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**STRIVING FOR NETWORK POWER: THE  
PERSPECTIVE OF SOLUTION INTEGRATORS AND SUPPLIERS**

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## **STRIVING FOR NETWORK POWER: THE PERSPECTIVE OF SOLUTION INTEGRATORS AND SUPPLIERS**

*This paper explores how companies in complex networks strive for inter-organizational power. Solution provision was chosen as the empirical context because of its highly networked nature and the complex power relationships within the networks. We raise the level of analysis from buyer-supplier dyads to a network involving solution integrators, their suppliers, and the users of their respective solutions. Our findings demonstrated that the integrators and suppliers take action to shape their power sources on three different levels. In contrast to the literature regarding solution provision, our findings from the analysis of six embedded cases indicate that suppliers can also achieve structurally powerful network positions by skillfully focusing their development efforts on fostering the complementarities of power sources. In addition, our study indicates that integrators may find it notably challenging to achieve power over their suppliers by creating better access to customer information.*

**Keywords:** solution provision, solution network, power source, case study

## **1 INTRODUCTION**

The current business landscape in developed economies is characterized by the increasing provision of services. For example, in the US, the contribution of services to the gross domestic product (GDP) was 79.7% in 2012 (Central Intelligence Agency, 2013). This change is also reflected in the transition of manufacturing companies toward solution provision, which means that manufacturers take responsibility for customers' problems by providing solutions to them. This provision is achieved by integrating various types of machinery, services, and technologies (Brax and Jonsson, 2009; Davies and Brady, 2000; Davies et al., 2006, 2007). Because of its complex nature, solution provision typically takes place in networks that are global and competitive (Brandenburger and Nalebuff, 1996; Choi and Kim, 2008; Wu and Choi, 2005). In this context, the concept of power is central because it enables an actor to influence other actors to change their intentions and actions (Emerson, 1962; French, 1956; French and Raven, 1959), which can subsequently be reflected, for example, in improved contract terms, perceptions of responsibilities, or information sharing among the actors (Meehan and Wright, 2011). In solution provision, such attempts to influence other companies are frequent because different networks compete against each other on one hand and, on the other hand, companies participate in different networks and compete with other actors in their own network. Within each network, the most powerful parties can improve their financial performance and reap a greater share of the network's profits through the use of their power over weaker actors (Gelderman et al., 2008; Ramsay, 1994, 1996). Thus, solution provision networks provide an interesting and timely context for studying how companies compete to gain power.

Originating in the social sciences, research investigating power in social networks (Dahl, 1957; Emerson, 1962; French, 1956) has developed in the area of marketing (e.g., El-Ansary and Stern, 1972; Etgar, 1976; Gaski, 1984; Hunt and Nevin, 1974; Wilkinson, 1973) and, more recently, focused on purchasing and supply management studies (e.g., Caniëls and Gelderman, 2005; Cox, 1999; Gelderman et al., 2008; Kraljic, 1983; Ramsay, 1994; van Weele and Rozemeijer, 1996). The literature has identified various sources of power, of which structural power induced from the position in the network (Bastl et al., 2013; Burt, 1992; Wu and Choi, 2005) has gained

increasing interest as competitive strategies have become based on networks (e.g., Teece et al., 1997; Teece, 2007). Other power sources can be divided into those that are specific to an organization, such as its tangible and intangible resources and capabilities (Cox, 1999, 2001a; Pfeffer and Salancik, 1978; Ramsay, 1994), and those that are specific to relationships between two organizations (e.g., Brax, 2005; Caniëls and Gelderman, 2005; Cox, 2001b; Johnsen et al., 2009).

Despite several previous insightful studies, there are still gaps in the literature regarding how companies attempt to change power sources in their favor. In addition, the discussion on power has paid little attention to the context of solution provision. The power sources have been studied in detail in the context of value networks (Kähkönen and Virolainen, 2011) and the meaning of power for the network actors (Meehan and Wright, 2011). However, in line with Borgatti and Halgin (2011), we argue that the sources of power are tightly intertwined with companies' efforts to alter and manage them. In other words, research examining inter-organizational power, especially in the context of solution provision networks, needs to explore how companies act to achieve power. These studies examine companies' actions, but understanding the link between the actions and the realized power also requires understanding how power is thereafter enabled through changes in the (structural) power attributes (Kähkönen and Virolainen, 2011). The focus of previous research on companies' actions to realize power has focused on buyers and their strategies in relation to supplier relationship management and purchasing (e.g., Caniëls and Gelderman, 2005; Cox, 2001a; Pazirandeh and Norrman, 2014; Ramsay, 1994; van Weele and Rozemeijer, 1996), whereas studies on suppliers have focused mostly on the actions of dominant suppliers (e.g., Gelderman et al., 2008).

In response to this knowledge gap, we set out to study power in networked solution provision (Brady et al., 2005; Brax and Jonsson, 2009; Davies, 2003; Davies and Brady, 2000; Tuli et al., 2007). We chose to utilize the perspectives of power in purchasing and supply management (e.g., Caniëls and Gelderman, 2005; Cox, 2001a, 2001b; Kähkönen and Virolainen, 2011; Pazirandeh and Norrman, 2014; Ramsay, 1994, 1996; van Weele and Rozemeijer, 1996) and focus our analyses on the actions taken to achieve power, which are carried out by solution integrators and their suppliers. Choosing solution provision as the research context enabled us to study situations in which industrial companies with varying emphases on sources of power

are part of the same network. Our aim is to identify the links between the decisions and actions by supplying companies, which lead to changes in their structures and positions in the network, thereby enabling power. Our approach in studying these links is similar to the one used in previous studies on purchasing power (e.g., Caniëls and Gelderman, 2005; Pazirandeh and Norrman, 2014; van Weele and Rozemeijer, 1996). However, we take the opposite viewpoint. We study the actions taken by supplying companies to improve the power in a supply network, whereas the above-mentioned studies investigated the purchasing strategies of buyers.

We aim to take part primarily in the discussion of *solution integration* and secondarily in the discussion on inter-organizational *power in purchasing and supply networks*. Specifically, we aim to reveal how power is achieved through actions and decisions that lead to an advantageous position in the network. The previous studies on power in service and solution provision used mostly a triadic perspective to focus on the bridge position. These analyses predominantly used a conceptual approach (Bastl et al., 2013; Choi and Wu, 2009b; Li and Choi, 2009). Consequently, these studies were on a broader and higher level, explaining power relationships and strategic choices, whereas we intend to add significant detail to this picture. In addition, we aim to contribute to the discussion on network power (e.g., Dahl, 1957; Emerson, 1962; French, 1956; Håkansson et al., 2009; Kähkönen and Virolainen, 2011; Pazirandeh and Norrman, 2014) through exploring the context of solution provision, in which companies participate to various degrees in providing goods, services, and technologies. Thus, we aim to answer to the following research question: *How do integrators and their suppliers take action to shape power sources and thereby achieve power in solution provision networks?*

Next, to establish a theoretical basis for our study, we review the literature on solution provision from a network power perspective and aim to augment it by analyzing the literature on power sources and actions taken to improve power. We identify alternatives for sources of power and develop a literature framework that links companies' actions, power sources, and inter-organizational power in the network. This framework is used in our empirical analysis. The research method is a multiple-case study and the methodological decisions are presented in the methods section. After that, through an empirical analysis of six embedded cases, we identify the ways that companies strive for power and changes in the power sources enabling the power.

The primary findings are presented as propositions in the cross-case section. Next, the primary contributions are summarized in the discussion and conclusions section in addition to the limitations of the present study and recommendations for further research.

## **2 THEORETICAL BACKGROUND**

This section presents the theoretical background of our research. We start by discussing solution provision in networks, which is the context of the paper. After a brief introduction of the context, we analyze the literature on power relationships in solution provision networks from the viewpoint of the power sources and we analyze the actions taken by companies to change their power sources.

### **2.1 Research context: Networked solution provision**

The current business landscape is characterized by networks of interrelated companies that can be simultaneously direct competitors and collaborators for common benefits (e.g., Brandenburger and Nalebuff, 1996; Håkansson et al., 2009). Solution provision (Brady et al., 2005; Brax and Jonsson, 2009; Davies and Brady, 2000; Tuli et al., 2007) can be observed as an archetype of interrelated operations, where very different types of companies are part of complex networks. Global manufacturers provide equipment uptime and services for outsourcing whole production lines, technology experts focus on supplying components of the equipment, local independent service companies provide maintenance for users, and so forth. Solution integrators are responsible for solving customer problems with customized solutions (Brax and Jonsson, 2009; Davies, 2003; Davies et al., 2006, 2007), instead of only delivering products and services in separate transactions. This responsibility can include, for example, integrating various types of machinery, power appliances, software, and services to offer the customer everything required to install, operate, and maintain an entire production line.

The operations of each actor in the solution network are interdependent. Integrators must rely on a number of suppliers of technologies, subassemblies, and services (Brady et al., 2005; Davies, 2003; Davies et al., 2006; Tuli et al., 2007). Furthermore, a maintenance provider can specialize in servicing the equipment produced by a specific manufacturer and therefore, depending on that party, in providing its

customers with technological expertise and maintenance solutions. In addition, most companies in solution networks participate simultaneously in a number of such networks and some compete more or less directly against each other. Because of this complex interdependence, a network approach is essential to the analysis of power in solution integration.

Previous studies have frequently utilized service triads to focus their research on the context of these complex networks. The triads are considered the building blocks of organizational networks (e.g., Choi and Kim, 2008; Choi and Wu, 2009a; Wu and Choi, 2005). Triads contain three actors that are directly related, such as a buyer, a customer, and a supplier of the buyer (Li and Choi, 2009; Rossetti and Choi, 2005, 2008); two suppliers and a buyer (Choi and Wu, 2009a; Wu and Choi, 2005); or a supplier and two buyers (Choi and Kim, 2008). In this paper, we use the term “integrator” instead of “buyer” because it applies better to the context of solution provision. Moreover, we analyze primarily the supplier-integrator-customer triads within the solution provision networks.

With regard to the roles of the actors in networks, we define a “supplier” as a company that has a direct relationship with the integrator and supplies this party with goods or services, or a combination of both. Correspondingly, we define the integrator as the party with the most comprehensive offering defined in the contract with the customer that is the user of the provided solution. The integrator’s role is determined based on the following: (a) the offering integrated from the service and product components, possibly also including software and technology; (b) the comprehensiveness of the offering determined in the contract with the customer; (c) the level of revenue from the contract with the customer; and (d) the number of partnering suppliers participating in service delivery to the customer.

## **2.2 Power sources in solution provision networks**

We perceive power as the maximum potential ability of an actor to overcome the resistance of other actors to change their intentions and thus the actions they take (Emerson, 1962; French, 1956; French and Raven, 1959). The use of power can then be defined according to Meehan and Wright (2011): companies’ attempt to affect positively the commercial details of contracts, the attitudes of other actors, or the intentions of others regarding operational and strategic issues. On an abstract level,



companies that control the access to a key resource have power over those without such access because the latter are dependent on the former (Caniëls and Gelderman, 2005; Pfeffer and Salancik, 1978). This access can be used to influence the dependent party to change its behavior in a way that it otherwise might not desire. The power can then be used, for example, to improve the commercial detail of contracts with the dependent party, such as achieving a better price. By using its power, the focal company then can reap a larger share of the profits that the network generates. This subsection focuses on the sources of power in solution provision networks. To analyze these sources, we aim to review the literature on both solution provision and power sources.

Research on the sources of inter-organizational power has its roots in the work of French and Raven (1959) on social power. They divided the bases of power into five different categories: reward, coercive, legitimate, referent, and expert power. The first two are mediated in the sense that they are based on the possibility of receiving rewards or threat of punishments. The latter three are solely based on the views of the power object on the qualities of the party possessing the power and therefore are non-mediated (French and Raven, 1959; Zhao et al., 2008). All five types of power are present also in solution provision networks. Namely, the downstream actors possess reward and coercive power over their suppliers, by having the possibility to decide whom to reward product and service business and whose orders will be cut down (cf. Maloni and Benton, 2000). Solution integrators working at the customer interface derive expert power based on their understanding of customer needs, while their high technology suppliers may induce similar power from their capabilities and experience related to the technology provided (Brax and Jonsson, 2009; French and Raven, 1959; Zhao et al., 2008). Legitimate power resides mainly among downstream actors, due to their role as customers whose problems integrators and their suppliers aim to solve with their integrated solutions (Davies, 2003; Davies et al., 2006, 2007). Referent power is apparently highly actor dependent, stemming from personal and organizations' desires (French and Raven, 1959). However, it can be perceived as linked to company reputation (Maloni and Benton, 2000) and thereby company and product brand, among others.

To focus our efforts on the different power sources in solution provision, we utilize Kähkönen and Virolainen's (2011) three-level division: power sources specific to the

organization, those specific to the relationship between the focal organization and another actor in the network, and those specific to the wider network structure. Solution provision that integrates service and product components has implications for power sources, most of which are caused by the differences between manufacturing and service operations (see Table 1 for a synthesis of the literature on solution provision and power sources). First, solution provision has particularities regarding organizational power sources. The heterogeneity of services greatly affects the ways that operations are managed (Zeithaml et al., 1985). Service processes are usually either non-routine or routine, instead of standardized (Lillrank and Liukko, 2004). Consequently, economies of scale are more difficult to achieve than in manufacturing operations. Accordingly, achieving *financial* power (see Table 1 for a summary of the power sources) through economies of scale (Caniëls and Gelderman, 2005) is also possible in the solution business, such as in spare parts deliveries, but to a lesser extent than in pure manufacturing. In addition, heterogeneous production processes lead to variability in service quality (Lillrank and Liukko, 2004). Hence, the ability to maintain high operational quality can induce power in the party responsible for delivering services, through improving customers' perceptions of their capabilities, which will then be reflected on the *brand* (Cox, 2001a, 2001b; Ramsay, 1994).

The *size* of the company in terms of business volume can also accrue power by increasing the potential for other parties to become dependent on the focal company (Thorelli, 1986). In solution provision, the *resources and capabilities* of each party are central to their power (Cox, 2001a; Pfeffer and Salancik, 1978; Ramsay, 1994, 1996). The solutions are usually complex and require expertise in various types of technologies and resources for supporting the swift operations of the solution (Davies, 2003; Davies et al., 2006; Tuli et al., 2007). Especially important are the capabilities related to different types of product *technologies* that the companies either provide or support at customer sites, as well as process technologies that are utilized in the production and servicing of equipment (Brax and Jonsson, 2009; Davies et al., 2006, 2007; Thorelli, 1986).

Second, solution provision is characterized by specific characteristics of power sources that are bound to a relationship. The inseparability of service production and consumption can be directly related to the requirement of having significant input

from customers into the production process (Sampson, 2000; Sampson and Froehle, 2006). For example, the maintenance services provided by solution integrators require access to the installed equipment and *information* on their number, location, and condition (Ala-Risku, 2009; see also Cox, 2001b; Pfeffer and Salancik, 1978); therefore, the access to and control of this information is crucial. In addition, the intangibility of pure services makes the evaluation of the solution integrators' and service suppliers' performance notably different and more challenging than in the case of goods (Lillrank and Liukko, 2004). This finding diminishes the negotiation power of the customer, who is less able to compare providers directly (Handley and Benton, 2012). Even finding alternative providers can sometimes be challenging, which increases the possibilities of inducing power from low *substitutability* (Brady et al., 2005; Cox, 2001a, 2001b; van Weele and Rozemeijer, 1999; Ramsay, 1996; Pfeffer and Salancik, 1978). Substitutability is also central in an integrator's service outsourcing, where the principal becomes dependent (Caniëls and Gelderman, 2005; Pfeffer and Salancik, 1978) on the capabilities of the supplier in delivering the services to the integrator's customers.

The perishability of services requires that they be partially produced at the exact time of consumption (Zeithaml et al., 1985). Therefore, service providers must adjust their production capacity to the demand (Auramo and Ala-Risku, 2005), which means that their ability to predict demand reliably is essential (Cox, 2001b). The scope of customers' demand is also central in shaping the power sources of solution provision because it affects the possibilities of different supplying companies to act at the customer interface. Accordingly, the integrator's power is affected by its *share* of the customer's purchases, by increasing the customer's dependence on it, as well as by the share of the supplier's supply that the integrator buys (Thorelli 1986; Ramsay, 1996). Service relationships are usually long term, so the importance of *trust and openness* increases (Brax, 2005; Cox, 2001b; Davies et al., 2006; Johnsen et al., 2009). Trust is also emphasized because of the lower predictability of operations. Sudden equipment malfunction may require an immediate response to avoid a customer's direct and extremely costly production losses. The contracts usually cannot cover the full complexity of such events, which requires flexible responses, deep commitment, and trust among all the parties.

Third, solution provision takes place in complex networks, which is reflected in network-specific power sources. Solution provision involving services for long life-cycle equipment requires closer cooperation and sometimes even partnerships with customers (Brax and Jonsson, 2009; Johnsen et al., 2009; see also Caniëls and Gelderman, 2005). The integrators utilize supplier bases with a large *number* of providers with different *roles*, such as suppliers of subassemblies, services, and technologies, whereby the business becomes highly networked and the actors become interconnected and interdependent (Davies, 2003; Davies et al., 2006; Tuli et al., 2007; Håkansson et al., 2009). For example, the competitiveness of a solution offering may depend greatly on a core software component that is owned and developed by an information technology (IT) supplier (Brax and Jonsson, 2009). Furthermore, the network relationships affect each other and the network should be regarded as a solution provision system (Aronsson et al., 2011; Gotzamani et al., 2010; Locket et al., 2011). Each company may use its *position* in the network to affect the other actors and form cooperation arrangements with others (Bastl et al., 2013; Burt, 1992; Finne and Holmström, 2013; Wu and Choi 2005), which then shapes the network structure.

In summary, because of its interconnected nature as a network, solution provision has specific characteristics regarding power sources. Because our primary interest is in how solution integrators and their suppliers take action to achieve power, we will analyze the literature on their interplay within solution provision networks in the following subsection 2.3. Table 1 below presents the synthesized perspectives of the literature on the power sources of companies in solution provision networks.

**Table 1. Synthesis of power sources in solution provision networks, arranged based on Kähkönen and Virolainen's (2011) three-level categorization.**

<b>Organization-specific power sources</b>	<b>Relationship-specific power sources</b>	<b>Network-specific power sources</b>
Financial resources  (Caniëls and Gelderman, 2005; Lillrank and Liukko, 2004)	Information access and control  (Ala-Risku, 2009; Cox, 2001b; Pfeffer and Salancik, 1978; Sampson, 2000; Sampson and Froehle, 2006)	Number of actors  (Davies, 2003; Davies et al., 2006; Tuli et al., 2007; Håkansson et al., 2009)
Product brand  (Cox, 2001a, 2001b; Ramsay, 1994)	Substitutability of the actor  (Caniëls and Gelderman, 2005; Brady et al., 2005; Cox, 2001a, 2001b; van Weele and Rozemeijer, 1999; Ramsay 1996; Pfeffer and Salancik, 1978)	Roles of actors  (Davies, 2003; Davies et al., 2006; Tuli et al., 2007; Håkansson et al., 2009)
Company size  (Thorelli, 1986)	The share of demand or supply  (Thorelli, 1986; Ramsay, 1996)	Positions of actors  (Bastl et al., 2013; Burt, 1992; Finne and Holmström, 2013; Wu and Choi, 2005)
Resources, expertise, and capabilities  (Cox, 2001a; Pfeffer and Salancik, 1978; Ramsay, 1994, 1996)	Interconnection between the actors: trust and openness  (Brax, 2005; Cox, 2001b; Davies et al., 2006; Johnsen et al., 2009)	
Technologies utilized in relation to product and production process  (Brax and Jonsson, 2009; Davies et al., 2006, 2007; Thorelli, 1986)		

### **2.3 The actions of integrators and suppliers in striving for power in solution networks**

All companies aim to take action to increase their power by positively manipulating their bi-directional dependence on other network actors (Emerson, 1962; Pfeffer and Salancik, 1978). This is done to increase their potential to advance the ultimate business objectives within their networks, such as reaping a greater share of profits. Empirical studies that focus on power in solution provision networks (e.g., Bastl et al., 2013; Choi and Wu, 2009b) have mostly analyzed how the distribution of power affects the dynamics within a triad. This paper focuses on how integrators and their suppliers act to shape the sources of power in solution networks.

In an evolutionary-ecological perspective, competition among companies is essentially a fight over scarce resources (e.g., Hannan and Freeman, 1989; Pfeffer and

Salancik, 1978). Hence, organizations achieving control over access to the resources of an industry segment grow and flourish, while other organizations with limited or no access to these resources struggle for survival (Pfeffer and Salancik, 1978). However, in the solution business, a single company rarely possesses all the resources and capabilities that are required to offer a complete solution (e.g., Davies et al., 2006; Håkansson et al., 2009; Tuli et al., 2007; Turunen and Toivonen, 2011). In addition, services require significant input from the customer (Sampson, 2000; Sampson and Froehle, 2006) with regard to the production process. Companies also make decisions about specialization to build on their core power sources and to increase their efficiency, such as delivering a certain subassembly (Jarillo, 1988) or a knowledge intensive component (Brax and Jonsson, 2009). Therefore, integrators, their suppliers, and their customers need to rely on shared resources and capabilities, which requires the development of relationship-oriented skills (Brax and Jonsson, 2000; Davies et al., 2007). In such situations, the party bridging a resource with the organization needing that resource can execute power over the other (Burt, 1992; Caniels and Gelderman, 2005). For example, integrators bridge not only suppliers with demand but also customers with the desired supply of technologies and other resources (Burt, 1992; Finne and Holmström, 2013; Li and Choi, 2009). This type of power is mainly mediated, being based on the possibility to increase or decrease suppliers' business and customers' access to technologies; however, it can also be legitimate power, as it is partly based on contractual agreements or on the role as a customer (French and Raven, 1959; Maloni and Benton, 2000). Because the integrators provide broad ranges of components from multiple suppliers, integrators need to develop the capabilities for supporting different types of equipment and technologies (Brax and Jonsson, 2009; Davies and Brady, 2000; Davies et al., 2007; Tuli et al., 2007). Accordingly, the development of such support resources and capabilities is essential for integrators to achieve greater power than their suppliers.

Because of the numerous, crucial relationships in solution networks, the current literature on solution provision considers the position closest to the end customers—that of the integrator—to have the most strategic power in access to the customer's purchasing power and information about customer processes (e.g., Brax and Jonsson, 2009; Davies and Brady, 2000). These resources are perceived as necessary for success. Therefore, by striving for close collaboration with customers and thereby

acquiring detailed information about their needs, solution integrators can try to achieve power, especially over suppliers having fewer possibilities of gaining access to such information (Ala-Risku, 2009; Cox, 2001b). Thereby, the information can yield integrators achieving expert power through creating understanding of the customers' needs (cf. Maloni and Benton, 2000; Zhao et al., 2008). The integrators could attain possibly an even more powerful position if they manage to create a situation where the access to end customers is critical and where they have tight control over these relationships, which is often the case with the providers of complex solutions (Brax and Jonsson, 2009; Brady et al., 2005; Davies and Brady, 2000; Tuli et al., 2007). This necessitates developing project management skills and relationship capabilities to carry the full responsibility for the solution and to manage the dependencies, both downstream and upstream (Davies, 2003; Davies et al., 2007; Håkansson et al., 2009).

The integrator's position is also strengthened by the consequences of integrated solutions involving the components of both goods and services. Services require significant input from the customer (Sampson, 2000; Sampson and Froehle, 2006) in the production process, which implies that an industrial service supplier needs to have a direct relationship with the customer in the network to be able to deliver its part of the entire system. Conversely, a goods supplier can deliver its product to the solution integrator and have no direct relationship with the customer in the network, except indirectly through the integrator. This situation would mean that the network has a structural hole between the supplier and customer and the integrator acts as a bridge between these two (Burt, 1992; Finne and Holmström, 2013; Li and Choi, 2009). The structural hole then gives power to the integrator, particularly over the goods supplier, as it is usually more dependent on the customer than vice versa. The nature of this power is essentially mediated, but depending on the situation, it can also be legitimate expert power in case the bridging role is accepted by other members of the network (cf. French and Raven, 1959; Xhao et al., 2008). However, the power advantage is limited compared to the possible situation of a structural hole between the service supplier and the customer.

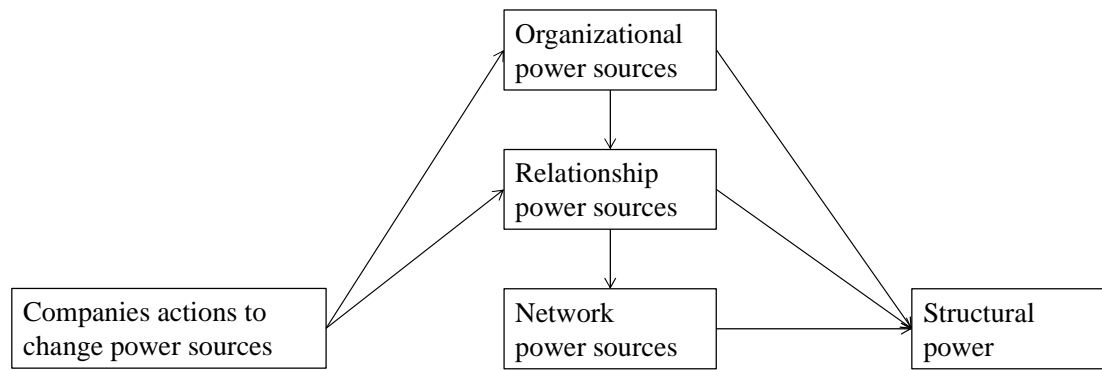
The literature also acknowledges that suppliers can improve their expert power by developing their own valuable organizational power sources. These include, among others, product and/or process technology, accumulated experience in the required

maintenance actions, and product brand (Cox, 2001a, 2001b; Pfeffer and Salancik, 1978; Ramsay, 1994; Thorelli, 1986). Suppliers of key technologies for solutions can aim to achieve an advantageous position in relation to integrators (Caniëls and Gelderman, 2005; Chang et al., 2012; Cox, 2001a, 2001b; Pfeffer and Salancik, 1978; Thorelli, 1986) by developing their technology's characteristics regarding the value provided to integrators and customers, as well as substitutability for technologies from competing suppliers (see the previous subsection 2.2).

Accordingly, in the solution business, interdependencies and power relationships are complex, and mastering them requires developing significant partnering competencies, as well as trust (Caniëls and Gelderman, 2005; Thorelli, 1986). Because the solutions are targeted towards solving customer problems, solution integrators and their suppliers have to acquire the understanding of customer processes; therefore, information acquisition and management is central (Ala-Risku, 2009; Tuli et al., 2007). Moreover, service and product suppliers need to develop their capabilities to support the integrators efficiently and effectively and to cooperate at different levels of intensity. The party that achieves the most powerful network position depends on the degree to which it controls the access to resources, the existing alternatives for these resources, and the value the resources can bring to the network (Caniëls and Gelderman, 2005; Cox, 2001a, 2001b; Pfeffer and Salancik, 1978; Ramsay, 1996; van Weele and Rozemeijer, 1999).

The power that suppliers and integrators can gain from a single resource depends on how unique the resource is and how well it can be utilized with other resources. Creating power through the complementarity of power sources means that the combined power from different resources is greater than the power induced from each separately (Håkansson et al., 2009; Kähkönen and Virolainen, 2011; Ramsay, 1996). Hence, our viewpoint is that power sources are tightly interlinked (see also subsection 2.2) and the key is how different actors are able to utilize these complementarities to create a position that is more powerful than that of the other members of their network. Regarding the effect on power sources, we agree with the perspective of Kähkönen and Virolainen (2011), which holds that actors are able to change their organizational and relationship power sources directly, but they can change the network power sources only through the indirect influence of changed organizational and relationship power sources.





**Figure 1. A synthesized framework of the links among companies' actions to change the sources of power, the three categories of the power sources, and realized structural power.**

In summary, the literature finds that companies within a solution provision network take action to shape their power sources and that changes in these sources are realized as improved (or weakened) inter-organizational power. The most powerful companies can then utilize their power to affect others and thereby promote their ultimate business objectives. Figure 1 above presents the key constructs and their interrelationships based on the synthesized perspectives in the literature on integrated solutions and inter-organizational power. Companies take action to change their power sources related to organizational resources and relationships with other network actors. The changed organizational power sources then affect relationships, which then alter the network's power sources. The changes in these three types of power sources lead to changes in inter-organizational power such that the effects of the power sources do not accumulate in linear fashion, but complementarities are crucial. The synthesized framework shown in Figure 1 is utilized to guide our empirical analysis. To investigate how power is achieved in solution networks, we conducted a multiple case study, which will be discussed below.

### **3 METHODS**

Our research objective was to study how companies take action to achieve power in solution provision networks. To understand this process, we also studied the links among the actions, changes in power sources, and the companies' views of the realized power. We adopted an inductive case study approach (Eisenhardt and Graebner, 2007) because we aimed to contribute to the theoretical knowledge on a topic that required deep understanding (Eisenhardt and Graebner, 2007; Wacker, 1998). The case study design offered the best fit to investigate a subject that still requires an exploratory research design (Eisenhardt, 1989; Yin, 1984). A case study

design enabled us to observe the phenomenon in its natural context to reach the most thorough understanding of it (Meredith, 1998). In addition, we applied Eisenhardt's (1989) recommendation to use a large number of cases to improve the transferability of the results, which in our research also served the essential goal of gathering sufficient amounts of data from different types of companies (see Table 2). Regarding the supply network position, we focused the analyses on solution integrators and their suppliers. Solution integrators considered their offering to be service based and the primary goal was to fulfil customers' needs by providing solutions. On the other hand, the suppliers provided the integrators with the components of the total solution; that is, with services, goods, or a combination of both.

### **3.1 Sampling**

We applied a theoretical sampling method to select the cases (Eisenhardt, 1989; Miles and Huberman, 1984; Yin, 2003). This method enabled us to include a wide spectrum of companies, which increased our understanding of different types of context variables. We focused on selecting companies that represented theoretical extremes: either being the central part of it (integrator) or supplying these integrators with varying degrees of goods or services. This provided a perfect context to observe the varying degrees to which the companies relied on different types of strategies. In their quest for power, they used different approaches to change organizational, relationship, and network power sources (Kähkönen and Virolainen, 2011). To increase the dispersion of our data and to enable a fruitful comparison, we searched for companies with varying emphasis on these aspects. Because the approaches to power could not be thoroughly identified beforehand, only "educated guesses" could be made. The second criterion for the case selection was that the company candidates had to be part of a wider solution (comprising service and goods components) provision network, in which a triad could be identified as the reference point in our analysis. This was essential to establish a basis for the empirical analysis. Third, to enable us to observe the practices of the best-performing networks, the selected companies had to be well known for their high performance in solution provision networks. These companies were identified in data gathered from the business press, academic publications, and financial reports. Fourth, to reach a rich understanding of the contextual underpinnings, we searched for companies that operated in solution provision and that

mainly served manufacturing- and construction-related industries utilizing high technologies in their businesses.

Initially, we identified 10 companies as potential candidates for the sample, from which five were finally chosen for the analysis. The included companies were evaluated as the most suitable with regard to the theoretical sampling criteria described previously. The decision to leave five companies out of the sample was based on criteria such as a relatively low proportion of the manufactured goods component in the solution of the delivery network in relation to the service component, which would not serve our purpose of comparing well-performing companies within typical solution provision networks. This was identified in the preliminary analysis of the potential cases. The five selected companies were all large multinational organizations, and many of them were operating in a number of industries. In each company, we decided to set the level of analysis to one division (Barratt et al., 2011). This satisfied the sampling criteria because of the wide variety of industries and modes of operations logic among different divisions within single companies. The unit of analysis is therefore a company division (for simplicity, we refer hereafter to the analyzed company divisions as “company” because they operate independently) and the unit of reference is the triad in which the division operated.

For each company, we selected a solution provision network in which the company participated and which played a critical role in determining the success of its solution provision. In the analysis phase, one of the five companies, TechCo (all company names in this paper are pseudonyms), was identified as involved in two key networks that required separate analyses as embedded cases. For clarity, the focal companies in both embedded cases were renamed, which was inspired by the characteristics of the cases: TechProjects and TechAssemblies. Therefore, the final analysis covered six embedded cases/networks: three analyzed cases were suppliers and three were integrators (see Table 2).

### **3.2 Data collection**

Data were collected mainly through semi-structured interviews conducted in the six selected cases (see Table 2). Further, in most cases, we carried out interviews with each company’s supplier and/or customer to incorporate the perspective of business partners, who could observe the companies externally but still provide insights into

the context. In the case of ProsCo, in which interviewing other parties was not possible, we aimed to balance this shortcoming by increasing the number of interviews within the focal firm. We also utilized supplemental secondary data from archives, internal documents, marketing material, IT systems, and annual reports. Because they were collected from different sources, these data enabled triangulation (Diefenbach, 2009) and crosschecking of the findings.

**Table 2. Sample, data, and industrial coverage.**

Focal company	Supplied industry	Role in the network	Interviews within the company	Interviews with other members of the network	Number of interviews within a case
ComCo	Supplies for multiple industries (e.g., foods, metals, logistics)	Supplier	Sales mgmt 2 Product mgmt 1 R&D 1 Subsidiary director 1 Managing director 1	<i>With integrators:</i> Service unit mgmt 1 Service development 2 Service operations development 1 Spare parts 2 Service sales 5 Customer support 1	18
ProsCo	Pulp & paper	Supplier, trying to become an integrator	Corporate sales 6 Spare parts 1 Product mgmt 2 Business mgmt 1 Service mgmt 3 Service sales 4	-	17
TechAssemblies	Multiple (e.g., manufacturing of industrial equipment)	Supplier	Sales network: services 3 Sales network: products 7	<i>With integrators:</i> Purchasing 2 Production 1 Customer support 2	15
MinCo	Mining & construction	Integrator	Local service center 1 Service unit 1 Service development 2 Service operations development 1 Spare parts 2 Service sales 5	<i>With suppliers:</i> Sales mgmt 2 Product mgmt 1 R&D 1 Subsidiary director 1 CEO 1	18
TechProjects	Multiple (e.g., metals, mining, pulp & paper)	Integrator	Service development 3 Customer support 2 Solution sales 6	<i>With suppliers:</i> Production 1 Customer support 1 Product sales 1  <i>With customers:</i> Purchasing 1 Production 1 Maintenance 3	19
RoofCo	Construction	Integrator	Director 2 R&D 1 Marketing & sales 3 Project mgmt 1 Product / service specialist 2	<i>With customers:</i> Building owner 6	15
<i>Interviews in total</i>			65	37	102

To answer our research questions, we designed interview questions related to (a) value offering, (b) power focus, (c) demand and supply network, (d) risks associated with each solution regarding power, (e) the actions and decisions taken to achieve power, and (f) the power position that the company had established. Regarding network information, the questions covered member identification, network dynamics, information sharing, and power structures. Value offering was scrutinized for its content (goods and service components), specialization, and competition. The actions and decisions taken to achieve power were analyzed based on Kähkönen and Virolainen's (2011) categories of organizational, relationship, and network power sources. The questions also covered the structure, nature of demand, and partnering of the delivery system.

In order that we could gather data from informants with the most thorough insights into the studied phenomena, the interviewees were chosen according to their position in the given organization (Wacker, 1998). Our aim was to interview personnel with different perspectives on the provided solution, network, power focus, company offerings, actions taken to change power sources, and the realized structural power. In practice, a primary contact was first identified in each company, which was typically a division CEO or sales/development director. This person was asked to provide the contact information of the intended informants within the company. In addition, access to informants among suppliers and customers was sought from the personnel working in that interface. The informants included solution managers, sales directors, sales managers, sales representatives, research and development (R&D) managers, and R&D engineers from both service and product units. On average, the interviews lasted between 60 and 90 minutes (the extremes were 20 and 120 minutes). All 102 interviews, except 10, were recorded and transcribed. Permission to record was denied in 10 interviews, so extensive notes were taken. Interview outlines based on the notes were written and the outlines were sent to the interviewees to confirm their agreement with the contents. The interviewees could supplement the outlines with details that they felt were missing. The transcripts and interview outlines were analyzed according to the process described below.

### **3.3 Data analysis**

To analyze the data, we began by establishing a general analytic strategy (Yin, 2003). The analysis was based on interview themes and quotes were transferred from the transcripts to the data file and grouped according to themes. During the within-case analysis, themes were added if something appeared to differ from the interview theme structure. Throughout the analysis, we used an approach in which different qualitative data sources were combined (Yin, 2003). The data collection for each case continued until no new themes emerged, which indicated that theoretical saturation had been reached (Eisenhardt, 1989).

The analysis and interpretation of the data proceeded as recommended by Miles and Huberman (1984). First, we conducted a within-case analysis of each case (see Tables 3 and 4 below for a summary of the analyzed suppliers and integrators). At this stage, we conducted the analysis by “drawing and verifying conclusions about a single site” (Miles and Huberman, 1984, p. 79). Hence, each company and embedded case was first investigated in turn according to its own site, to distinguish company-specific findings. The three researchers involved in this process analyzed each embedded case. The researchers then compared their analyses and discussed possible disagreements.

Second, we established a cross-case analysis, in which the findings of each embedded case were interpreted in conjunction with the others. This cross-case analysis was useful in increasing the generalizability of the findings and identifying patterns. As expressed by Miles and Huberman (1984, p. 151), a cross-case analysis is useful because it reveals “how such processes are bent by specific local contextual variations.” We conducted both stages after the data collection in the above-mentioned order because this type of analysis is most useful when a complete database has been collected (Miles and Huberman, 1984). Next, we describe the findings across the six embedded cases. We start with the actions taken by suppliers to increase their power (subsection 4.1) and in subsection 4.2, we describe the actions of the integrators. In subsection 4.3, we explain how the changed power sources enabled the achievement of power.

**Table 3. Summary of the analyzed supplier companies.**

	ComCo	ProsCo	TechAssemblies
Network position	Supplier	Supplier, trying to become an integrator	Supplier
<b>Characteristics of solution provision</b>			
Offering	The company focuses on providing specialized technology and transactional services. Goods and services form approximately equal shares of the offering. Solutions are built on standard technological components, by which services can be offered.	The company offers a wide selection of products, services, and technologies. Goods form a slightly larger proportion than services in the offering. Relatively broad and easily transferable solutions are targeted, but services are outsourced for minimizing the costs of heavy organization.	The company focuses on providing products based on the technology it has developed. Offerings comprise almost entirely goods. New applications and delivery channels for the products are sought to improve economies of scale in sourcing and manufacturing.
Product components	The company's own manufactured products are central in their offering.	The company utilizes a large supply network for product assembly and manufacturing.	The company's business is based on selling the products and spare parts that it manufactures.
Service components	The services are a central part of the offering, yet are mostly offered via the integrator.	The services are a central part of the offering, yet the company has the ability to offer only transactional services supporting its own technology.	The company supports integrators by providing support and training related to its product.
<b>Demand chain characteristics</b>			
Buyers' valued offering characteristics	High quality, long-lasting technology, and easy configuration of the product.	Technology, price, and services.	High quality, low cost, and easy configurability of the product.
Purchasing scope of buying companies	The integrators buy focused offerings, but often with accompanying services.	Also purchase only products, but then need to rely on an integrator that is able to employ a variety of technologies from different manufacturers.	The integrators buy focused offerings with varying degrees of services.
<b>Company's power focus</b>			
Emphasize areas to reach power	Combination of differentiation through technology and efficient manufacturing: "Our future is in intelligent technology."	Turnkey solutions are aimed to capture the highest margins and a high share of the total solution: "We are a product company."	Advanced product functionalities, good quality, and strong branding are sought to balance the strong pressures on efficient manufacturing operations: "We obtain the money from goods."
Main risks identified regarding power	Losing the position of technology leader.	Inability to maintain and service competing technologies; inefficiency in service delivery system.	Quality issues with installed products caused by the company itself or third party service providers could significantly impede product sales.



**Table 4. Summary of the analyzed integrator companies.**

	MinCo	TechProjects	RoofCo
Network position	Integrator	Integrator	Integrator
<b>Characteristics of solution provision</b>			
Offering	The company offers a wide selection of products, services, and technologies. Goods form a larger proportion than services in the offering. Large scale is achieved; customized solutions are offered for large, key customers.	The company offers a wide selection of products, services, and technologies. Goods form a slightly larger proportion than services in the offering. Relatively broad and easily transferable solutions are targeted in combination with partly outsourcing services to minimize the costs of heavy organization.	The company focuses on providing installation services together with its own necessary components, based on technology it has developed. Relatively broad and easily transferable solutions are targeted in combination with outsourcing services to minimize the costs of heavy organization.
Product components	Manufactures its core product, yet it also utilizes a large supply network for supporting product manufacturing.	The company's own manufactured products and spare parts are part of its total solution offering.	The company's own manufactured products and spare parts are part of its total solution offering.
Service components	Services are a central part of the offering to the extent that only availability is contracted.	The business is based on providing customers solutions in which services are central but mainly outsourced to partners.	Manages customer relationships in solution provision, but assembly work is outsourced to partners.
<b>Demand chain characteristics</b>			
Buyers' valued offering characteristics	Technology, price, services.	High contribution to productivity, trouble-free operations, and low life cycle costs.	Convenience of installation, long-term durability of the product, low maintenance costs, and price.
Purchasing scope of buying companies	Can also purchase only products but needs to rely on a third party designer or an integrator.	The customers require broad offerings, including various products, services, and technologies over the equipment life cycle.	Customers can also purchase a pure product, but the increasing majority buys total solutions.
<b>Company's power focus</b>			
Emphasize areas to reach power	Turnkey solutions are provided to capture the highest margins and a high share of the customer's total solution: "Technology is a main driver of our business."	A combination of differentiation through solution provision and efficient operations through service outsourcing are sought: "We are offering solutions built around high technology equipment."	A combination of differentiation through solution provision and efficient operations through service outsourcing is sought; provides customer-focused installation services. "It is clear that if we want to be a respected [construction product] provider, we need to have the service offering also in good shape."
Main risks identified regarding power	The potential loss of a few key customers would have a large impact on the business volume and profitability.	Low service quality of service partners could do significant harm to the company's brand because the partners are associated with the brand.	Low service quality of service partners could do significant harm to the company's brand because the partners are associated with the brand.

## **4 CROSS-CASE FINDINGS AND DEVELOPED PROPOSITIONS**

The findings from our cross-case analysis are summarized in Tables 5 (subsection 4.1) and 6 (subsection 4.2). According to our analysis, three integrator companies (MinCo, TechProjects, and RoofCo) operated with the primary intention of achieving power mainly through changing relationship power sources. All three supplier companies were operating with an emphasis on organizational power sources. ComCo and TechAssemblies were satisfied with the achieved position, while ProsCo was striving for the integrator role in the network. For the sake of clarity, we will summarize our key findings in short paragraphs and highlight them in italics. The findings providing the most novel contribution to existing knowledge are structured as propositions. The findings from different subsections are summarized in Figure 2 in subsection 4.3. We start with the actions taken by the three suppliers to achieve power, continue with the integrators' actions, and conclude by discussing how the changed power sources enabled power in the networks.

### **4.1 Supplier companies' actions taken to shape the power sources in solution provision networks**

Our sample included three supplier companies. One supplier, TechAssemblies, relied mostly on manufacturing operations, while ProsCo and ComCo emphasized both service and product provision. TechAssemblies was among the companies that were the most satisfied with their realized power. This setting offered us an opportunity to compare extremes. ComCo was very satisfied with its position as a supplier, whereas ProsCo was dissatisfied and therefore aimed to change its situation and transition toward the integrator role. Theoretically, we perceived this change as a challenge because the re-positioning would require changes in both organizational and relationship power sources. The case served as an excellent point of comparison between the positions. We first describe how these companies took action to increase power (subsection 4.1). In subsection 4.3, we explain how changes in different power sources, especially those related to the network structure, enabled suppliers to achieve power.

Our analysis of supplier companies demonstrated the importance of developing the core source of power and the power sources that are essential in supporting the core. This was particularly reflected in the interplay between the power sources at the

organizational level—*technology*, human *resources*, and *brand*—and power sources at the relationship level—*information*. Because these power sources were found to be interdependent, development actions were needed in all of them, at least to a certain extent. Failing to appreciate fully the need to develop all these interacting power sources could place the companies in less-powerful positions. We became aware of this finding from our comparison of the two supplier companies, ComCo and TechAssemblies, both satisfied with their power, with the third company, ProsCo, which was dissatisfied and striving for the integrator position.

The findings showed certain similarities between the actions taken by these suppliers to achieve power. All three companies were technology-based manufacturing firms that targeted their actions toward the development of *technology* utilized in their products, instead of relationship management within the network. The companies seemed to invest heavily in technology research and development (R&D) and in gathering *information* from integrators and customers to develop high-technology products. However, we found substantial differences with regard to technological aspects, especially in the choices of development areas emphasized in achieving power. Specifically, ComCo and TechAssemblies had decided to build their businesses around delivering technology-based products and spare parts manufactured in-house, whereas ProsCo had to use multiple suppliers for some basic components. ProsCo was simultaneously developing its own technology by combining several components and trying to build relationship-oriented capabilities for close cooperation with integrators, customers, and suppliers of components and technologies. In contrast, ComCo and TechAssemblies had identified the need to choose between prioritizing the building of either relationship capabilities or technology. Based on these strategic choices, ComCo and TechAssemblies managed most integrator and supplier relationships at arm's length. For example, TechAssemblies was supplying several hundred integrators but had developed a customized support model for only four of them; others were served through routine processes that usually required only order handling. The company also made a strategic decision to provide services only to equipment manufactured and designed in-house because it lacked the resources to acquire the knowledge and information required to service a variety of brands.

Despite their arm's-length relationships with integrators, ComCo and TechAssemblies emphasized the role of *information* gathering in supporting the utilization of the

developed technology. Specifically, information was gathered about customers' product and service needs, experiences in product usage and reliability, and directions of customers' future business agendas. The information gathered about the equipment that was delivered and installed at customer sites (i.e., installed base information [IBI]) was perceived as an extremely important source of power. This information was needed to promote the visibility of the installed base toward which the service and support operations were targeted. Both ComCo and TechAssemblies developed a *technology* through which they could monitor the equipment remotely. In addition, TechAssemblies had designed a semi-automated IT tool for storing and managing information about delivered products, and they encouraged integrators and customers to use it to give TechAssemblies visibility to the installed base. Both companies utilized the gathered information in their search for new product applications by creating novel functionalities that allowed multiple varieties of products. One way to achieve this was TechAssemblies' programmable interface through which the equipment could be optimized to serve very different types of customer applications.

Both ComCo and TechAssemblies had also organized product development around customer application teams that specialized in certain industries. These key account teams gathered *information* from customers through multiple channels: partners, consultants, customers, and business cases in which they collaborated with integrators. The extent to which companies had established *partnerships* with integrators for data collection varied. ComCo gathered information about product usage and reliability mostly through integrators and remote monitoring, whereas TechAssemblies extensively utilized different channels such as integrators, customers, and consultants. The ultimate goal of these actions was to support the utilization of the product technology; therefore, new customer applications and delivery channels were sought constantly and systematically. The solid basis of this search derived from an extensive effort to understand the market and customer needs. Findings regarding the actions taken by suppliers to change power sources are summarized in Table 5.

**Table 5. Cross-case analysis of actions taken by suppliers to change power sources.**

	ComCo	ProsCo	TechAssemblies
Network position	Supplier	Supplier, trying to become integrator	Supplier
<b>Decisions and actions on organizational power sources</b>			
On <i>technology</i>	The company focuses on providing high technology products and transactional services. The key focus is on technology innovations, R&D, and technology-based services (remote monitoring, etc.).	The company aims to offer a wide selection of products, services, and technologies. New suppliers of desired technologies are sought, and service-delivery capabilities are constantly developed.	The company focuses on providing products based on technology it has developed. Large investments are made in developing new applications and product functionalities, and in improving manufacturing.
On product <i>brand</i>	The product brand should be associated with high technology and quality but, as with any components, the brand is not always shown in total solutions.	The product brand should be associated with high quality and efficiency of total solutions. The company invests in after-sales reliability and flexibility to improve its brand image.	The product brand should be associated with high technology and quality, but some of the largest integrators may deny the brand's visibility in their products.
On <i>resources</i> , expertise, and know-how	Technology experts are kept in-house for solving possible complex problems with installed equipment.	Investments in developing after-sales processes and material resources, consignment stocks of spare parts.	Expertise acquired from business cases with integrators and core technology support capabilities kept in-house.
<b>Decisions and actions on relationship power sources</b>			
On <i>information</i> management	Dedicated teams gather information on customers' needs, such as reliability in connection with service, to feed R&D. Most of this information is acquired through collaboration with integrators, but some is acquired through remote monitoring.	Information on customer needs and their forthcoming developments is gathered through multiple channels regarding technological products.	Dedicated teams gather information about the customer applications of the product through multiple channels, including partners, customers, and remote monitoring, to feed R&D operations.
On <i>interconnection</i>	The production of the whole offering is carried out in-house.	Core products and related spare parts are manufactured, and most services are provided; everything else is sourced from the network.	Production of the entire product line is carried out in-house.

Supplier companies tried to affect power sources not only through improving *technology* and *information* control but also by carefully developing their *resources* and personnel competencies to support technology products. A strong product *brand* and technology leadership were perceived as essential. Although integrators and customers serviced a significant portion of the equipment delivered by both ComCo and TechAssemblies, the companies assigned teams of technology experts within their own organizations to be responsible for handling the most demanding service requests. This task force was utilized when the customer or integrator encountered equipment malfunctions that they could not solve. The teams of high tech experts were formed to guarantee that equipment users would not encounter problems that would cause significant downtime in their operations. This support, in addition to the companies' actions to constantly improve product quality, ensured high valuation of their product brand by customers and the wider network. However, ProsCo focused its resource development efforts on basic after-sales processes and material resources such as designing consignment stocks of spare parts and basic maintenance. Consequently, ProsCo was able to provide a basic offering with a wide selection of technologies, but it was not able to support fully equipment that utilized technologies other than their own. Like the other two suppliers, ProsCo emphasized the role of after-sales support in improving its brand image by focusing on reliability and flexibility. However, this was hindered by a lack of capability to support the full range of products provided. It seemed that, in the suppliers' cases, the depth of technology competence and the ability to utilize it in a variety of customer industries and applications made up for the breadth offered by the provision of different technologies.

Accordingly, in these cases, the deciding factor in actions to achieve power was resource allocation. ComCo and TechAssemblies directed investments to developing their unique *organizational* power sources, which were mainly technologies utilized in products and services such as remote monitoring and supporting capabilities. This enabled these companies to create product varieties based on information that they could acquire regarding the usage of their technology. This also meant that they were not able to integrate broad customized offerings from different types of technologies; nor could they build excellent relationship management capabilities or close relationships with customers. Instead, they allocated resources to technology R&D

and to building arms-length relationships with a great number of integrators, which proved a successful strategy for achieving the type of power they required. How the changes in power sources enabled the acquisition of power will be discussed in subsection 4.3 in conjunction with the findings regarding the integrators.

In summary, the findings from our case analysis of suppliers allowed us to confirm the arguments in the previous literature. *In the search for power, instead of building relationship capabilities, the suppliers of high technology equipment directed their efforts to further developing their technology-based power sources and capabilities supporting them such as information gathering, technology support personnel, and brand* (see also Figure 2 in subsection 4.3). *However, the pre-requisite for increasing technological focus is that the technology scope provided is focused such that suppliers do not need to rely on other actors for related capabilities.*

As previously mentioned, ProsCo was not satisfied with its less-powerful position and aimed to transform from being a supplier of integrators to being an integrator that provided solutions directly to customers. However, this was significantly hindered by the company's decisions regarding power sources. Specifically, ProsCo focused on the breadth of its offering, as this was perceived as the deciding factor. However, this was based on assumptions rather than precise knowledge of buying behavior. The great variety of *technologies* that ProsCo tried to offer and support seemed to cause an *information* overflow that was impossible to manage; the company was caught in a commodity trap. The legacy of the industry was also a significant hindrance because a group of specialized integrators already existed that had been very active in nurturing customer relationships. This group had gained a *position* in which they were able to provide consulting services for customers and assist those in choosing between different technological solutions. These companies had focused their efforts on developing capabilities in customer *relationship* management, and they relied on specialized suppliers for technological expertise. Unlike ProsCo, they were neither developing nor manufacturing any technologies but instead focused on solving customer problems with offerings that consisted of products, services, and technologies sourced from a number of suppliers. ProsCo was not able to find the right suppliers or integrators with which to partner without stepping on the feet of the integrators and even the customers. The purpose of partnering would have been to

support all the technologies to form a solution that would have differentiated it from competitors and provided customers with effective solutions to their problems.

In summary, the case analysis revealed that *attempts of suppliers of high-technology equipment to increase their power by transforming to solution integrators was hindered by a lack of the capability to partner with suppliers able to support competing technologies. In addition, the ability to gather and manage information effectively regarding customer needs encompassing the total solution is a critical source of power for these suppliers. In essence, suppliers transforming to integrators would need to develop capabilities to support both their own technologies and other technologies as part of a total solution.*

#### **4.2 Integrators' actions taken to shape the power sources in solution provision networks**

We analyzed three integrator companies: MinCo, RoofCo, and TechProjects. These companies were the closest in our sample to the operational model indicated by the solution provision literature. It is noteworthy that for all three companies, goods were a major component of their total offering, and all three companies were satisfied with their level of realized power. We first describe how these companies took action to search for power (subsection 4.2); then, we explain in subsection 4.3 how the changes in different power sources, especially those related to the network structure, enabled these integrators to achieve power. We will also contrast the findings with those of the suppliers because doing so provides interesting insights into the competition for power by companies in these positions.

The comparison in our extensive analyses of the three integrators revealed their efforts to build long-term *relationships* with customers, acquire a larger *demand-share*, support multiple *technologies*, and utilize *information* gathering as main sources of power. Interestingly, our findings contrasted those in the solution provision literature and the integrators' own assumptions that information could provide them with a considerable power advantage over the suppliers. We also identified three distinctive approaches through which the integrators attempted to mitigate suppliers' actions to increase their own power.



The comparison of integrator companies yielded particularly interesting findings about the way that companies act to manage *information* as a power source and the way that integrators adjust their power-reaching actions by taking into account the intentions of suppliers with similar aims. Specifically, based on the predominant viewpoints in the solution provision literature (e.g., Ala-Risku, 2009; Brax and Jonsson, 2009), information should be the decisive factor through which integrators can induce power, especially over their suppliers, because this position is perceived as the closest to the customer. Our analysis showed that all integrators in our study emphasized the role of the customer; all installed base information (IBI) gathering to build and maintain a powerful position in the solution provision network. However, the cross-case analysis revealed that, despite the crucial importance of information in solution provision, the integrators found it increasingly challenging to derive any power advantage over suppliers merely from information management.

The *information* that the integrators gathered included diverse categories ranging from product data to performance optimization knowledge and the development plans of customers. This information was used to facilitate service innovation and sales. The integrators' concrete actions to increase power through information differed based on business strategies and settings. TechProjects and Minco carried out information retrieval through technical solutions in addition to direct customer interaction, but RoofCo focused on gathering information about project success and customer satisfaction. A remarkable finding showed that the focus on information gathering and capabilities seemed of equal importance to both suppliers and integrators. Both the analyzed groups had access to information sources through multiple channels via the support of their information gathering and management tools. Suppliers made great efforts to acquire the information essential for increasing the number of alternative delivery channels (see subsection 4.1). Simultaneously, most integrators tried to block suppliers' visibility into the installed base, with varying degrees of success. Suppliers were able to build technological solutions to remotely monitor the equipment. In addition, suppliers acquired IBI and customer information through several other channels, as discussed in subsection 4.1. Therefore, integrators found it particularly challenging to derive a power advantage by acquiring information. In summary, information, which was suggested in the literature as the integrator's most important power source, was rendered partly ineffective because of

suppliers' increasing information gathering capabilities, which were mainly promoted by technological developments in IT.

**Proposition 1a:** *Power-seeking solution integrators direct efforts toward improving their capabilities to gather information about their customers and their installed base of products.*

**Proposition 1b:** *However, these integrators are not able to gain a considerable power advantage over suppliers merely by having information about their customers and their installed base of products.*

We observed that integrators focused on *interconnection* building to achieve power. The analysis revealed that integrators can focus on either building trust and a mutually beneficial interconnection with customers, with suppliers, or with both. The case companies differed in their choices in this matter. Specifically, RoofCo sought mutual interconnection among all parties, including suppliers. In contrast, both MinCo and TechProjects focused on developing non-coercive relationships mainly with customers, and it tended to operate more aggressively with its component suppliers. TechProjects also stressed the development of its own technology-related *resources* and capabilities for supporting all its offerings; MinCo acquired competencies for providing and supporting a great variety of different brands through mergers and acquisitions. Furthermore, both MinCo and TechProjects kept high-tech experts in-house to indirectly improve product reliability. In addition, RoofCo insisted on keeping both material and component production in-house. It targeted customer relationships (as did ProsCo, the supplier aiming to become an integrator; see subsection 4.1) to achieve power mainly through increasing *demand-share* and being a one-stop-shop for customers by aiming to deliver extremely broad offerings including planning, delivering, operating, and managing the lifecycle of production lines or similar vast installations. MinCo decided to add competitors' products and technologies to its offerings, whereas TechProjects did so only if necessary, instead mainly utilizing its own huge range of products. The latter was also RoofCo's intention. Our findings on actions that integrators took to change power sources are summarized in Table 6.

**Table 6. Cross-case analysis of the actions integrators took to change power sources.**

	MinCo	TechProjects	RoofCo
Network position	Integrator	Integrator	Integrator
<b>Decisions and actions on organizational power sources</b>			
On <i>resources</i> , expertise and know-how	High tech experts kept in-house for maintaining the equipment reliability and customer trust. Competencies in serving competitors' technologies acquired through mergers and acquisitions.	High-tech experts kept in-house to maintain equipment reliability and customer trust. Competencies cover the vast range of own products.	Particular focus on long-term development of the service-supply partner network.
On product <i>brand</i>	The product brand should be associated with high overall quality and efficiency in high-quality service and leading technology products.	Maximizing equipment uptime and certifying service partners are key drivers of perceived quality and brand.	Strong product brand built using highest quality components and materials. The brand is also utilized in service business with outsourced service delivery.
<b>Decisions and actions on relationship power sources</b>			
On <i>information</i> management	Information on product usage and optimization, customer needs, and their forthcoming developments is gathered through multiple channels that combine technology and manual data collection.	Information about customer needs and their forthcoming developments is gathered through multiple channels in constant interactions with customers. Decided to limit service provision to own manufactured equipment.	Detailed information gathered on customer needs related to installation projects. No information gathered on forthcoming developments.
On <i>interconnection</i>	Maintaining customer relationships throughout the equipment lifecycle through technology developed to support after-sales services.	Dependence on service suppliers decreased through establishing a certification program for partners to guarantee service quality.	Trust within service supplier network nurtured through awarding business to the whole network. Dependence on service suppliers managed through knowledge sharing and training.
On suppliers of technology/service	New suppliers of desired technologies are sought, and service delivery capabilities are constantly developed mainly through partnering and mergers and acquisitions.	New suppliers of desired technologies are sought, as are more efficient service suppliers, and existing service partners are trained in operations that are more efficient.	More service suppliers are sought and service partners are trained to increase the efficiency of operations.
On <i>demand/supply share</i>	Offering competitors' products as part of the total offering.	Focusing on solutions developed around a vast range of own products.	Share of service suppliers' purchases maximized through continuous evaluation of suppliers' businesses and reallocations of orders.

Through increasing *demand-share*, the three integrators aimed to transform their dependence on customers into mutual dependence and to maintain their bridge position between customers and suppliers. For example, both TechProjects and RoofCo were renowned among customers for their full-service concepts, which were industry benchmarks. These concepts increased the significance of TechProjects and RoofCo for the customers. They also prevented suppliers from gaining customer access through more-focused offerings because most customers found that the service concept brought significant advantages compared to sourcing from different providers. Actions taken to increase demand-share added a relatively small number of customers, each creating a large volume of sales. MinCo and TechProjects also developed long-lasting *partnership relationships* with their customers (similarly to ProsCo) and invested heavily in developing their service delivery capabilities and finding the right suppliers to improve the customer value of their offerings. How the changes in power sources enabled the integrators' power is discussed in subsection 4.3.

In summary, our findings are in line with the literature with regard to *how power-seeking solution integrators (and suppliers trying to transform into integrators) attempt to form long-term relationships with and increase their demand-share of customers (see Figure 2 in subsection 4.3) by broadening the technological scope of their offerings to cover all product lines and the management of their lifecycles.*

Regarding integrators' focus on *interconnection* building, both RoofCo and TechProjects decided to outsource the delivery of operational services in response to company- and customer-originated pressures to cut costs. However, TechProjects did this only in certain markets; it kept core service-related capabilities and significant service resources in-house. This was done because the company had determined that service capabilities related to its products were a crucial source of power. The outsourcing of services induced dependence on the service performance of suppliers; actions were directed by both companies toward these suppliers to counterbalance the power through fostering *trust* within the networks. Both integrators took actions to develop close *relationships* with the service suppliers and monitor their service performance. TechProjects also developed a partner certification program involving training, materials, and manuals to ensure the quality of support delivered. After

completing the certification program, service suppliers turned to service partners with permission to utilize the certifier's *brand* and with the obligation to provide services only to the certifier's products and according to clearly defined guidelines. RoofCo also provided training and guidelines, and it required some partners to use its brand signature, but it did not formally certify the partners. Through these measures, RoofCo and TechProject aimed to manage their dependence on service suppliers and to hinder suppliers' possibly taking actions to increase their power. RoofCo even decided to allocate service orders, a decision which was partly based on the suppliers' capacity utilization. RoofCo and TechProjects also constantly sought potentially efficient suppliers.

The rationale for RoofCo's *trust* building behavior toward all network actors was to achieve a powerful network by enabling long-term planning of the business and network structure. Hence, the company aimed to build a sustainable power source by building trust relationships and promoting non-opportunistic behavior by all parties. In particular, RoofCo revealed that even an integrator that only produced materials and components in-house could achieve a relatively stable position by integrating a solution that comprised various services, such that RoofCo was able to manage the supplier network skilfully. The company decided to keep material production capabilities in-house, which also enabled it to leverage the gained legitimacy of material production in service provision. This materialized in the customers' requests for RoofCo to provide services as part of the solution. The company then delivered these services via the service partners. A particular characteristic of RoofCo was that it sporadically monitored financial aspects of its partners and changed the order allocation accordingly to keep the delivery network stable. It maintained that all suppliers should have received enough orders to utilize available capacity and to avoid the exit of unsatisfied suppliers from the network.

**Proposition 2:** *Power-seeking solution integrators attempt to mitigate suppliers' actions to increase their power through*

- a) *contractual obligations, such as requiring suppliers to support only their products,*
- b) *allocating customer demand between different suppliers, and/or*
- c) *fostering long-term mutually beneficial business in the supplier network.*

### 4.3 Changed power sources enabling inter-organizational power in solution provision

Suppliers accumulated power by engaging in interplay among technology, personnel, brands, and information. This also created a network structure providing the two satisfied suppliers, ComCo and TechAssemblies, with a powerful position. Because of its decisions and actions with regard to changing its power sources, ProsCo seemed to be in the process of changing the network structure to enable the intended change in its position. Our analysis revealed that structural power was impossible to gain directly, yet it could be achieved by focusing on sources of organizational and relational power.

The main difference among the three suppliers was that ComCo and TechAssemblies had decided to manufacture and design all their technology products, whereas ProsCo had built an extensive *supplier network* to assemble a technological solution that also covered technologies produced by its competitors. This approach supported ProsCo's decision to invest significantly in developing relationship management capabilities. The networks of ComCo and TechAssemblies were characterized by integrators requiring focused offerings that were built around the core product and that had support ranging from spare part deliveries to contracts that guaranteed equipment uptime. The companies also had mostly arms-length *relationships* with the integrators and relatively few competitors that were able to deliver offerings that utilized similar technologies. It was natural for ComCo and TechAssemblies to deliver their services *through integrators* with broader offerings. However, ProsCo would have needed to deliver its services intended for larger installations *directly to customers* or, alternatively, to find a strong integrator with whom *to collaborate*, to transform from its transactional business model of covering repairs and basic maintenance to a model that offered solutions.

ComCo and TechAssemblies were very satisfied with operating *via integrators* because the technologies they provided could be applied in *different industries*. The companies were satisfied with their power, despite strong cost pressures introduced by the integrators bridging them to customers. They balanced these pressures with constant development of product functionalities, quality, support resources, brand, and, most importantly, by increasing the number of *delivery channels* by researching

new customer applications. Because of these actions, ComCo's technology was used in solutions in food, metal, and logistics-handling industries. TechAssemblies' technology served several industries, such as shipping, pulp and paper, and metal industries, to name a few. In contrast, ProsCo's technology applied mainly to a specific industry. Hence, ComCo and TechAssemblies occupied a delivery network with a significantly greater number of *downstream arms*, which largely freed the companies from dependence on any single integrator or even any one industry. In contrast, the limited applicability of ProsCo's technology increased the company's dependence on integrators and led it to strive toward an integrator position. The key seemed to consist of having a large number of integrators, possibly in multiple industries, so that the network-induced power was balanced between the suppliers and integrators.

**Proposition 3a:** *Suppliers of high-technology equipment can achieve structural power through a specialized offering applicable in multiple industries and applications.*

**Proposition 3b:** *Such an offering enables the network structure to balance the power disadvantage arising from the downstream network position by increasing the number of alternative delivery channels.*

Our analyses of the integrators revealed that their actions in relationship building with customers, acquiring a larger demand-share, and supporting multiple technologies created a *network structure* that was significantly different from suppliers'. This provided a powerful position for the two satisfied integrators, MinCo and TechProjects, but less so for RoofCo. The former two were able to capture a large share of the purchases of their customers, which were in a few industries. In contrast, RoofCo was dependent on only one industry, and it lost some positional power because of its total dependence on suppliers in the service business.

The network structures of the three integrators were similar in that the companies had grown *large* compared to both their suppliers and their customers. Moreover, they had *few competitors* but a *larger number of suppliers*. However, MinCo and TechProjects had developed their own technology for the solutions of manufacturing assets in *different industries*, whereas RoofCo provided solutions for *one industry* only.

Furthermore, RoofCo's customers were less dependent on the company because they were able to purchase parts of the solution and carry out the integration by themselves, to varying degrees. RoofCo also had *arms-length relationships* with its customers. Its customers prioritized the company's purchasing brand, whereas customers of the other two companies emphasized lifecycle, technology, and contribution to productivity. MinCo and TechProjects had built longer-term partnerships with almost all their customers and provided a one-stop-service with broad offerings. Therefore, customers were also relatively dependent on them as integrators of larger installations contributing significantly to customers' productivity.

On a wider technological scale, MinCo and TechProjects provided solutions that were utilized in different industries, whereas RoofCo was dependent on one industry. TechProjects was able to retain considerable power by continuing its own service provision in particular markets, in particular by maintaining core service capabilities in-house. Through these decisions, the company was able to control the service delivery network and insource service delivery whenever it was preferable.

**Proposition 4:** *Solution integrators can derive power from their strong customer relationships with mutual dependence, characterized by longer duration, integrators' large size, large demand-share, and very low direct supplier influence on the customer.*

The findings analyzing the actions of the solution integrators and their suppliers in striving for power are summarized in Figure 2. The figure shows the focus of these actions in different organizational and relationship power sources as well as the resulting network positions. It is noteworthy that both suppliers and integrators could achieve a central network position through their actions. The main difference is whether a company was bridging actors vertically within networks or horizontally across a number of networks.



	<b>Suppliers</b>	<b>Integrators</b>
Actions on <b>organizational</b> power sources	<ul style="list-style-type: none"> <li>• Brand</li> <li>• Technology</li> <li>• Support resources</li> </ul>	<ul style="list-style-type: none"> <li>• Brand</li> <li>• Company size</li> </ul>
Actions on <b>relationship's</b> power sources	<ul style="list-style-type: none"> <li>• Information</li> </ul>	<ul style="list-style-type: none"> <li>• Information</li> <li>• Interconnection</li> <li>• Demand-share</li> </ul>
Resulting <b>network</b> position	Located upstream, bridging delivery channels. A great number of integrators and customers.	At customer interface, bridging suppliers and customers. A few customers, a great number of suppliers.

**Figure 2. Focuses of supplier and integrator actions on organizational and relationship power sources and their resulting network positions**

## **5 DISCUSSION AND CONCLUSIONS**

Through the qualitative analysis of six embedded supplier and integrator cases, we developed four propositions (two of which are divided into two parts) regarding how solution integrators and their suppliers take action to achieve power in their networks. In addition, our analysis revealed how resulting changes in power sources enable the achievement of power. The approach used to study the power-attaining actions of two groups of companies on the supply side is novel, and it yielded valuable insights into both theory and practice. By revealing the companies' actions and decisions in emphasizing development in their attempts to strive for power, our findings enrich the stream of studies on solution provision networks.

The theoretical contributions of this study to the literature are three-fold. First, our findings on suppliers highlight the underlying perspective of structural power (Kähkönen and Virolainen, 2011) in solution provision networks (Davies, 2003; Davies et al., 2006). Specifically, the analysis revealed that suppliers of high-technology products would reach a structurally powerful position in the network, although they were located upstream in the value chain. Regarding some companies,

the imperative seems to be to maintain the upstream position instead of going downstream (cf. Wise and Baumgartner, 1999), enabling them to utilize better their organizational and relationship power sources. Furthermore, we extended Kähkönen and Virolainen's (2011) findings on how interplay between organizational- and relationship-specific power sources affects a network's power sources. Actions taken by high-technology suppliers to develop their product technology, information gathering, technology support resources, and branding accrued more power than the sum of these individual power sources did. This finding showed how crucial the complementarity of the power sources is (Håkansson et al., 2009). However, the entire picture of the suppliers' structural power goes beyond the triad view. Specifically, it requires understanding of the multitude of networks in which the supplier might participate. This understanding sheds light on the supplier's central position in this wider constellation (see Burt, 1992) instead of on its seemingly distant position within the triad. Hence, in the analysis of power constellations, the focus on a triad provides only a narrow perspective. A wide view of the network is needed to reveal actual power positions.

Second, we extend existing theories on power induced from a bridge position (Burt, 1992; Li and Choi, 2009) by explaining how solution-providing companies act to achieve such power and how the changes in their power sources enable it. Integrators that aim to induce power from bridging tend to focus on fewer customers, but they develop long-term partnerships (Davies and Brady, 2000) with broad offerings covering a vast variety of products, possibly including technologies that are not designed in-house. In the case of offerings that also covered competing technologies, our findings confirmed that integrators might prefer to acquire required support capabilities through mergers and acquisitions (see Turunen, 2011). Our findings also indicated that suppliers could acquire a bridge position that linked delivery channels of different industries, thereby achieving a structurally powerful position. In addition, we showed that integrators have means to mitigate their service suppliers' possibilities for accumulating power. In the case of outsourced service delivery, they take great care to ensure the performance of suppliers through training and certification. However, similar options were not evident to mitigate actions of high-technology suppliers to achieve power. Instead, integrators need to seek alternative suppliers continuously, and they can utilize acquisitions to transform competing

suppliers into partners. In our sample, approaches taken by suppliers and integrators to achieve power seemed strategic alternatives because of the need to allocate scarce resources for development.

Third, our findings were also in contrast to the solution provision literature regarding the role of information as a source of power for integrators and their suppliers (Brax and Jonsson, 2009; Davies et al., 2007). The analyses of the six embedded cases confirmed expectations that access to adequate and accurate information was crucial (Ala-Risku, 2009). However, integrators did not seem able to achieve considerably more power from having information than did suppliers. Suppliers had invested significantly in developing IT-based tools for gathering and managing information about customer needs and installed bases of equipment. In addition, two suppliers had developed internal organizations specializing in certain customer industries and applications. These organizations gathered information through multiple channels regarding applications of interest. This information played a central role in enabling development of new product varieties, thereby increasing the number of delivery channels and consequently the amount of structural power.

Managerial implications of the research are three-fold. First, our propositions offer managers a conceptual tool that could assist in constructing strategies for achieving inter-organizational power, regardless of whether the focal company is a supplier or an integrator. Second, the propositions clearly refer to performance issues. For example, suppliers seemed unable to strive successfully for the integration of services and products by using competitors' technologies because doing so would necessitate a position that was close to customers. Becoming an integrator would then be a natural option, and our findings provided insights on actions contemplated when companies consider this possibility. Third, the propositions enable managers to understand the interplay among different sources of inter-organizational power. Specifically, they explain how certain decisions and actions may lead to changes in power sources and which strategic actions are alternatives to each other. For example, investing heavily in finding new customer applications for the offering would support the supplier's search for power, but when carried out by an integrator, such investment might be in conflict with possibilities that other power sources could bring.

Our study has two main limitations. The first is related to the difficulty of measuring realized power (Ramsay, 1996). In the present study, we had to rely on the subjective views of the informants that were interviewed, which might have biased the findings. However, to minimize such bias, we triangulated the findings within the organizations by having a large number of informants and utilizing supplementary material such as data from IT systems and various internal company documents. We also triangulated across organizations by contrasting the views of one organization to those of its suppliers and/or customers. The second limitation derives from the chosen methodology. Although case studies enable a thorough understanding of phenomena in their natural contexts, their lack of cross-context generalizability is unavoidable (Eisenhardt, 1989). Therefore, further studies are needed to test the applicability of our findings outside the context of solution provision. We encourage such research in the contexts of business-to-business service networks by utilizing methodologies suitable to test theories, such as surveys. We suggest that the body of knowledge on inter-organizational power would benefit from multi-industry studies such as comparisons of the networks of professional services with those of manufacturers. We also recommend that future studies elaborate how network power varies in diverse actor positions in different industry contexts. An example of a suitable method for such an inquiry would be a survey, enabling statistical generalization. Both of these further research avenues require that researchers take the inter-organizational network as a unit of analysis and move beyond a focal actor point of view.

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