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# Building Sustainable Collaborative Networks: A Healthcare Information Portal Case Study

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## ABSTRACT

This paper reports the findings of a case study of a collaborative network formed to develop and promote a healthcare information portal. We utilize prior research on the role of resources and capabilities in achieving competitive advantage to develop a conceptual framework of the resources and capabilities needed to sustain collaborative networks. We then apply this framework in analyzing the empirical case study in order to develop an initial understanding of this relatively under-explored phenomenon. Development and delivery of effective healthcare information systems increasingly relies on the collaborative efforts of a large number of stakeholders, underlining the importance of generating knowledge on how to manage collaborative networks post-formation.

## Keywords

Healthcare portals, collaborative networks, resources, capabilities, sustainability.

## INTRODUCTION

Inter-organizational collaboration enables organizations to co-specialize and complement existing resources with acquired resources (Rothaermel and Boeker, 2008). Accordingly, companies in a range of industries are forming networks of alliances (Kale, Singh and Bell, 2009). In particular, cooperation among potential competitors is becoming a common approach for managing product development and market creation in emerging technologies (Garraffo, 2002). For example, in many countries, efforts are being made to develop electronic health record systems and healthcare portals to digitally manage and exchange patient data between multiple authorized users, often including the patients themselves (Chou and Chou, 2002; Häyrinen, Saranto and Nykänen, 2008). The integrated and interoperable nature of such systems means that their development involves collaboration between a network of stakeholders, including solution providers, information providers, healthcare organizations and government health agencies. However, despite the strategic and operational benefits attributed to collaborative alliances and networks, they are often of limited success (Kale and Singh, 2009), suggesting the need for research into how such inter-organizational relationships and networks can be sustained over time (Braa, Monteiro and Sahay, 2004; Kale et al., 2009; Taylor, 2005).

We define a sustainable collaborative network as an inter-organizational collaboration involving more than two organizations that persists long enough to achieve a collective goal. Das and Teng (2000a) argue that the sustainability of a strategic alliance, and thus by extension a collaborative network, requires balancing three pairs of competing forces that act as internal tensions in collaborative arrangements. The first of these is between cooperation – the pursuit of collective goals, and competition – the pursuit of individual interests at the expense of others, often characterized as opportunistic behavior in collaborative relationships. A second tension is between rigidity in structuring inter-organizational connections and flexibility in modifying such arrangements to adapt to changing conditions. The third tension is between a short-term orientation that focuses attention on performance and encourages exploitation of a collaborative relationship and a long-term orientation that encourages investment in and commitment to a relationship. If sustaining a collaborative network requires balancing each of these internal tensions, how do the collaborating organizations achieve this balance? We suggest that collaborative networks need to possess certain resources and develop appropriate capabilities in order to be sustainable. In this paper, we draw on prior work on the role of resources and capabilities in achieving competitive advantage (Ayra and Lin, 2007; Barney, 2001; Das and Teng, 2000b; Dyer and Singh, 1998) to develop a conceptual framework of the resources and capabilities needed for sustainable collaborative networks. We then apply that framework to an empirical case study of a collaborative network formed to develop a healthcare information portal.

## RESOURCES AND CAPABILITIES FOR SUSTAINABLE COLLABORATIVE NETWORKS

Resources can be defined as tangible and intangible factors an organization possesses or controls that are available to be utilized to gain competitive advantage or influence organizational performance (Amit and Schoemaker, 1993; Araya, Chaparro, Orero and Jogler, 2007). While resources are needed to execute an organization's functions, an organization requires appropriate capabilities to adequately exploit them to perform those functions (Araya et al., 2007). Thus, a capability can be considered as a higher-level resource, and defined as the "capacity to deploy resources, usually in combination, using organizational process to effect a desired end" (Amit and Schoemaker, 1993, p. 35). We propose that sustaining a collaborative network requires three types of resources, together with three types of capabilities to co-ordinate, deploy and enhance the productivity of these resources. Specifically, these are technological, organizational and governance resources and capabilities.

### Technological Resources

Increasingly, information and communication technologies (ICT) are deployed by organizations to facilitate and support inter-organizational collaboration, and make it more flexible and networked (Bajwa, Lewis, Pervan, Lai, Munvolk and Schwabe, 2007; Barua, Konana and Whinston, 2004; Dewett and Jones, 2000). Various ICT are capable of supporting and facilitating communication, co-ordination and co-operation across functional boundaries, acting as a "resource to facilitate the effective collection and utilization of information" (Tippins and Sohi, 2003, p.745). A rich and resourceful assimilation and dissemination of information can suppress management conflicts between the collaborative partners and allow a better co-ordination of collaborative activities such as decision sharing and process sharing (Legler and Reischl, 2003; Midwinter and Sheppard, 2000). This study proposes that three ICT-based resources are needed to sustain a collaborative network: (1) an *ICT infrastructure* that supports the communication process to achieve strong inter-organizational information processing within a collaborative network (this infrastructure could include the Internet, intranets, extranets, knowledge portals, group decision support systems, electronic meeting systems, and so on); (2) *technical skills and knowledge* to utilize the ICT infrastructure and facilitate a dynamic communication process that can lead to an effective decision making within a collaborative network; and (3) human and financial resources for *training* of users to efficiently and effectively utilize the ICT infrastructure, increasing information flow and richness within a collaborative network (Barua et al., 2004; Bharadwaj, 2000; Bhatt and Grover, 2005).

### Organizational Resources

Organizational resources are the set of factors which are crucial in managing the 'soft' side of the inter-organizational relationships in a collaborative network. They involve "the cultivation of socio-psychological or behavioral attributes that is beneficial in the alliance working relationship" (Robson, Skarmeas and Apyropoulou, 2005, p. 586). We suggest that collaborative relationships can be deepened where a high level of connectedness has developed between the members of a collaborative network. In particular, connectedness is enhanced through (1) partner *complementarity*, in which each collaborator is an approximately equal partner and contributes complementary resources or capabilities to the network (Das and Teng, 2000a; Kale and Singh, 2009); (2) a collaborative *culture* in which collaborative partners have compatible organizational cultures or share cultural similarities (Beugelsdijk, Koen and Noorderhaven, 2009); and (3) *commitment* to the network's norms and values and to maintaining ongoing collaborative relationships (Robson et al., 2005).

### Governance Resources

Governance resources are essential for stabilizing and regulating inter-organizational relationships (Das and Teng, 2000a), ensuring that partners act in the best interests of the collaborative network and minimizing the risk of opportunistic behaviors (Dekker, 2004; Faems, Janssens, Madhok and Looy, 2008; Kale and Singh, 2009). There are two types of governance resources that are needed to structure and control the development and maintenance of collaborative relationships: (1) *structural mechanisms* such as contracts and agreements that stipulate rights and obligations, define roles and responsibilities, and make provisions for network communication, co-ordination, operation, enforcement and dispute resolution (Chen and Chen, 2003; Kale and Singh, 2009; Reuer and Arino, 2007); and (2) *relational mechanisms* such as goodwill trust and reputation, that act to self-enforce governance in a collaborative network (Dekker, 2004; Dyer and Singh, 1998; Ireland, Hitt and Vaidyanath, 2002; Kale and Singh, 2009). In particular, trust is a critical resource in sustaining collaboration. The basis for trust in a collaborative network may evolve over time, from a deterrence-based trust that revolves around the structural and contractual regulation of collaborative partners, to knowledge-based trust as communication and information sharing occurs, to identification-based trust such as that based on goodwill, empathy and shared values (Lander, Purvis, McCray & Leigh, 2004; Shapiro, Sheppard & Cheraskin, 1992).

**Technological Capability**

Technological capability is the "ability to mobilize and deploy IT-based resources in combination or co-present with other resources and capabilities" (Bharadwaj, 2000, p. 171). It refers to a human competence in the form of the managerial skills needed to develop and leverage ICT technological resources to support and enhance collaborative activities (Bharadwaj, Sambamurthy and Zmud, 1999; Mata, Furest and Barney, 1995).

**Organizational Capability**

We suggest that an organizational capability is required to exploit the organizational resources such as complementarity, culture and commitment, which a collaborative network may possess. Organizational capabilities are typically embedded in routines and processes. Learning from experiences and learning-by-doing from these routines and processes serve as the primary means for the building of organizational knowledge (Grewal and Slotegraaf, 2007). As such, organizational learning is significant in determining the effectiveness of organizational capabilities (Grant, 1996; Schreyogg and Kliesch, 2007), needed for collaborative success (Kale and Singh, 2007). A collaborative network learning capability comprises of three types of learning processes: content learning that leverages a calculative commitment, partner-specific learning that builds attitudinal commitment, and management learning in which the collaborative partners constantly acquire, gather, share and disseminate the know-how of network management skills to strengthen the level of connectedness (Das and Kumar, 2007; Nielsen, Boer and Gertsen, 2008).

**Governance Capability**

A governance capability is required to design and manage the contractual agreements that regulate a collaborative network (Argyres and Mayer, 2007). Such agreements only serve as effective co-ordinating mechanisms if they are well-crafted and able to be enforced. Similarly, relational governance requires a capability that builds on goodwill trust and reputation, as well as the accumulation of past collaborative experiences, to establish positive expectations of partners' intentions (Ring and Van de Ven, 1994) and facilitate cooperative behavior. Together, governance capability is the dynamic capability to balance structural and relational governance mechanisms in performing the "coordinating and monitoring activities [that] must occur in order for collaborations to survive" (Bryson, Crosby and Stone, 2006, p. 49).

Based on the preceding literature review, a conceptual framework (Figure 1) is developed to explore the research question: How are resources utilized and capabilities developed in sustaining a collaborative network?
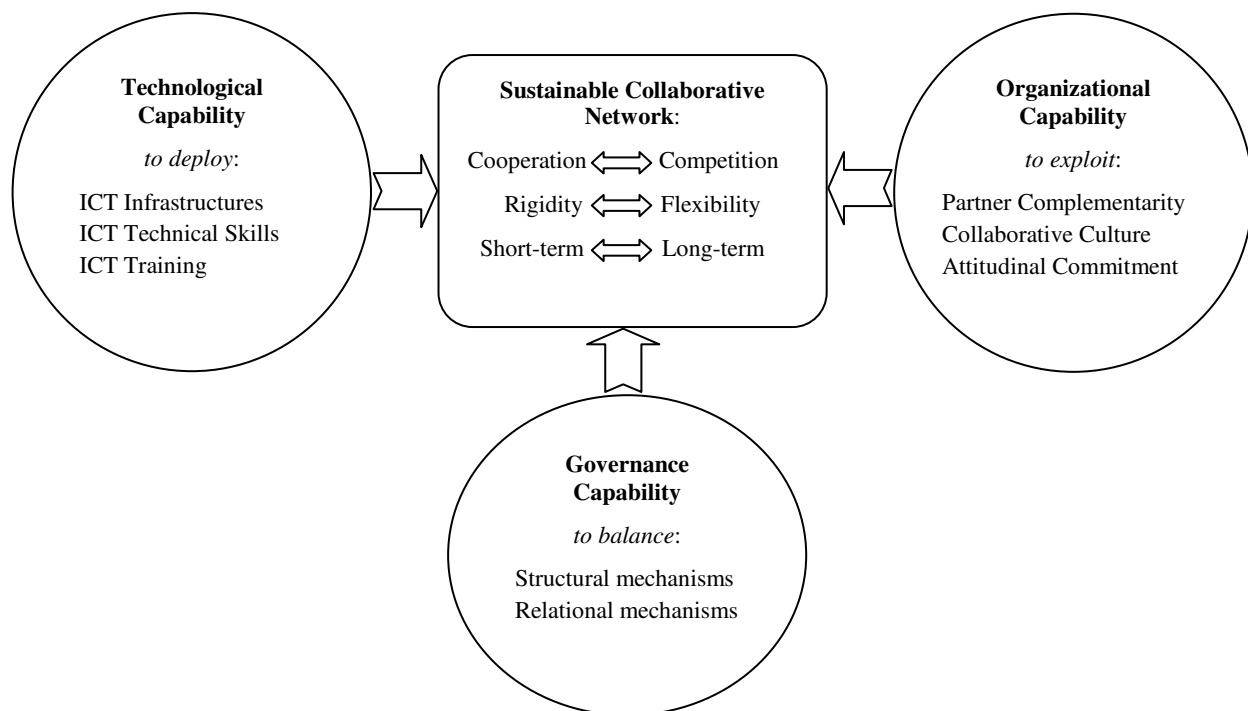


**Figure 1. Proposed Conceptual Framework**

## RESEARCH METHOD

In this paper we present the findings from a case study of an e-health collaborative network in order to evaluate the usefulness of the conceptual framework of resources and capabilities that we described above for understanding how collaborative networks are sustained. The exploratory nature of this research lends itself to a case study approach (Yin, 2003).

The case study involves the work of a collaborative network of eight organizations that sought to develop a national Patient Health Portal (PHP) for the New Zealand public. The rationale for the portal was to enable an increasingly aging population to effectively manage their chronic conditions and cardiovascular disease at home. The PHP was intended to provide a low-cost means for individual healthcare consumers to co-ordinate and choose healthcare services targeted to their health status and needs. The PHP project was envisioned as having two phases. The first phase was known as the Proof of Concept, and involved the development, consolidation and testing of a prototype PHP. The second phase involved rolling out the resulting PHP into a clinical environment by providing it to a number of primary healthcare practitioners and their patients. While the Proof of Concept was successfully developed and demonstrated, the collaborative network did not persist past this point. Instead, the network terminated when one of the participating organizations decided to develop their own healthcare information portal rather than proceed with commercializing the PHP.

The primary form of data collection was through semi-structured interviews with the key representatives from each organization involved in the collaborative network. Altogether, five face-to-face interviews and three telephone interviews were conducted with representatives from six organizations, with an average duration of one hour per interview. The organizations and interviewees are shown in Table 1. One organization did not agree to participate in the study and one organization no longer existed at the time the fieldwork was conducted. While the number of interviews is limited, it represents all the primary project participants available to be interviewed. A detailed interview protocol was developed to guide the interviews (Yin, 2003). All of the interviews were tape-recorded and transcribed. Complementing the interviews was a range of project documentation, including the terms of reference for the project and the various roles and responsibilities of each network member. The qualitative interview data was analyzed using a form of content analysis in which coded the text of the interview transcripts line by line, categorizing relevant data into themes based on our conceptual framework (Cavana, Delahaye and Sekaran, 2001).

| Organization (names are pseudonyms) | Roles in the project | Interviewee |
|---|---|---|
| Health Technology Consortium | Lead the project and provide governance through a contractual framework and funding agreements | CEO(x2) Programme Manager |
| Software Company | Multinational software company acting as project sponsor and providing ICT infrastructure including a server environment and collaboration software | Health Sector Account Manager |
| ITConsult | Manage the project and build the health portal architecture | Project Consultant |
| Primary Health Organization | Network of primary healthcare practices responsible for clinical focus in portal design and user acceptance testing | Chief Information Officer |
| Health Systems Provider A | Provide the patient management system for the portal | CEO |
| Health Systems Provider B | Provide a healthcare decision support system for specific chronic health conditions | Not available to be interviewed |
| Health Information Provider A | Provide an online tool for consumer healthcare information and services search and referrals | Business Development Manager |
| Health Information Provider B | Provide interactive voice response coaching for healthcare consumers | Not available to be interviewed |

**Table 1. Organizations and Interviewees**

**FINDINGS**

In this section we summarize the major findings from the case study organized around the conceptual framework of resources and capabilities described above. Where appropriate we provide participant quotes form the interview transcripts to illustrate a point.

**Technological Resources and Capability**

Members of the collaborative network utilized the available ICT infrastructure to support and facilitate co-operation among the collaborating organizations, primarily through document sharing and computer-mediated communication. The collaboration software provided by the project sponsor was perceived as easy to use and did not require specific technical support or training. However, while the ICT facilitated asynchronous communication of technical aspects of the project, a number of participants commented that aspects such as proprietary ownership of the portal and the financial incentives were not openly communicated: *"The wider project and important stuff never got communicated … There was no communication in that sense"* (CEO, Health Systems Provider A).

While the technological resources for communication were available within the network, the capability to fully utilize them seemed to be lacking. At the outset, the collaborative network had failed to identify a focal leader who could effectively co-ordinate and manage the communication process. As described by the CEO of Health Systems Provider A: *"From a communication perspective there was not really anyone in charge of it."* As a result, the official communication channel became mainly a repository system for delivering and sharing technical information, and issues related to project management and governance were relegated to infrequent face-to-face meetings that were not attended by all participants. This resulted in asymmetric communication of some critical issues between the participating organizations, rather than *"the openness of communication [that] is very important"* (Project Consultant, ITConsult).

**Organizational Resources and Capability**

The participating organizations shared a common mission in developing the PHP. This mission had a social dimension in *"enhancing people's lives … in the health sector"* (Project Consultant, ITConsult), and a commercial dimension in developing *"some really ground-breaking technology … that could then possibly be taken to elsewhere, overseas"* (Business Development Manager, Health Information Provider A). Initially, there appeared to be a shared culture uniting the collaborative network: *"We all thought that we had a good feeling about a shared goal and vision"* (CIO, Primary Health Organization). However, part way through the first phase of the project, it became apparent that one of the participating organizations, Health Systems Provider A, *"were very competitive rather than 'passionate' or 'visionary' and not able to see beyond competitiveness"* (CEO, Health Technology Consortium). This organization's commitment to the collaborative network appeared to be calculative, focused on the economic rewards accruing to them, rather than attitudinal and involving a willingness to cultivate and sustain the collaborative relationship. As emphasized by the Business Development Manager from Health Information Provider A: *"It was never a cohesive effort probably because one player involved in the project had different goals and objectives"*.

In terms of the capability to leverage the various organizational resources available to the collaborative network, significant content and partner learning took place. For example, the Primary Health Organization explicitly adopted a content learning approach in order to acquire and internalize the technical applications related to the PHP. Similarly, the Software Company was sponsoring the project in order to *"learn from it as a participant not necessary from New Zealand and also take those learning offshore"* (Health Sector Account Manager, Software Company). Partner-specific learning also occurred as the organizations involved worked together. Unfortunately, this included learning about Health Systems Provider A's non-collaborative attitude. Despite past collaboration experiences of some of the participating organizations that *"help in the degree of flexibility and reasonableness that people displayed toward this project"* (Project Consultant, ITConsult), the network lacked the capability needed to adapt to the opportunistic behavior exhibited by Health Systems Provider A and manage the tensions arising from it.

**Governance Resources and Capability**

The findings of the case study suggest that the structural governance mechanisms established for the project were insufficient to regulate the collaboration effectively. Despite a detailed contractual framework, the development of a business model for exploiting a successful PHP and sharing the economic benefits between the participating organizations had not been formally agreed. This allowed Health Systems Provider A to justify subsequent development of its own portal, which the other members of the collaborative network viewed as a betrayal of the shared vision for the project. This shared vision, together with the reputation and prior knowledge of various network members, had formed the basis of the trust that had characterized the initial collaborative relationships: *"There were levels of trust and friendship and camaraderie … because a number of*

*network members had worked together on previous collaboration projects*" (Programme Manager, Health Technology Consortium). However, as the interactions among the participating organizations proceeded, this goodwill trust was undermined by the opportunistic behavior of one of the network members: *"Fundamentally it failed at the end because at least one of the parties absolutely did not wish to share with anyone else"* (CIO, Primary Health Organization).

Overall, the collaborative network for the PHP project exhibited a weak governance capability. Despite the Health Technology Consortium devising a detailed contractual framework, the lack of development of a business model for commercializing the PHP going forward created uncertainty that meant that it was difficult for the network to regulate collaborative or non-collaborative behaviors: *"To put in this kind of effort and best people in the project you need to have a commercial agreement in place"* (Project Consultant, ITConsult). With respect to relational governance, the erosion of goodwill trust as the project proceeded meant that the network lacked the capability to self-enforce collaborative behavior and sustain its existence past the first phase of the project: *"With … one [participant] in particular, there was completely a level of distrust, which undermined the whole project. If that did not occur, I think the whole thing would have gone off further"* (Business Development Manager, Health Information Provider A).

## CONCLUSION

Summarizing our findings, we observe that while an ICT infrastructure can provide a technical basis for communication in a collaborative network, without the capability to organize and coordinate communication, communication asymmetries can develop between the members of a network. This in turn can hinder the development of a shared culture and commitment to the network necessary for establishing the high levels of connectedness among the partners needed to sustain collaboration when adversity or contentious issues are encountered. Despite the content and partner learning that took place in the PHP project, ultimately the collaborative network was unable to learn how to manage the opportunistic behavior of one of its members. This was exacerbated by the absence of structural governance mechanisms surrounding the commercial exploitation of a successful PHP and the inadequacy of relational governance of the collaborative network when goodwill and trust amongst the members became undermined. Ultimately, insufficient technological capability in managing communication in the network, insufficient organizational capability in learning to manage the collaborative relationships as the project progressed, and inadequate structural governance capability combined with the erosion of relational governance resources, meant that while the first Proof of Concept phase was a technical success, the collaborative network surrounding the PHP was not sustained into subsequent phases.

The case study provides useful insights into how both resources and capabilities are critical in managing the sustainability of a collaborative network. Further, it highlights how technological, organizational and governance capabilities complement and reinforce each other, and how all are needed to sustain a collaborative network. In terms of Das and Teng's (2000a) internal tensions, we can say that eventually competition within the PHP network jeopardized cooperation among its members, the structural arrangements did not provide sufficient rigidity to maintain network relationships and neither did the network possess sufficient flexibility to adapt to the challenges it faced, and that a short-term orientation by one organization conflicted with the longer term orientation implicit in the vision for the PHP shared by many of the other network members. While our conclusions are limited to the findings of a single case study, the conceptual framework of the resources and capabilities needed for a sustainable collaborative network we describe in the paper helps us understand and explain the outcome of this particular collaborative project. Further case studies of e-health collaborative networks are currently being conducted to help us refine and validate the framework.

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