printing of policies					
Training of staff members on patient rights					
Proper use of consent form					
Health education scheduling for patients					
Putting in place a proper mechanism for the patient complaints process					
Risk Management					
Development of policies					

Printing of policies					
Putting in place a regular facility inspection process and frequent documentation of the inspection process					
Keeping inventory of hazardous materials within the facility					
Provision of a fire extinguisher					
Provision of fire safety clearance					
Training of all staff members on fire safety					
Fire drill					
Provision of inventory of all facility equipment					
Data Management					
Development of policies					
Printing of policies					
Detailed assessment of patients on arrival and during on-going care (ensuring all staff members are aware of this)					
Doing a detailed clinical audit with results shared amongst concerned members of staff					
Doing a detailed documentation audit and sharing results amongst members of staff					
Provision of proper documentation of care, including detailed nursing care plans, pre-surgical ward rounds and use of partograph					
Provision of signs and symbols used for within the facility					
Organising frequent clinical meetings					
Ensuring external trainings for members of staff					
FACTORS AFFECTING IMPLEMENTATION	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Limited funds					
Qualified staff members					
Limited time					
Frequent engagement of staff members					
Limited level of understanding					
Additional Comments:					

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CHAPTER 4

CHAPTER 4. Network Administered Improvement: Network participation and effective improvement tactics

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Network Administered Improvement: Network Participation and Effective Improvement Tactics

Abstract

Context: Attaining some amount of interorganizational learning is an important part of why organizations collaborate. Information from one organization can be used by another to increase productivity and improve performance. Creating multiple networks of hospitals opens an opportunity to implement different types of improvement activities, and thus observe how effective each activity is under various settings. Different features of improvement activities may be more effective than others at engaging network participants and improving their hospital's performance. Given the financial constraints and trade-offs that must be made for health care organizations in developing countries, it is important to understand which features of improvement activities from a network administrative organization, a form of network governance where an external entity centrally manages participants to achieve network-wide goals, are most successful at helping facilities improve their operational performance.

Objective: To determine participants' views on how beneficial different aspects of network quality improvement activities have been for their organization's quality learning and improvement, the reasons different activities were viewed as helpful, and place activities on a relative scale of helpfulness.

Design, Setting, and Participants: Data were collected from quality improvement teams at a sample of 55 Nigerian hospitals from April 2014 to October 2015. Personnel and

quality improvement teams from these hospitals participated in surveys and semi-structured in-person interviews. Secondary data included assessments of quality improvement scores across facilities.

Main Outcome Measures: Level of helpfulness toward improvement of 8 aspects of quality improvement activities that were recommended and supported by the NAO were identified. Performance improvement across networks was determined by scoring, before and after, the implementation of several improvement activities across multiple dimensions of facility quality. Lastly, participants' preferred learning styles were identified to determine whether activities aligned with how participants actually learn.

Results: Participants viewed four aspects of network quality improvement activities as most helpful for accelerating their quality improvement efforts: one-on-one meetings, on-site facilitation, solicitation of staff ideas, and improvement manuals. These most beneficial features were particularly useful in transferring knowledge and information from the NAO to facility QI teams, which facilities did not previously have access to. Networks that showed the most improvement also rated activities that had one-on-one interaction with experts as more helpful, whereas networks with the least improvement rated as most helpful activities that provided self-learning.

Conclusions: Qualitative findings together with analysis results from this study indicate that the use of different learning techniques are beneficial at different points in time in resource-constrained settings and developing countries such as Nigeria. Individual learning activities are preferred for establishing general knowledge of what to do, while interactive learning activities are better for confirming general knowledge and exchanging implementation knowledge.

Keywords: Quality improvement, networks, network governance, management, performance

Network Administrated Learning: Network participation and effective improvement tactics

Background

Networks in health care can take several different forms, with existing types including alliances, partnerships, and collaborations between health facilities. Traditional provider based networks have long been present in the health care systems of developed countries. Health networks in the form of group practices, multi-hospital organizations, and care collaboratives have flourished over the past two decades in advanced economies. In 1979, only 31 percent of hospitals operated as part of a system, increasing to nearly 54 percent of hospitals in 2001, with another 12.7 percent in looser health networks (Federal Trade Commission and the Department of Justice, 2004). In 1996 only 15.6 percent of clinically active physicians practiced in groups of more than 10 physicians. By 2011, only 18 percent of physicians in the United States remained in solo practices, with approximately 25 percent of physicians in groups practices of 2 to 10 medical doctors, and another 57 percent in group practices of 10 or more doctors (Welch, Cuellar, Stearns, & Bindman, 2013). The percentage of physicians practicing within increasingly larger groups reflects both the economic and administrative difficulties as well as the resulting need for collaboration (Pham & Ginsburg, 2007).

The sharing of resources between participants that takes place within networks makes them particularly relevant to health care settings. Engaging in external relationships is a means through which firms are able to attain resources and capabilities they may not possess internally (Mahmood, Zhu, & Zajac, 2011). Such alliances and

partnerships provide a means through which firms can access new technologies, knowledge and resources, reduce transaction costs, and together develop economies of scale and scope that are unattainable outside interorganizational relationships (Powell, Koput, & Laurel, 1996; Kale & Singh, 2000). These strategic alliances can be beneficial or detrimental to firm performance outcomes such as profitability, innovation, and survival of the firm (Shane & Foo, 1999; Stuart, 2000).

Many cooperative, patient-focused service relationships have been developed between providers of health care and health related services. The success of many healthcare partnerships has resulted in improved health outcomes for patients. Clients are often best served through an integrated system of care service providers (Shortell & McCurdy, 2009; Burns & Pauly, 2002). Given that many patients are unable to have all their needs met from a single provider, health organizations often voluntarily cooperate with one another to form a network of providers within different geographic communities. Such cooperation amongst health care delivery organizations is generally favorable for patient outcomes (Plsek, 1997; Madison, 2004). Sharing of information and physical assets through the network model in health delivery organizations has many positive results with respect to greater efficiency and flexibility in knowledge-intensive activities, efficiency in the use of resources to provide medical services, and improvements in care quality outcomes (Fattore & Salvatore, 2010; Yu & Chen, 2013).

However, developing relationships with others requires increasing an organization's dependency on partners, making some firms reluctant to enter into partnerships and less likely to collaborate with others (Aggarwal, Siggelkow, & Singh, 2011; Albert, Kruezer, & Lechner, 2015). Additionally, not all organizations that seek

external partnerships are able to build interorganizational relationships that leverage the skills and resources of others to sufficiently meet their needs.

One means of overcoming such partnership and coordination issues is creating networks of care organizations through network administrative organizations (NAOs). NAOs are a form of network governance where an external entity centrally manages the activities of firms participating in a network to achieve the pre-defined objectives of the network (Provan & Kenis, 2008). Through frequent interaction via NAO-managed activities, network participants are often able to develop the trust and mutual understanding that is required for successful collaboration. NAOs can play the role of an “intermediary” organization, third party, broker, or bridging organization that connects firms engaging in performance related inputs or innovation (primarily SMEs) to others able to provide such inputs (Howells, 2006; Winch & Courtney, 2007).

In the health care setting, the role of NAOs has largely focused on administrative coordination. Mental health, elderly care, HIV, and substance abuse services have been both studied due to their use of the NAO structure and explored as a potential area for applying the NAO model for administrative coordination of services to develop integrated services for patients (Provan, Sebastian, & Milward, 1996; Marafioti, Mariani, & Martini, 2014; Willem & Gemmel, 2013). In recent years, interorganizational quality improvement collaboratives and other multi-organizational models of care delivery have increased in popularity. Given the perceived limitations of single-organizational approaches to quality improvement in healthcare, multi-organizational quality improvement activities have grown in response to the need for increased collaboration (Nadeem, Olin, Hill, Hoagwood, & Horwitz, 2013).

Literature review and study development

Central to many interorganizational health care collaborations is the knowledge and learning aspect of relationships. In attempting to make continuous improvements in care delivery, a number of hospitals are entering into quality improvement collaboratives as a means of exchanging information and learning from one another (Tucker, Nembhard, & Edmondson, 2007; Franco, Marquez, Ethier, Balsara, & Isenhower, 2009). Evidence on interorganizational learning from other industries has indicated that organizations can learn more rapidly and at a lower financial cost through interorganizational learning collaborations (Greve, 2005; Downe, Hartley, & Rashman, 2002). Through successful interorganizational learning and knowledge transfer, learning networks in health care can diffuse knowledge on how to deliver quality care and provide other benefits to the process of improving health outcomes (Mittman, 2004).

The prospect of accruing tangible improvements through relationships with other organizations is a central reason why previously independent hospitals may agree to enter networks. Health facilities in developing countries have the additional complexity of limited resources; therefore the time, effort, and financial investment made to enter any collaboration must lead to substantial results to be worth doing. Though few health-related networks are seen in developing countries, the majority of health networks that do exist largely do not engage in the sharing of physical assets and goods, but rather attempt to support one another in improvements through the sharing of information. With such emphasis placed on learning and information exchange for health care organizations in developing countries, the learning activities undertaken within networks play a significant role in improving (or not) the performance of individual hospitals and the overall network.

Many existing quality improvement collaboratives have been modeled after the Institute for Healthcare Improvement's (IHI) Breakthrough Series. The learning of improvement techniques and sharing of ways to implement best practices is essential for hospitals' successful improvement endeavors (Institute for Healthcare Improvement, 2003). Quality collaboratives can employ a myriad of activities to achieve improvement and develop knowledge. Reviews of BTS collaboratives show over a dozen potential features of collaborative design and implementation that participants can utilize (Kilo, 1998; Nadeem, Olin, Hill, Hoagwood, & Horwitz, 2013; Baker, 1997). Components of this approach include the development of quality improvement teams, in-person learning sessions, execution of Plan-Do-Study-Act (PDSA) cycles, and support in the form of calls, emails, and on-site visits.

Some research on the effectiveness of collaboratives has considered the significance of learning styles. Nadeem et al. identified 14 quality improvement collaborative components, each with specific educational components such as learning sessions, phone meetings, and lecture trainings (Nadeem, Olin, Hill, Hoagwood, & Horwitz, 2013). Prior research has found that some components may be more beneficial than others toward learning and quality improvement. However, few studies link different components of QIC components to participants' learning processes, with regard to the effectiveness of each component based on how participants actually learn (Leape, et al., 2006; Gustafson, et al., 2013). Differences between individual learning styles and how learners respond to various educational components can influence the effectiveness of a learning initiative such as quality improvement collaboratives (Keefe & Ferrell, 1990; Cassidy, 2004).

Five distinct preferred learning styles have been identified in learning literature (Simons & Ruijters, 2008; Simons, Germans, & Ruijters, 2003):

- a. *Acquisition*: Learning guided by gathering objective facts and theoretical knowledge from experts. Examples include classroom lectures and literature reviews.
- b. *Apperception*: Learning from observation of experienced role models and best practices. Examples include real-world situations, site visits, and shadowing.
- c. *Discovery*: Learning based on focused knowledge creation through personal curiosity and self-reflection. Examples include brainstorming, storytelling, and conferences.
- d. *Exercising*: Learning through training sessions and simulations to practice and employ new skills. Examples include workshops, skills labs, and other supervised exercises in a low-pressure simulation environment.
- e. *Participation*: Learning from other non-expert peers through interaction and communication. Examples include peer consultation, communities of practice, and case discussions.

Since the match between preferred learning style and the quality collaborative's educational components may impact effectiveness of the QIC (Cassidy, 2004; Weggelaar-Jansen, van Wijngaarden, & Slaghuis, 2015), it is important to determine participants' preferred learning style in addition to the effectiveness of each improvement component.

A number of studies on organizations, learning, and performance have shown evidence of a positive impact of management support and organizational culture on performance, while other studies have shown little or no evidence, leaving the results mixed (Bradley, Holmboe, Mattera, Roumanis, Radford, & Krumholz, 2003; Edmondson, 2003). Health-related studies on interorganizational learning have examined the effectiveness of quality improvement collaboratives in developed countries, with many examining specifically how practices are implemented and whether quality of care is improved (Crandall, et al., 2012; Horbar, et al., 2004). Some early studies on the impact of care collaboratives on organizational performance suggest that they have a substantial impact on improvement (Horbar, et al., 2001; Howard, Siminoff, McBride, & Lin, 2007), while others show no significant effect of collaboratives (Young, Glade, Stoddard, & Norlin, 2006; Ovretveit, et al., 2002; Schouten, Hulscher, Huijsman, & Grol, 2008; Landon, et al., 2004). Nembhard's study on the aspects of care collaboratives that are most valued by participants identified features of collaborative activities worth particular focus when managers design collaborative activities (Nembhard, 2009). Additional studies have indicated that certain features of quality improvement collaboratives, such as deliberate learning tactics, may be more important than others for improving performance (Schouten, Hulscher, van Everdingen, Huijsman, Louis, & Grol, 2010; Nembhard & Tucker, 2011). These features of quality improvement collaboratives can be adapted to fit other forms of alliances and collaborations.

Networks of health facilities brought together by an NAO have many features similar to those of care collaboratives. Both quality improvement collaboratives and NAO-governed health networks are guided by an external entity that brings together

previously unrelated health organizations and supports them in achieving defined network goals. Many of the features of quality improvement collaboratives can be integrated into the improvement activities in which network participants are involved through their NAO. However, while the leaders of care collaboratives solely focus on quality improvement, managers of NAOs are able to focus network aims beyond quality such as financial performance or data reporting. More importantly, NAOs seek to connect facilities to share resources and capabilities, and ultimately create efficiencies through economies of scale and scope.

Despite the existing similarities between NAO and care collaborative improvement activities as models of health network engagement, little information is available on how NAO-governed quality improvement related activities impact network participants. Studies have yet to examine the usefulness of quality improvement collaborative features when implemented in multiple hospitals through a single network administrative organization. Significantly, to establish successful health networks in developing countries, a deeper level of understanding of the most helpful features of network learning and quality improvement activities needs to be developed. The influence of different types of quality improvement activities on performance, particularly from the viewpoint of network participants, needs to be established. For many health systems in developing countries, health-related funds from governments, donors, and private firms are often accompanied with very stringent budget requirements. Therefore it is critical to make decisions about allocating funds in the most value-based and cost-effective manner.

Empirical setting, data, and methods

This study seeks to examine the helpfulness of NAO improvement activities, as perceived by network participants, and network performance. It examines participants' views of different features of a NAO's quality improvement activities for networked hospitals. Specifically, I study which activities were deemed most and least helpful, why different activities were perceived as helpful, and the particular elements of activities that were viewed as critical for success. Data were gathered from surveys and interviews of personnel from 55 hospitals grouped into 6 networks in Southeastern Nigeria. Quantitative data from survey results from participants were used to determine activity helpfulness, and pre- and post- quality scores were used to determine performance. Qualitative data from group meetings and one-on-one interviews provided information on the relationship dynamics between network participants and the NAO.

Study Design and Setting

A total of three surveys were performed to gather the information used in this study—one 6 months before the NAO implemented network activities across network participant facilities, a second approximately 6 months into network management by the NAO, and another at approximately one year into the NAO-intervention. Survey participants are staff members of health facilities located in the lowest-income areas of Lagos city in the southeastern region of the country.

Over 60 facilities were initially contacted for participation in a network intervention that coordinated together previously independent health facilities into networks of between 6-12 facilities, all managed by a single NAO. The NAO's objectives were to increase the financial performance of private hospitals through

improvements in the quality of care delivery and expanding the resources available to all network hospitals. NAO managers aimed to do this by engaging network participant hospitals in interorganizational quality improvement activities, improving the patient information data collection and reporting processes at all hospitals, inducing the sharing of physical resources such as diagnostic or laboratory equipment, and transferring knowledge such as a best-practice for malaria case management.

Selection of facilities occurred with the help of a local medical association. A total of over 3,000 medical facilities exist in Lagos state, with nearly 2,500 of those being private facilities, therefore some guidance was needed on how to attain the target number of facilities. NAO managers attended meetings of the Medical Practitioners Association, identified key executive supporters for the networks project, and with the insight of those supporters identified a small number of facilities that were well suited for participation in the project. Basic criteria for determining whether or not a facility was appropriate for this study at this stage included the facility's accreditation and certification with state and local medical boards, chief medical director membership in the formal medical association, and the presence of staff members with formal medical training. Following introduction by the Medical Practitioners Association, initial interviews and discussions were held with executive members of the Association and a small number of other facility owners who had significant knowledge of the current state of hospitals in the region. Chief Medical Directors of those hospitals referred me to other facilities in their geographic location. Criteria included the preparedness of facilities to work with others and patient population.

Facility selection was influenced by geographic and economic considerations for the local community population. Facilities needed to be within a 45 minute driving radius from one another and serve the low-income population they were embedded within. Facilities in the same network typically provided the same type and number of services. Aside from two, all facilities identified through this referral system were willing participants. Of the 63 CMDs identified and contacted, one declined participation due to “unpreparedness” of his facility, one declined for “legal reasons” that likely referred to his facility’s involvement in a legal dispute with a former patient, one facility was closed by government authorities due to a questionable iatrogenic event, and two facilities simply lost interest. Early in network implementation, three additional facilities consistently failed to attempt to perform network activities, given the time needed for the study’s interviews, surveys, and data collection requirements. 55 facilities were ultimately included in the networks, with networks having between 5 and 11 facilities each depending on the number of facilities in driving proximity to one another within their state assigned local government area (similar to a township in U.S. states’ counties). The resulting survey sample is composed of 165 staff members across the executive, operational, and front-line staff members within the 55 facilities.

Survey data

Survey data on the helpfulness of improvement activities and preferred learning styles was collected from personnel and administrative members of the participating network facilities. The process for data collection was consistent with accepted methods for developing countries based on current observations of lower literacy rates, complex multi-language use, and sensitivity of populations and questions (Kumar, 2006; United

Nation, 2005). Surveys were initially distributed to CMDs during monthly network meetings where all network participants were presented updates from the NAO and given a platform for discussion. The initial handing out of surveys was done not with the intention of having CMDs fill out surveys on their own, but to provide participants with sufficient time to read and understand the questions being asked within the survey. Survey responses and related information were primarily completed by NAO network facilitators. These facilitators were NAO staff members, recruited and hired for the sole purpose of creating and supporting facility quality improvement teams to implement all activities initiated by the NAO. Facilitators' backgrounds were either in engineering or nursing, and all received a six-week orientation on providing support to health facilities.

Facilitators visited each facility at least once a week to introduce new activities, check on the progress of already implemented activities, and interface with facility staff members to answer any questions and receive feedback. Each network had one dedicated facilitator to monitor all facilities, with a total of 6 facilitators across all 55 facilities. For the survey, facilitators interviewed each participant and explained in detail any questions that were opaque from the participant's point of view. CMDs are requested by the NAO to fill out information as feedback on how well the engagement is meeting their needs and expectations. Surveys are also distributed to front line staff and non-clinical facility managers at each facility by network facilitators.

Though it would have been less costly to distribute surveys via email or a web portal, the difficulties with internet connectivity, mail infrastructure, phone connectivity, and the low income level of most facility staff members would likely result in poor response rates. In our setting, in-person delivery, explanation, and interviews for filling

out surveys appears to have improved response rates. This is consistent with the experience of other research teams conducting studies in resource-constrained settings, in which providing information to participants about the research aims and study context has been shown to increase response rates approximately 70 percent and verbal information providing higher response rates as compared to written information (Khamisa, Peltzer, Ilic, & Oldenburg, 2014; Broyles, Rodriguez, Prie, & Sevick, 2011).

Interview data

A team of three investigators and six network facilitators conducted semi-structured in-person and telephone interviews with approximately 165 participants. All in-person interviews, which ranged in length from 45 minutes to two hours, were performed with facility CMDs to get the highest level of detail and insight into the problems facing health facilities. These interviews, which frequently touched on ways in which the NAO could ameliorate any identified issues, took place throughout a 22-month period, beginning before the initiation of NAO management activities. Interviews of lesser formality were performed on key staff members at each facility, typically consisting of two head nurses and sometimes an administrative assistant. For example, if a facility had an operations manager who, during initial contact, was knowledgeable about the facility's internal and external activities, a shortened interview would be scheduled with that individual. Though the majority of interviews were recorded, for those participants who were uncomfortable being recorded, information was collected through a written account of the interview. A combination of audio transcriptions and written notes were developed to create a qualitative data set.

Process data

A pre- and post-assessment of each facility's performance across five areas of administrative and clinical quality improvement was conducted by an external organization called CareFirst. CareFirst is an Africa-focused quality improvement organization that supports healthcare providers in resource-constrained settings. CareFirst's approach helps facilities attain increasingly complex levels of international quality standards, similar to that of The Joint Commission in the United States, and places facilities on an improvement path that ultimately qualifies them for full quality accreditation. CareFirst was commissioned to provide support to the NAO in measuring process improvements across all facilities through each network. Quality improvement interventions combined primarily monthly learning sessions, site visits, and change packages for network facilities.

Metrics for assessment grouped under five focus areas were each scored by CareFirst analysts. Focus areas looked at leadership responsibilities and accountabilities, workforce competency, patient safety environment, clinical care, and quality and safety improvement. Within each focus area, a hospital is rated on each metric based on a four-point scale of 0 to 3, with a 9 indicating that the area is not applicable for the facility (Tables 4.1.). Facilities' scores were captured at the beginning of the study, just before the implementation of improvement activities, and 12 months into improvement activities (Table 4.2.)

Table 4.1. Full list of CareFirst assessment areas, scored 0-3

FOCUS AREA
LEADERSHIP RESPONSIBILITIES AND ACCOUNTABILITIES ARE IDENTIFIED
1.1 Leadership responsibilities and accountabilities are identified 1.2 Leadership for quality and patient safety 1.3 Day-to-day planning is collaborative 1.4 Clinical and managerial contracts are effectively managed 1.5 Compliance with laws and regulations related to the clinic 1.6 Clear commitment to patient and family rights 1.7 Policies and procedures for high-risk procedures and patients Average score
COMPETENT AND CAPABLE WORK FORCE
2.1 All staff have personnel files and job descriptions 2.2 The credentials of physicians are reviewed 2.3 The credentials of nurses and other health professionals are reviewed 2.4 Staff members are oriented to their jobs 2.5 Patient care staff are trained in resuscitative techniques 2.6 Staff are educated on infection prevention and control 2.7 Communication among those caring for the patient Average score
SAFE ENVIRONMENT FOR STAFF AND PATIENTS
3.1 Regular maintenance of buildings 3.2 Control of hazardous materials 3.3 There is a fire safety program 3.4 Biomedical equipment is maintained in a safe condition 3.5 Stable water and electricity sources are available 3.6 Reduction of health care-associated infections through proper hand hygiene 3.7 Barrier techniques are used 3.8 Proper disposal of sharps and needles 3.9 Proper disposal of infectious waste 3.10 Appropriate sterilization and cleaning procedures are used Average score
CLINICAL CARE OF PATIENTS
4.1 Patients are correctly identified 4.2 Patient education about high risk procedures and informed consent 4.3 Medical and nursing assessments for all patients 4.4 Laboratory services are available and reliable 4.5 Diagnostic imaging services available, safe, and reliable 4.6 Anesthesia and sedation are used appropriately 4.7 Surgical services are appropriate to patient needs 4.8 Medication use is safely managed 4.9 Patients are educated to participate in their care 4.10 Care that is planned and provided is written down in a patient record Average score
IMPROVEMENT OF QUALITY AND SAFETY
5.1 There is a process for collecting and reviewing events that are unexpected and/or potentially harmful to patients 5.2 High-risk processes and high-risk patients are monitored 5.3 Patient experience is monitored 5.4 There is a complaint process 5.5 Clinical guidelines and pathways are available and used 5.6 Staff understand how to improve processes 5.7 Clinical outcomes are monitored Average score

Table 4.2. Results of facility improvement (N=55)

FACILITY	LEADERSHIP		WORKFORCE		SAFE ENVIRONMENT		CLINICAL CARE		QUALITY IMPROV.		ANY SUB IMPROV.
	Before	After	Before	After	Before	After	Before	After	Before	After	
1	0	0	0	0	0	0	0	0	0	0	
2	0	0	0	0	0	0	0	0	0	0	
3	0	0	0	0	0	0	0	0	0	0	
4	0	0	0	0	0	0	0	0	0	0	
5	0	0	0	0	0	0	0	0	0	0	
6	0	1	0	0	0	0	0	0	0	0	Yes
7	0	0	0	0	0	0	0	0	0	0	
8	0	0	0	0	0	0	0	0	0	0	
9	0	0	0	0	0	1	0	0	0	1	Yes
10	0	0	0	0	0	0	0	0	0	0	
11	0	1	0	0	0	0	0	0	0	0	Yes
12	0	0	0	1	0	0	0	0	0	0	Yes
13	0	0	0	0	0	0	0	0	0	0	
14	0	0	0	1	0	0	0	0	0	0	Yes
15	0	0	0	0	0	0	0	0	0	0	
16	0	1	0	0	0	0	0	0	0	0	Yes
17	0	0	0	0	0	0	0	0	0	0	
18	0	0	0	0	0	0	0	0	0	0	
19	0	0	0	0	0	0	0	0	0	0	
20	0	1	0	0	0	0	0	0	0	0	Yes
21	0	0	0	0	0	0	0	0	0	0	
22	0	0	0	1	0	0	0	0	0	0	Yes
23	0	1	0	0	0	0	0	0	0	0	Yes
24	0	0	0	0	0	0	0	0	0	0	
25	0	0	0	0	0	0	0	0	0	0	
26	0	0	0	0	0	0	0	0	0	0	
27	0	1	0	0	0	0	0	0	0	0	Yes
28	0	0	0	0	0	1	0	0	0	1	Yes
29	0	0	0	0	0	0	0	0	0	0	
30	0	0	0	1	0	0	0	0	0	0	Yes
31	0	0	0	0	0	0	0	0	0	0	
32	0	1	0	0	0	0	0	0	0	0	Yes
33	0	0	0	0	0	0	0	0	0	0	
34	0	0	0	0	0	0	0	1	0	1	Yes
35	0	0	0	0	0	0	0	0	0	0	
36	0	0	0	0	0	0	0	0	0	0	
37	0	0	0	0	0	0	0	0	0	0	
38	0	0	0	0	0	0	0	0	0	0	
39	0	0	0	0	0	0	0	0	0	0	
40	0	0	0	0	0	0	0	0	0	0	
41	0	0	0	0	0	0	0	0	0	0	
42	0	0	0	0	0	0	0	0	0	0	
43	0	0	0	0	0	0	0	0	0	0	
44	0	0	0	0	0	0	0	0	0	0	
45	0	1	0	0	0	0	0	0	0	0	Yes
46	0	0	0	0	0	0	0	0	0	0	
47	0	0	0	1	0	0	0	0	0	0	Yes
48	0	0	0	0	0	0	0	0	0	0	
49	0	0	0	0	0	0	0	1	0	0	Yes
50	0	0	0	0	0	0	0	0	0	0	
51	0	1	0	0	0	1	0	0	0	0	Yes
52	0	0	0	0	0	0	0	0	0	0	
53	0	0	0	0	0	0	0	0	0	0	
54	0	1	0	0	0	0	0	0	0	0	Yes
55	0	0	0	1	0	0	0	0	0	0	Yes

Together, the pre- and post-exposure assessments quantify each facility's improvement over the period during which they participated in network activities. The pre-assessment data suggests that the majority of facilities fall under the category 0 of "the desired activity is absent, or there is mostly ad hoc activity related to risk reduction" and category 1 of "the structure of more uniform risk-reduction activity begins to emerge". This low level of activity for most of the facilities is not surprising due to financial, human capital, and infrastructure constraints seen in this setting. For the purposes of this study, a facility moving from 0 to 1 is sufficient to qualify as substantial improvement, and a network with more than 50% of facilities advancing from 0 to 1 has substantially improved. This reference for substantial improvement is based on CareFirst's experience with over 1,700 hospitals and clinics. Members from CareFirst noted that for many of the facilities they have worked with in the past, improvement of any form may not be detectable over a one-year period. CareFirst, along with other quality improvement teams from the Institute of Healthcare Improvement that have worked in Nigeria's low-income health facilities, have noted that seeing improvements in patient outcomes often takes years and requires diligent collection of patient records. However, improvements are more often captured in terms of the successful implementation of processes and establishment of routines that meet the required quality standards.

Measures

Participants reported how helpful seven aspects of the network design and execution were for network members. This list of activities was created using literature on collaborative learning. In collaboration with the NAO and CareFirst, a quality

improvement engagement framework was developed through a literature review of Institute for Healthcare Improvement's Breakthrough Series collaboratives, discussions with managers from IHI, and on-ground realities of activities that are more and less favorable for implementation in our specific settings. From the literature review, an initial list of over a dozen possible interventions from collaboratives was developed (Weggelaar-Jansen, van Wijngaarden, & Slaghuis, 2015; Nadeem, Olin, Hill, Hoagwood, & Horwitz, 2013; Institute for Healthcare Improvement, 2003; Nembhard, 2009; Simanovski, et al., 2014). This initial list was then assessed for relevance to the study's particular developing country and resource-constrained environment, and which activities would be implementable within the study's timeframe. This process resulted in the seven network improvement activities itemized in Table 4.3.

Survey respondents and interview participants were asked a multitude of questions regarding the quality improvement activities that were implemented in their facilities. Questions touched on helpfulness of activities, management support, preferred learning style, and team functionality. Respondents were asked to measure each aspect of the engagement using a five-point Likert-type scale from 1 = no help, 2 = of little help, 3 = moderate help, 4 = great help, and 5 = very great help.

A distinction has been made in organizational learning literature between different types of knowledge. Know-what, know-why, know-how, and know-who have been distinguished as different aspects of knowledge (Lundvall & Johnson, 1994; Nonaka & Takeuchi, 1995). Two of these knowledge types, know-how and know-what, have been noted as being learned through collaboratives (Kilo, 1998). Know-what refers to informational knowledge about facts that can be broken down into smaller pieces and

communicated as data. In contrast, know-how refers to skills and the ability to do something based largely on intuition and skills related to pattern recognition.

Table 4.3. NAO network improvement activities

Network Improvement Activities	
<i>Activity</i>	<i>Description</i>
One-on-one meetings	Meetings held between NAO facilitators and the staff of the network participants. Similar to BTS collaborative faculty features, these meetings sought teach individuals from teams at each hospital improvement techniques and provide guidance as needed, including responding to the needs of network participants and how best to achieve those aims.
Group/board meetings	Meetings held with chief medical directors (CMDs) of all facilities in each network with the aim of discussing areas of mutual concern and potential collaboration opportunities.
Learning lecture discussions	All-day (6-8 hour) learning events for facility staff to teach key elements of administrative and care quality. Modeled after BTS learning sessions, participants are first given information on the elements, then provided with the opportunity to discuss amongst one another about the particular ways they each uniquely address them.
On-site facilitation	Support provided to facility staff by NAO facilitators. This includes many PDSA elements to identify problems, make changes, measure effects, and achieve outcomes. This facilitation takes the form of answering questions, reminders about reference materials, and problem-solving with individual facilities on ways to achieve success.
Phone facilitation	Telephone calls by NAO facilitators to network participant personnel with the aim of problem solving and addressing any hindrances to their performance.
Solicitation of staff ideas	NAO facilitators working with each network participant hospital's team to brainstorm ideas and feedback on ways to improve the change and implementation process.
Site visits	Visits by facility staff to a facility that is not their own, to showcase examples of best or worst practice and determine potential ways of improving processes.
Improvement manual	Similar to a BTS change package, a toolkit of examples of evidence-based best-practices from international health organizations, along with locally identified appropriate solutions that have been translated for the resource-constrained and developing country context.

In this study we aimed to explore the effect of different improvement activities on the two types of learning. However, cognitive testing of survey questions revealed that many respondents could not differentiate between know-what and know-how. Most of these early test respondents collapsed the two knowledge categories into one, assuming that knowing-how presupposes knowing-what. I thus omitted the knowledge distinction questions from the survey and interviews in order to reduce complexity.

Survey areas for assessment include activity helpfulness, management support, and team functionality. In total, the three topics included in the survey, aside from activity helpfulness, were meant to create variables that would act as covariates since prior research indicated that they may have an influence on the performance of quality improvement activities. The survey tool was adapted to include information on each individual participants' network participants' preferred learning style. Studies have shown that individuals differ in their styles of learning, and different learning activities may be more favorable for different learning styles (Pashler, McDaniel, Rohrer, & Bjork, 2009; Dunn & Dunn, 1998; Keefe & Ferrell, Developing a defensible learning style paradigm, 1990). Given that there exists some variation between the health setting where nearly all IHI BTS features were developed and the resource-constrained environment in which this study's target hospitals operate, it was important to understand the extent to which activities were appropriate. The additional learning style survey questions sought to determine if there was a match between the preferred learning styles of the participants and the approaches used by the NAO. Leadership of organizational learning has been shown to impact the psychological safety and mentoring of workers through a change process (Carroll & Edmondson, 2002), therefore perceptions of management support

were included in survey questions. Survey questions on management support were culled from constructs of the frequently used Survey of Perceived Management Support (SOPMS) and narrowed to fewer questions from the most relevant constructs (Eisenberger, Huntington, Hutchison, & Sowa, 1986). Management support, team functionality, and preferred learning style were shown to have no significant impact on helpfulness perceptions.

Through the survey I also gathered information on the preferred learning style of each participant. Respondents ranked how helpful statements reflecting the five different preferred learning styles were for helping them understand and learn new or different types of information and skills. Our questions were based on the validated learning style tool developed by Family 5, derived from the Simons and Ruijters (2008) model that focuses on organizational learning and change.

Participant statistics

The sample of 55 hospitals, at which the 165 participants were based, was composed of all privately owned and operated for-profit health facilities in the same city in Nigeria and approximately the same geographic location. These facilities were located 91 percent in an urban setting and the remaining 9 percent in a close-by semi-urban setting. Differences between the facilities in the NAO-governed networks (N=55) with regard to geographic setting and facility size were not statistically significant from a sample of other facilities (N=43) that have engaged in CareFirst improvement activities in the past. (Table 4.1).

Table 4.1. Comparative statistics of NAO facilities and other CareFirst facilities

	NAO Facilities (55)		Sample, other facilities (43)		p-value
	Mean	SD	Mean	SD	
Geographic setting	91% urban; 9% semi-urban		93% urban; 7% semi-urban		
Facility size					
Total beds	17.49	7.94	17.31	7.94	0.71
No. of outpatients (daily)	20.36	14.01	21.72	13.83	0.60
No. of admissions (daily)	2.64	1.07	2.78	1.10	0.49

To assess the average helpfulness measure of each aspect from the participants' perspective, I employed standard frequency analyses like those performed in previous studies determining quality improvement collaborative feature helpfulness (Nembhard, 2009; Weggelaar-Jansen, van Wijngaarden, & Slaghuis, 2015). The average helpfulness rating measuring from 1 = "No help" to 5 = "Very great help" was determined for each activity of the NAO. Mean helpfulness scores can be found in Figure 4.1. Solicitation of staff ideas and on-site facilitation were perceived as the most helpful improvement activity with scores of 4.52 and 4.53 respectively. Site visits between hospitals and group/board meetings were scored as the least helpful improvement activity. Other improvement activities fell between these two extremes.

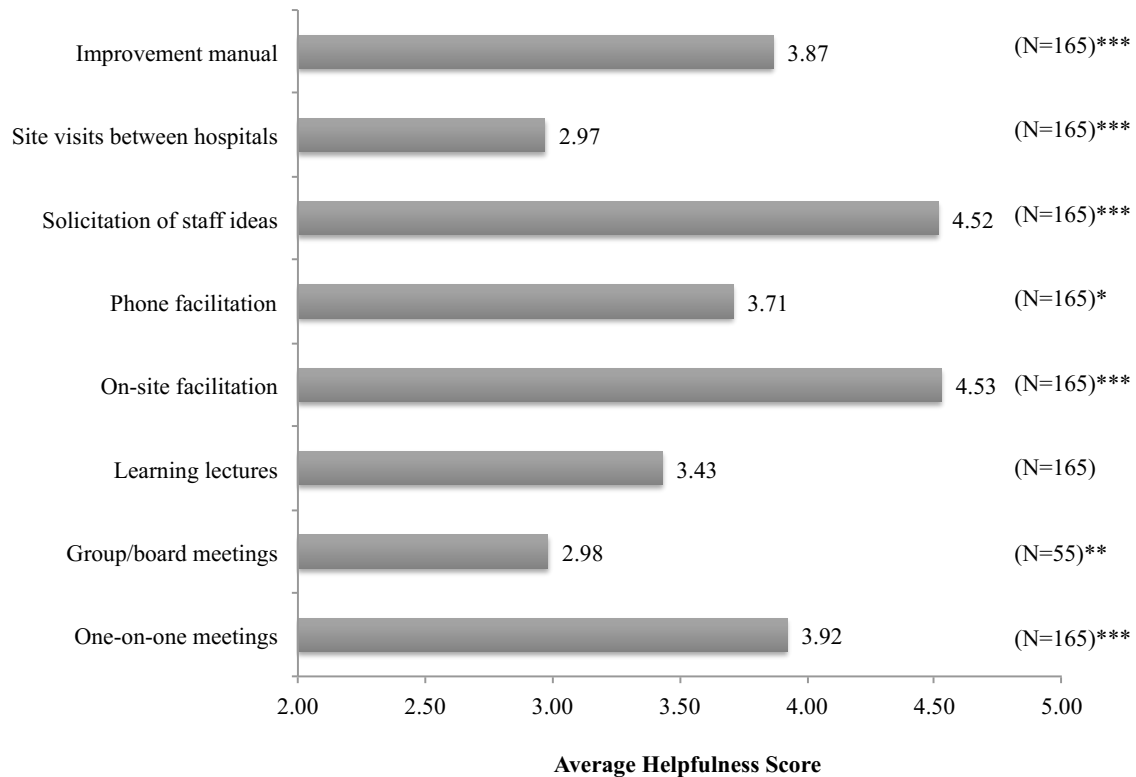
One-sample t-tests were performed to assess whether each score differed significantly from a score of 3.5 ($p < .05$). This number was used as the point of reference rather than a null of 0 since 3.5 indicates that a feature was perceived as being more than moderately helpful during improvement initiative implementation. The 3.5 cutoff on 1 to 5 scale is also preferred over the midpoint, 3.0, as it has been used as the point of reference previous work on assessing collaborative features (Nembhard, 2009).

Results

A number of the QI activities were identified as significantly better than the 3.5 reference point. The improvement manual, solicitation of staff ideas, phone facilitation, and one-on-one meetings were given significantly better ratings, suggesting that staff at facilities found them more than moderately helpful, with the remaining three items found not to be statistically different from 3.5 and less than moderately helpful toward achieving the NAO's quality improvement goals.

An ANOVA test was performed by network to determine if there were differences between networks on perceptions of helpfulness of different activities. Figure 4.2 shows activities with significant differences, with the standard p-value of $p < .05$ shown along with other significance levels ($p < .001$, $p < .01$, $p < .05$, $p < .10$). Figure 4.3 shows non-significant differences between different networks. One-on-one meetings, phone facilitation, and improvement manuals were seen to be significantly different between facilities in Networks 1 and 5 as compared to all others.

Figure 4.1. Average perception of NAO quality improvement activity helpfulness



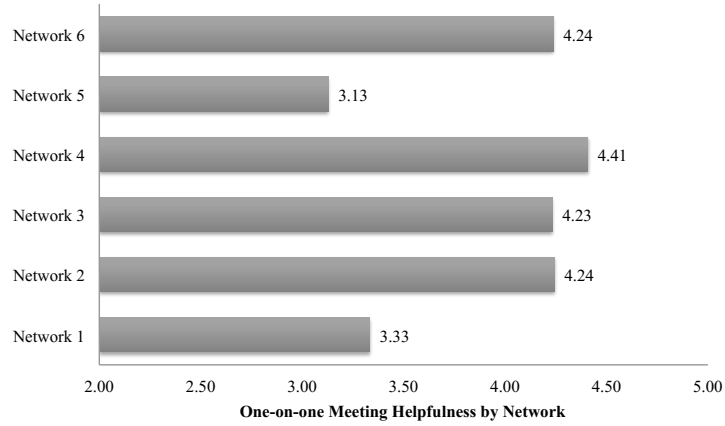
* = $p < .05$ (relative to scale median of 3.5)
 ** = $p < .01$ (relative to scale median of 3.5)
 *** = $p < .001$ (relevant to scale median of 3.5)

Average helpfulness scores were assessed using one-sample t-tests to a score of 3.5. This score represents the upper limit score for an activity that was deemed moderately helpful. A score that is significantly higher than 3.5 indicates that an activity was more than moderately helpful to network participants while they were attempting to implement quality improvement initiatives.

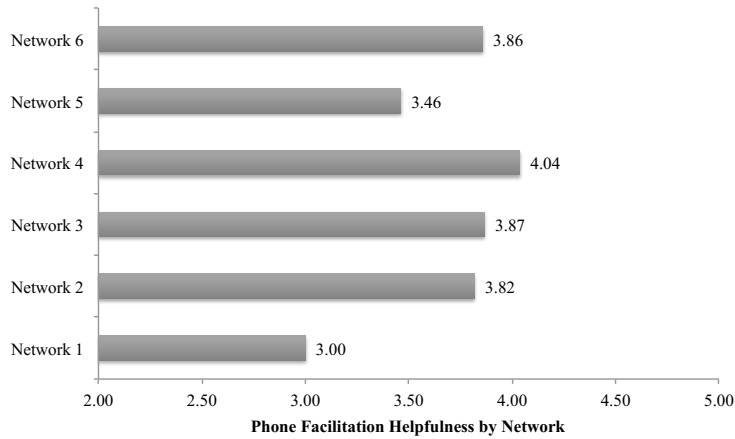
Cohen's *d* effect sizes of 0.20 indicates a small effect, 0.50 a moderate effect, and 0.80 a large effect. The Cohen's *d* for the activities that were shown to be statistically significant: 0.34 for Improvement manual, 0.41 for Site visits, 2.02 for Solicitation of staff ideas, 0.20 for Phone facilitation, 1.66 for On-site facilitation, 0.43 for Group/board meetings, and 0.387 for One-on-one meetings.

Figure 4.2. Significantly Different Helpfulness of Activities Between Networks

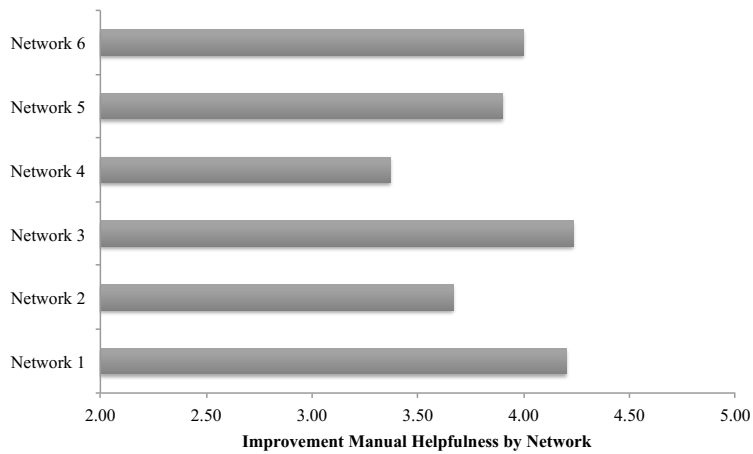
Note: This analysis of helpfulness scores are drawn from the ANOVA. The significance assesses whether the difference in mean scores between networks is statistically significant at the noted level.



***One-on-one Meeting, $p < 0.001$

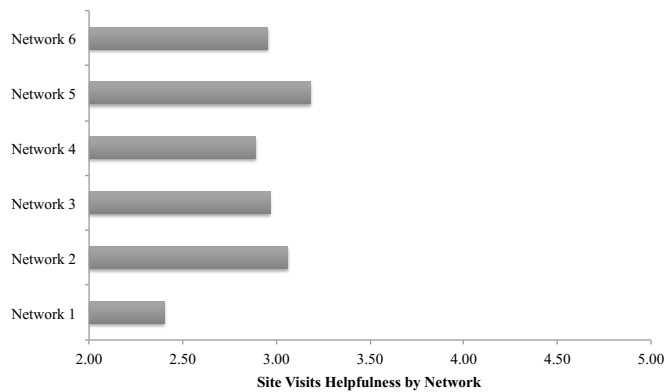
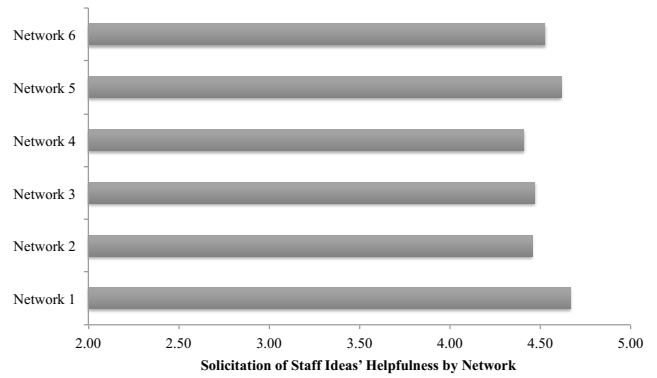
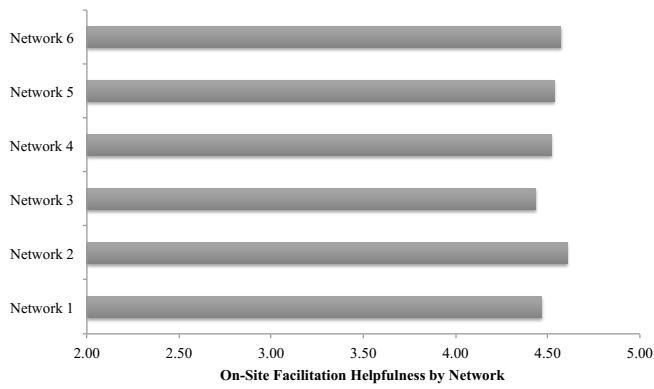
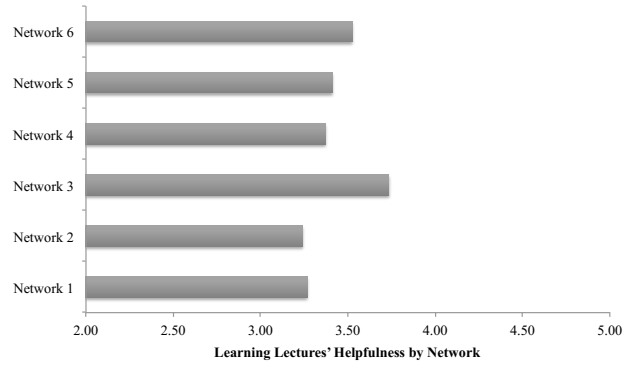
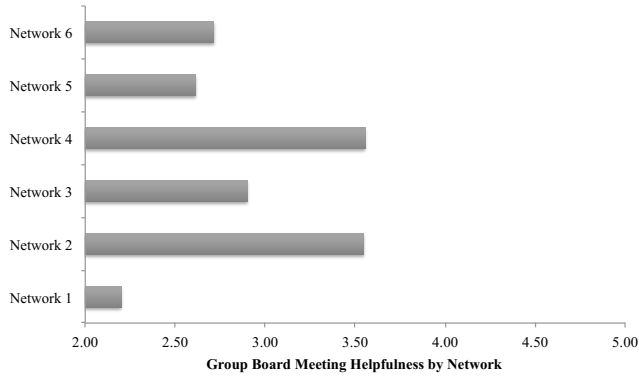


*Phone Facilitation $p < 0.05$



*Improvement Manual $p < 0.05$

Figure 4.3. Activities with no significant difference in helpfulness between networks



To develop an idea of how network performance may have been affected by perceptions of activity helpfulness, facilities that improved significantly were compared to facilities without substantial improvement for similarities and differences in their helpfulness scores. Facilities were identified as having improved through the pre- and post-assessments performed by CareFirst. Assessments were across five areas of hospital quality—leadership, workforce, safe environment, clinical care, and quality improvement. Across all assessment areas, all facilities began at the most basic quality level of “0”. Based on input from the CareFirst team and managers from the Institute of Healthcare Improvement (IHI), it was determined that a facility moving from a “0” to “1” in any area of the five assessment areas constituted substantial improvement.

Based on the pre- and post-assessments, 20 of the 55 facilities were identified as having made substantial improvements. The helpfulness scores of the 20 significantly improved facilities were aggregated and combined and then compared against the scores of those facilities that has not made substantial improvement (Figure 4.4). Two improvement activities, one-on-one meetings and group/board meetings, showed significantly different scores between the two groups.

To provide a comparison at the network-level, networks that contained a majority (more than 50 percent) facilities that had made substantial improvement were grouped together as networks with substantial improvement. Their activity helpfulness scores were compared to those of networks without a 50 percent majority of facilities with improvement (Figure 4.5.).

Figure 4.4. Helpfulness score comparison by facilities with substantial improvement

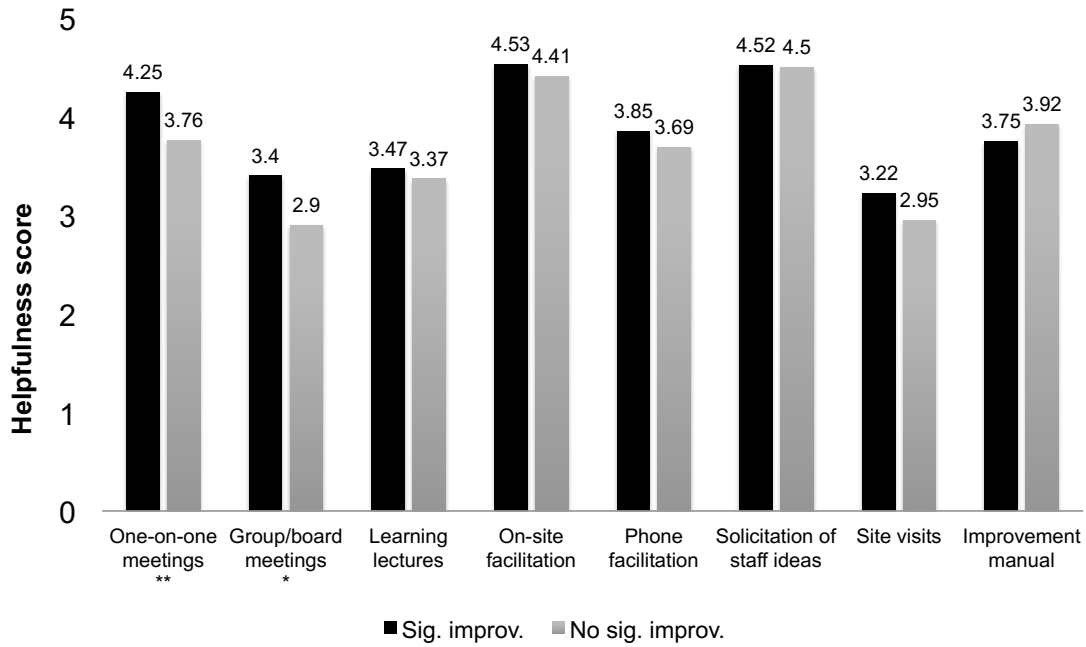
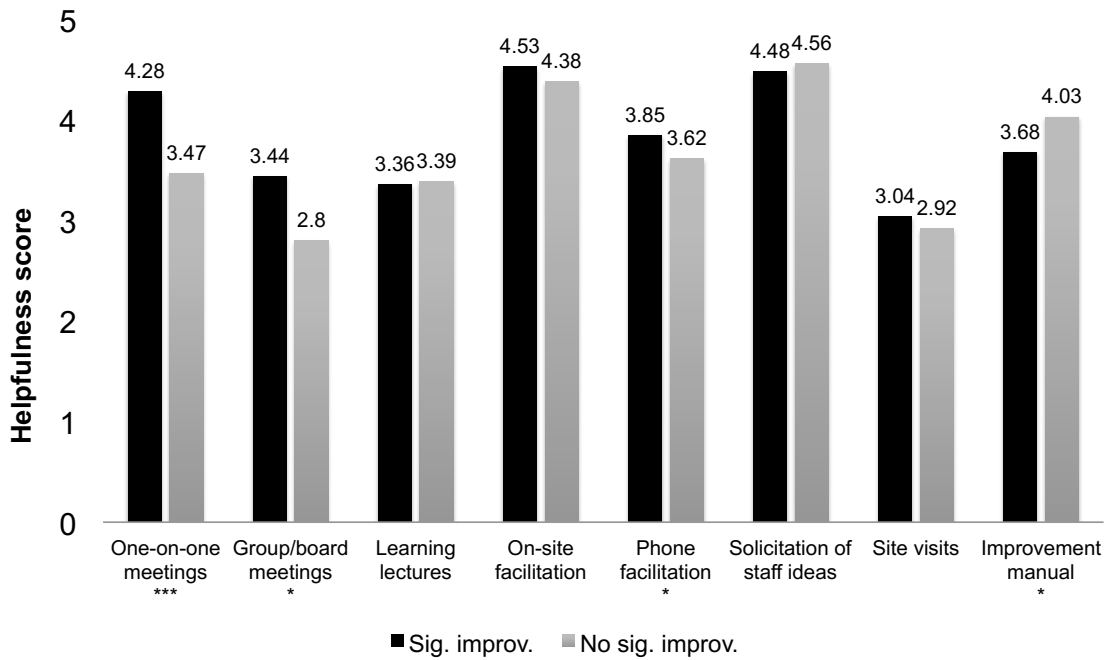


Figure 4.5. Helpfulness score by networks with substantial improvement



Networks with substantial improvement had, on average, 55 percent of facilities move from “0” to “1” in at least one area of assessment, while networks without substantial improvement had an average of 15 percent of facilities with any movement. At the network level, the networks that experienced significant improvement found 3 improvement activities to be more helpful than did networks that experienced less improvement. Those networks that experienced less improvement found one improvement activity, manuals, to be more helpful than significantly improved networks.

Lastly, the preferred learning style of each network (Figure 4.6.) and significantly improved networks (Figure 4.7.) was determined through analysis of survey questions focused on the five types of learning.

Figure 4.6. Preferred learning style by network

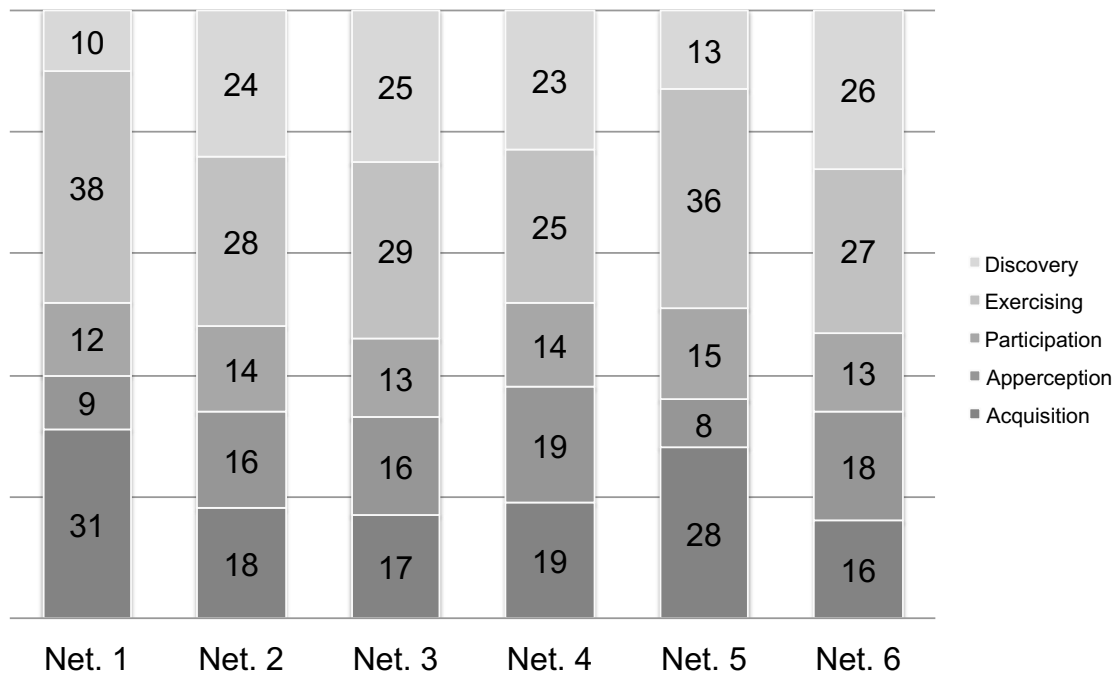
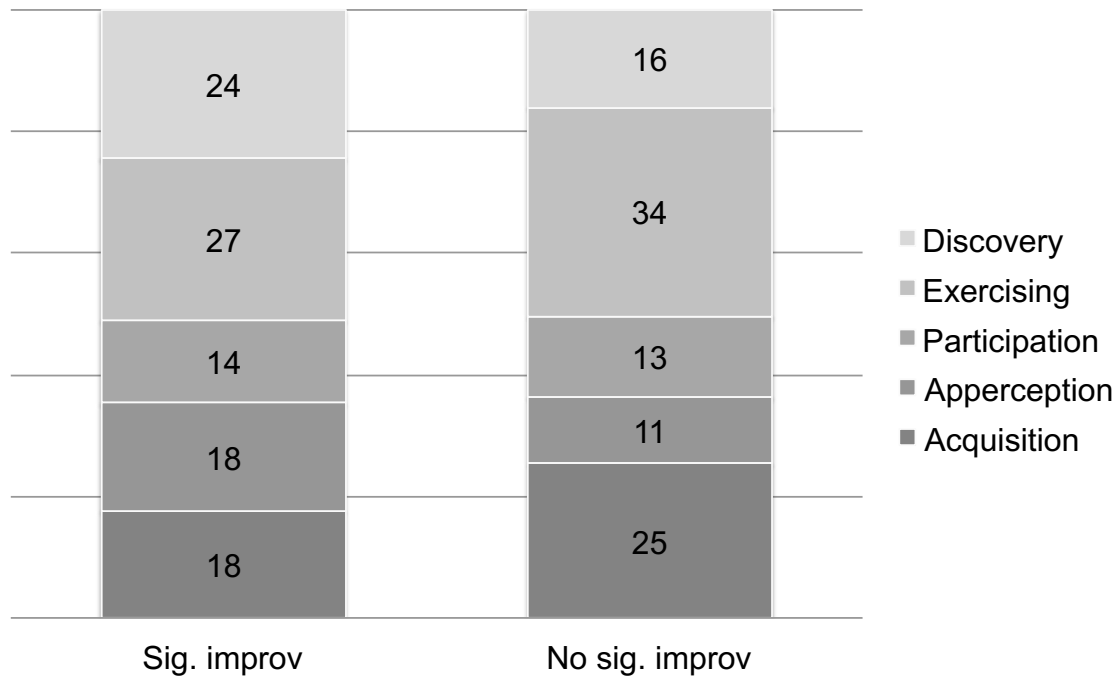


Figure 4.7. Preferred learning style by significant improvement



Discussion

Results indicate that participants found useful five of the eight improvement activities that they were engaged in through the NAO. The improvement manual, solicitation of staff ideas, on-site facilitation, and one-on-one meetings were the four activities that received the highest helpfulness scores across all facilities, while site visits between hospitals and group/board meetings received the lowest scores. The mean Cohen *d* effect size across all statistically significant activities above the 3.5 threshold is 0.92, reflecting that these activities had a large effect in terms of helping participants achieve the NAO’s improvement objectives.

The interview and meeting data gathered from participants provided insight as to why activities that were identified as more than moderately helpful were perceived that way. Many of the comments made by participants centered around the opportunity to

receive information and feedback immediately. One head matron nurse at a facility commented:

“I go for the learning lectures every time. I sit there and they talk and they talk and they talk. They tell us the things that we should know. Some of the people ask questions, but many of us just sit and listen. Do you know why? Because it doesn’t enter [the mind] in that type of situation. It does not help me to just sit and listen. I want to be close to you and always knowing what I can ask you again and again.”

This nurse is a leading staff member at her facility, but still did not feel comfortable asking questions in a learning lecture setting. In comparison to those activities noted as being more than moderately helpful, less than moderately helpful activities were generally attended by more people. Learning lectures, group/board meetings, and site visits between hospitals all involve interaction and communication amongst attendees. The larger audience required for such activities may cause participants to be hesitant to speak up or ask questions, potentially exposing their lack of knowledge or understanding of meeting content.

This concern with potential embarrassment was seen not only for nursing staff, but also with CMDs as leaders and owner-operators of the hospitals.

“I very much like the site visits to be able to see what other people are doing. Maybe there is something they are doing at their place that is better than what we are doing at our own place. We can learn from each other...but I just look with my eyes. I don’t like to ask too many questions. Some of them will be thinking I don’t know what I am doing. Or maybe even that I am weak and they can just take my patients. So even though I like it, I make sure I just look. I don’t ask questions too much.”

Across all levels of the facility, from leaders to lower-level clinical staff, the comments provided in follow-up meetings and interviews reflected that activities viewed as less helpful were those where the participant had to either speak up in a group setting or otherwise showcase the level of knowledge and understanding they had of clinical and operational tasks. Reputational risk amongst colleagues and between staff members seems to have played a large role in participants' perception of activity helpfulness.

Results also indicated that one-on-one meetings, phone facilitation, and the improvement manual were viewed significantly differently across networks. One-on-one meetings and phone facilitation were generally seen as helpful by all networks except networks 1 and 5, while the improvement manual was viewed as less helpful by networks 2 and 4. Interestingly, networks 1 and 5 were the two lowest performing networks with regard to the number of facilities that made improvement on any assessment areas, both having fewer than 15% of facilities making any improvement while the average across all other networks was 49% of facilities.

Of utmost importance, results gave evidence showing that activities that focused on learning by oneself rather than learning in groups were viewed as more helpful by networks that had made substantial improvement than by facilities and networks that had not. This particular finding helps to explain the variety of results on the effectiveness of interorganizational learning initiatives and the helpfulness of different quality improvement collaborative components. The activities that showed the most divergence in helpfulness between improved and not improved networks are those where participants are able to ask questions and receive immediate clarification (one-on-one meetings, phone facilitation) and those that give participants the ability to review the information

multiple times on their own (improvement manual). This notion is supported by the interview comments and meeting feedback provided by participants. In the developing country context of our study, participants from networks that make substantial improvement favor activities where they are able to review information with an expert from the NAO or a small group of others, whereas participants from networks that do not make substantial improvement strongly prefer activities that allow them to examine information individually. This may imply that learning with others provides opportunities to discuss information and ensure accurate understanding, while studying information alone may lead to misunderstanding of information or infrequent review of information.

Looking at the results on each network's preferred learning style, the worst performing networks (1 and 5) had a strong preference for a different style of learning than all other networks. Acquisition and exercising were preferred by the majority of participants in the same networks that showed no significant improvement. These learning styles are guided by learning from materials developed by experts and practiced in low-pressure settings, which reflects networks 1 and 5's significantly high scoring of the improvement manual. High performing networks also preferred exercising, but their fondness of slightly more interactive activities is shown with discovery being preferred nearly equally to exercising.

These results raise the question of why networks with lower performance preferred activities driven by self-learning (improvement manual) much more than activities that required interaction with one other (one-on-one meetings, phone facilitation) and activities that required higher levels of interaction and collaboration (site

visits, learning lectures, on-site facilitation). These results suggest that the NAO's activities for fostering interorganizational learning may work best for organizations that already have a basic level of *know-what* knowledge. Participants in organizations that already know that basics of what to do will be more comfortable exchanging ideas on the *how's* for implementation. One possible explanation is that, given the reputational risks involved, the worst performing networks want to better understand *what* to do before they are willing to interact with others to exchange ideas and learn best-practices.

Results here in our developing country context are different from what has been found in studies on the effectiveness of collaboratives in developed countries. Others have shown that inter- and intraorganizational activities should be combined to reap performance benefits (Ancona & Caldwell, 1992; Nembhard, 2009). However, those findings are based on the experience of organizations that already have a basic level of knowledge on the topics for improvement and collaboration. When directly asked about this aspect in follow-up interviews, participants in low-performing networks provided insight on their thinking process for preferring self-teaching activities.

“One will feel that in this area, where we are, there are not many doctors who know what they are doing. Is it true? Yes, it is true. If you are closer to [the city proper] you will be knowing more because they have more information there. What we need here now is the information. Let me study it. Let me give my nurses to study it. First and foremost we need to make sure we know what we are doing.”

In contrast, participants from high-performing networks tended to speak more about meeting with experts and gaining knowledge from the NAO.

“So maybe I know what I doing, clinically. The problem is how can I be sure? By asking [the NAO facilitator] directly. I can speak to them on the phone or when we have our meetings and ask if this and this and that thing

we are doing is okay. Sometimes they will say it is very very okay. Other times they will say no no it is bad. So by asking them, I will know.”

All participants from all networks favor self-study or learning from an individual expert over activities that required interorganizational interaction. The activities that were most interactive between facilities in each network, site visits between hospitals and group/board meetings, received the lowest helpfulness scores of all. Previous studies on activities under quality improvement collaboratives have also found that site visits between hospitals are not a great help to participants. However, this was due to difficulties in transferring tacit knowledge as opposed to not having the basic general knowledge as is suspected for these hospitals. These results do not imply that interactive activities are never helpful, but rather that they are not aligned with the needs, preferred learning style, or fears (reputation risks) of participants working in organizations within a resource-constrained setting such as the low-incomes areas of Nigeria.

Further investigation into general versus implementation knowledge levels amongst facilities in resource-constrained settings is required to provide more clarity on the helpfulness of collaborative activities. Managers of not only networks of hospitals but also of individual hospitals in developing counties will benefit from knowing how to modify their learning activities to be more effective. A potentially effective approach may be first to provide facilities with books, reports, journal articles, and other material conducive for self-learning in order to ensure a basic level of general knowledge. Following this, the knowledge from the self-learning process can be verified by an expert through one-on-one meetings and phone facilitation.

Finally, to achieve interorganizational and collaborative learning objectives, implementation knowledge can be shared between facilities through learning lectures, group/board meetings, and other means of transferring knowledge between facilities. This study suggests a hierarchy of learning activities, where three different tiers are conducive to learning when network facilities are at different stages of readiness. A phased learning approach that reflects the learning preferences of participants and the needs of facilities may produce better performance outcomes than the current parallel approach.

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CHAPTER 5

CHAPTER 5: Practical Application

In this dissertation, the creation and performance of inter-organizational networks under a single governance entity has been examined in the context of hospital networks in Sub-Saharan Africa, specifically Nigeria for these studies. Nigerian health care facilities that were previously independent were brought together through a network administration organization (NAO) for the purpose of improving quality of care, leveraging inter-organizational resources and capabilities, and ultimately lowering the cost of care delivery. Nigerian health care facilities are fitting research settings due to the currently fragmented nature of health care delivery, with each facility operating as an island with little connection or interaction to others in their geographic area. Although these facilities typically each have insufficient knowledge and ineffective management, they are unlikely to partner with one another or otherwise collaborate in order to improve learning or create operational efficiencies. Despite their understanding the potential benefits of working together, the obstacles to collaboration—such as trust, financial constraints, and knowledge resources—are often too great for a group of facilities to surmount on their own. The challenges to collaboration make such facilities well suited for improvement through support from external management entities such as a network administrative organization.

The studies in this body of work have focused on the impact that an NAO form of governance can have on the performance of a network of health facilities. The information put forth here has helped explain the differences in performance outcomes of the NAO by examining each of the networks in terms of contextual characteristics, shared

activities and trust, and quality improvement activities. This type of insight into potential ways managers can improve inter-organizational collaboration amongst health facilities in a resource-constrained and developing country setting is in many ways valuable for the development of the health system in low-income countries.

Current approaches to the developing country health systems challenge

The public health and development communities have long expended time, effort, and resources on various programs and initiatives with the aim of improving health outcomes in low-income countries. Many individuals, groups, and organizations have attempted to improve both population health as well as the health care systems of nations in the developing world, focused primarily on the traditional tenets of improving the quality, accessibility, and affordability of care. The inspiration for the majority of these programs has been to improve the public health sector in low-income countries, guided by the thought that through engaging governments, assuring the availability and delivery of health goods and services, and fostering fiscal responsibility, public health systems will eventually improve to provide sufficient care for ailing populations. This focus on the public health sector has created a system in which public health facilities receive the majority of international and donor funding, with little financial support or knowledge and information resources being provided to the private sector.

Remarkably, despite the fact that the private sector accounts for the majority of care services delivered and a large portion of care facilities in most Sub-Saharan African countries, development programs focused on health have routinely paid little attention to the private health sector. Given few options within generally troubled health systems, data indicates that many patients seek care from the private health sector (Barnes,

Chandani, & Feeley, 2008; Levin & Kaddar, 2011). Looking at woman and child health as a proxy for general health seeking behaviors, surveys on the percentage of women giving birth in private facilities confirm the trend that more than 60 percent of women in low-income countries receive care in private sector facilities (Limwattananon, 2008). Over 50 percent of care provision in Sub-Saharan Africa is provided through the private sector (International Finance Corporation, 2008). In Nigeria, the private sector accounts for over 60 percent of health care provision in the country, with higher percentages being seen in urban cities like the capital city of Abuja and the commercial and financial capital Lagos. The significant size and scope of the private health sector in Sub-Saharan Africa means that long-term health outcomes on the continent are, to a large extent, intricately tied to the success and growth of the private health sector.

Regardless of the size and expected future dependency on the private health sector given growing populations, there are several problems the sector faces that hinder its potential for impact in the overall health system and on long-term health outcomes. Issues of poor and variable quality of care persist. There is a debilitating lack of appropriate data systems in terms of both patient information and financial records. Most importantly, there are market failures in the sector centered on its heavy fragmentation and the resulting inability to scale interventions and activities (McKeon, 2009).

The issues with fragmentation and scale in the Nigerian health sector have stemmed from two surface-level hindrances: poor quality of care and high cost of care. However, at the root of these two hurdles are the underlying problems of ineffective management and inefficiencies of scale and scope. Poor quality of care and the high cost of care delivery have been driven by lack of operational efficiencies within and between

health care facilities, as well as by the mismanagement of already limited resources by owner-operators with little managerial knowledge or experience (International Finance Corporation, 2008). Poor quality of care has resulted in consistently poor performance on international health indices showcased through disproportionately high maternal and infant mortality rates, high incidence and prevalence of communicable diseases, and a perpetually high death rates from trauma (Wollum, Burstein, Fullman, Dwyer-Lindgren, & Gakidou, 2015). The high cost of care has left millions of patients with insufficient access to affordable health services and interventions, further exacerbating the poor health outcomes that are seen nation-wide (Gomez, et al., 2015; Onwujekwe, et al., 2010).

Insufficient management is a key issue across many industries in Sub-Saharan Africa, with particular impact within the healthcare industry where many clinicians enter facility owner-operatorship with scant knowledge on what is required to successfully and efficiently deliver high-quality care. At an individual level, facilities often attempt to deliver an array of services, many outside their actual core capabilities, in hopes of capturing monetary value from a wider span of patient conditions. Facility-level operational requirements, such as management of patient clinical information, accurate and appropriate patient flow processes, and management of facility financial information, are often inappropriately performed at the majority of health facilities (Ohioze & James, 2015; Geoffrey, Okwuoma, Abaraogu, Uwalaka, Asonye, & Nwankpa, 2014).

In light of the numerous and varied issues facing the health sector in many developing countries, new models of care delivery that incorporate the private sector and address its critical constraints must be developed (Stevens, 2010). For example,

governments have frequently approached the issue as a scarcity of infrastructure, leading to the building of hundreds of new hospitals and clinics over the years (Saka, et al., 2012). However, new infrastructure with poor management and insufficient resources has often resulted in underutilized or abandoned facilities (Ogunfolu, 2010). Other approaches, often derived from the international donor community, have centered on developing innovative models to care delivery that strengthen entire health systems (Oyibo & Ejughemre, 2014). One such promising innovation in care delivery is the network model for the delivery of care services through social franchises, peer-to-peer networks, and centrally coordinated care networks. The network model for care in low-income countries has been growing over recent years. Between 2009 and 2012, the number of clinical social franchising programs in the developing world grew 85 percent, and the number of countries engaging in the model expanded by 60 percent (Ravindran & Fonn, 2011). Network models have delivered measureable improvements in health outcomes of 8.3 million DALYs in 2012 through 39 programs and several examples of successful initiatives across the developing world exist (Clinical Social Franchising Compendium, 2013).

Networks in Health Care

The potential impact of networks in developing countries is profound. Evidence suggests that health networks in low-income countries have been able to extend coverage of services to new areas and provide health goods at a lower or subsidized cost to low-income populations. However, most studies on physician networks or franchising behavior for the provision of social goods and services have focused on reproductive health service, looking primarily at coverage and cost for low-income populations.

Research on best practices for clinical networks, characteristics of how such networks can increase access, the number of services and quality levels, and their broader ability to shape regional health markets is needed for additional understanding and effectiveness of health network models.

The role physician networks can play in the Nigerian health system is being explored by governments, donors, and partner organizations that focus on health systems improvement. Various domestic and international organizations are attempting to identify ways to deliver health services through aggregated channels, such as existing social networks of medical practitioners or creating health insurance networks for HMOs. The previously mentioned constraints within the health system can potentially be removed or partially alleviated through the use of networked care models. Nigeria's private health system, being primarily composed of micro-and-small enterprises run by one to two providers operating out of home clinics, create a heavily fragmented market with little coordination. Through a network governance organization that ensures the basic processes of quality improvement and the essential resources for care delivery are in place, the network structure can increase inter-organizational learning and the sharing of resources and capabilities to drive private health facilities toward world-class standards of care delivery. Moreover, through a centrally and externally governed network administrative organization that brings health facilities together, the private sector can be defragmented and, in the long term, scaled for increased operational efficiencies across multiple sites.

Turning research lessons to on-ground application

In the preceding series of papers, I have viewed a network administrative organization-governed network as a flexible structure that is neither a top-down rigid governance system, nor a bottom-up loose association of providers. Rather, this network type sits between the two extremes and is able to engage facilities to take action as a centralized coordinating entity, and receive feedback and guidance from facilities on how best to shape network activities to optimally achieve pre-determined objectives. In this manner, a properly NAO-governed network is positioned to decrease fragmentation, spur the sharing of resources and capabilities, and improve the delivery of care in the health sector of many developing countries.

Network contextual characteristics' effect on performance

Chapter 2 of this work focused on the effect that contextual characteristics have on the performance outcomes of different networks. While holding structural characteristics constant across networks through the governance of an NAO, the different performance outcomes of different networks indicated that contextual characteristics of the network are important factors to consider. The impact that resource munificence and community cohesion have on network performance means that managers should pay close attention to these contextual characteristics and manage facility networks differently based on the level of resources available to them and the uniformity or diversity of the local community.

The positive impact of resource munificence on network performance has implications for the types of strategies that network managers should employ with highly resourced vs. low resourced health facilities in Nigeria and other similar developing

countries. In our results, we saw that even within the same urban setting, there exist some significant differences in the way health facilities are funded and their level of profitability. Facilities within networks in geographic areas that experience even slight economic advantages are better able to engage with the NAO and implement the improvement and collaboration activities necessary to achieve network objectives. While we examined resources in terms of in-facility profitability and excess cash-on-hand, a more appropriate and relevant measure (but one that was unavailable to us) is the varying amount of federal, state, and donor funding that is provided to different localities. With disbursements of development for health increasing to \$28.7 billion in 2009 from just over \$10 billion in 2000, health programs and health facilities in developing countries are receiving more aid than ever before (Leach-Kemon, et al., 2011).

The funding provided to health facilities has been shown to directly impact their ability to deliver comprehensive and collaborative care both individually and as a network of community-centered health organizations (Provan & Milward, 1995). In the developed country context, better-funded facilities are better positioned to implement changes and improve processes that lead to better care. However, the same is not always the case in developing countries due to difficulties with implementation, procurement of resources, and misappropriation of funds (The Global Fund, 2016). For this reason, it is critical that health facilities in developing countries are able to internally generate revenue and attain financial stability independent of federal, state, and donor funding. Resource munificence currently plays a large role in the success or failure of Nigerian health facilities, but through support and governance from a NAO, interorganizational

collaboration can create efficiencies, lower costs, and improve quality to spur improved financial profitability.

Community cohesion was also shown as a contextual characteristic that mediates the effect of structural characteristics on network performance. Community cohesion was assessed as being a result of the number of previous ties and interactive experiences people in the geographic area of the created networks have had. More practically, community cohesion needs to include the ethnic and cultural diversity that exists in a given geography. Although not captured in the studies here, it is extremely important for network and hospital managers to be aware of the ethnic composition of the communities they are attempting to develop into networks. Although on the surface to an outsider many communities in developing countries seem relatively homogenous when compared to the racial diversity seen in countries such as the United States and the United Kingdom, there exist strong ethnic and cultural lines that may cause division within even small local communities.

In the networks examined during this study, the lack of community cohesion may have stemmed from multiple different ethnicities living in the same geographic areas. If a community is highly diverse, long-held negative perceptions and biases between different ethnicities may have influenced the amount of trust and the willingness of facility owner-operators and clinical staff to work with others. As opposed to the case being made in the United States for the benefits of diversity in health care, diversity at the community level in developing countries with little experience on how to tackle diversity may be causing short-term harm that inhibits the long-term benefits that could otherwise take place (Seeleman, Essink-Bot, Stronks, & Ingleby, 2015; Parboteeah & Seriki, 2014).

Improvements to diversify local communities and the health care setting in Nigeria are likely to take place over time, but the path to such diversity is currently unclear.

Shared activities, fostering trust, and improving network performance

Chapter 3 of this body of work examined the effect of trust and shared activities on network performance. Results from this study indicate that there is a significant and positive relationship between shared activities and performance, with the relationship partially mediated by trust amongst participants. More practically for on-ground application by network managers and facility owner-operators, through the course of the study the NAO was able to increase the frequency of collaboration and interaction between facilities through a number of shared activities. A key aim of creating and managing networks of health facilities is to develop collaboration and cooperation that fosters the sharing of resources and capabilities, ultimately leading to lowered cost of care delivery through at-scale operational efficiencies. Theoretically, the NAO develops a strong and trusting relationship with each facility, and is able to act as an aggregator that scales facilities together by fostering collaboration amongst facilities that would otherwise not interact. The NAO's ability to develop trust and enhance collaboration depends on the facilities' participation in shared activities. Without facilities actively participating in group/board meetings, learning lectures, and other activities that foster interorganizational interaction, the trust that needs to exist between facilities will not develop

A big concern for network managers when encouraging facilities to collaborate is what level of trust is required to get networks to be cohesive, but not so strongly tied together that they exclude the NAO itself. Outcomes from two of the networks in

Chapter 3's study showed that with too little trust, a network can break apart and facilities will be unwilling to collaborate with one another. On the opposite end of the spectrum, with very high levels of trust a network can start self-governing without the NAO as an intermediary. Depending on the objective of the NAO, the self-governing result can be viewed as either a positive or a negative outcome. If the NAO's objective is only to ensure that facilities are collaborating, operating profitably, and serving the community successfully with high-quality care, then self-governance of a network is a favorable outcome. In this scenario, the NAO is happy to provide knowledge and learning resources in addition to other forms of support to the network facilities. However, some NAOs are created with a business objective in mind, being focused on the delivering high-quality care at affordable prices in order to generate revenue for both the network facilities and to themselves for a management fee.

Organizations such as Kaiser Permanente and other managed care networks in the United States, as well as the Aravind system of hospitals and clinics in India can be examples of centrally managed networks that create scale and operational efficiencies while also making reasonable profits for the network managers. In such cases, having facilities break out on their own and no longer dependent on the NAO as a connector or source of information and knowledge is not a favorable outcome. Without being the central coordinator, the NAO will not be able to extract rents from the facilities for the services they provide. Therefore, for simply attaining public-good aims of increasing quality and sustainability of a health care system, self-governance may be advantageous. However, if there is a money-making objective or a need to cover NAO expenses, self-governance is not an attractive outcome.

Interorganizational learning and improvement activities

Chapter 4 of these studies examines network participants' views on different aspects of quality improvement activities and provides insight on why certain activities were viewed as significantly more helpful than others. The study found that low-performing networks tend to favor learning activities that were based on self-learning and individual study while high-performing networks were more likely to find activities that used learning from an external expert more helpful. An important detail to note is that whether low- moderate- or high-performing, no facilities preferred activities that required them to discuss their own knowledge and experience. This was discussed as the reputational risk that participants face, where the individual may experience embarrassment or be perceived negatively by his/her peers based on the responses that are given.

In addition to the potential reputational risk that participants may feel, what may be more pertinent for network managers and facility owner-operators to implement helpful activities is the desire for basic general information that participants seem to be requesting. Particularly for low-performing facilities, the finding that the implementation manual and likely other material that can provide basic information as personal references and guides may add significant marginal benefit as compared to the cost. In Nigeria, medical education are faced with a shortage of properly trained staff, poor facilities, strikes that cripple the academic year, and a lack of modern teaching tools (Malu, 2010; Ezeanolue, 2011). Exacerbating the poor medical training situation, there exist few opportunities in-country for physicians, nurses, and other clinical staff to expand their knowledge base and improve their skills. Providing staff in network facilities with books, journals, and other best-practice material that advances their

understanding of up-to-date medical practice is relatively simple and cost-effective way for NAOs to increase the helpfulness of their activities and position facilities for future improved performance.

Conclusion

Based my experience in executing these studies and the creation and management of health facility networks in Nigeria, current performance and improvement outcomes indicate that building a network of health facilities in a low-income setting and developing country context such that seen in Nigeria requires the creation of multiple, small, localized networks that are individually customized to the needs of the particular interpersonal relationships, facilities, and communities within each network. This approach will require more meticulous planning and involvement with each individual facility than is seen in developed countries, largely due to the lack of research in the African setting and the resulting difficulty predicting how organizations may behave under various circumstances. However, given the low stage of care delivery that most facilities are currently at compared to world-class standards, the individualized and conscientious approach toward properly coordinating and scaling the private health private sector is the most likely to succeed.

It will not be overnight that progress will be made away from the current fragmented structure that exists in the Nigerian health system. Unlike what is seen in many developed health systems with a majority of of multi-physician and multi-specialty group practices, health providers in Nigeria are largely unwilling and unable to come together under the same roof as a consolidated legal group practice. However, the NAO-

governance approach and system of facility coordination is a promising model to tackle this challenge.

I view this model of localized, network-specific intervention activities as a commencement phase that begins the process of system-wide consolidation. This model serves as a stepping-stone toward, over time, getting providers under one roof for optimal sharing of resources and capabilities by working with what currently exists on-ground. Under the NAO-governance system, these small and medium sized hospitals are able to maintain their independence, yet engage in activities that foster collaboration and binding ties are created amongst facilities. Given the success of future NAO implementation by private firms, I anticipate the Nigerian private health system will be able to benefit from the creation of multiple NAO-governed networks, leverage network effects amongst facilities, and ultimately increase quality, accessibility, and affordability of care through an at-scale care delivery model.

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