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Brokerage-based value creation: The case of a Danish offshore windmill business network

Abstract

Purpose: Social capital plays an important role in transforming knowledge within and across inter-firm business networks in industries. This paper explores different kinds of transfer mechanism as “bonding”, “bridging” and “protecting” within a case network of the Danish offshore windmill industry. Its aim is to describe how these mechanisms interactively support value co-creation among the involved enterprises and how social capital, residing in the relationships between actors from the firms, is influenced by the different transfer mechanisms.

Methodology: Based upon a single case study, the paper demonstrates “bonding”, “bridging” and “protecting” as distinct, yet related, mechanisms for inter-firm business networking. The sample used covers selected key actors from the network as well as third-party experts from the Danish windmill industry, which together represent the most important knowledge-offering and knowledge-demanding domains.

Findings: Activities associated with “bridging” and “bonding” clearly matter for creating value for the business network and the industry alike, for they are supportive of strategic capability development (for instance, high-skilled work). While producers and supply companies apply such “bridging”, “bonding”, and additional “protecting” mechanisms based upon their predominant position, small- and medium-sized enterprises (SME), however, need to shape teams to do so. A major finding of the study is thus that team-based interrelationships among SME activate “bridging”, “bonding” and “protecting” initiatives which are particularly supportive of capability improvement and industry growth. They enable the transfer of relevant capabilities between different projects where actors within SME organizations learn to activate and use such knowledge transfer mechanisms. Moreover, asymmetrical dependency-relationships can be partly overcome by shaping and using the mechanisms on the part of SME in the network.

Value: To date, brokerage is still an underexplored topic with regard to inter-firm business networks. This case study contributes to the research by illustrating important and distinct qualitative aspects of brokerage, which are conceptionalized as “bonding”, “bridging” and “protecting” initiatives on the part of brokers. The study highlights that not only strong actors with
central positions can step into the role as a broker. Even less resourceful actors within asymmetrical relations can act as brokers and compensate a lack of resources or strengthen their position within the industry network. Consequently, value co-creating processes within industry networks can also be boosted by brokerage initiated by small companies.

**Keywords:** Bridging, Bonding, Protecting, Business networking, Value creation, Windmill industry

**Introduction**

It has been acknowledged that the quality of the social capital within inter-firm business networks, *inter alia*, depends on “bonding” and “bridging” mechanisms for the network, which supposedly aim to either strengthen social cohesion within the network (“bonding”) or open up closely connected social groups to more diverse external sources of information and knowledge (“bridging”) (Burt, 2005, see, also, Eklinder-Frick et al., 2011). In fact, this distinction reflects the two different sides that social capital can have in network contexts (Gargiulo and Benassi, 1999, Bizzi, 2013). Consequently, inter-firm business networks using such mechanisms can be ineffective, depending on the specific network configuration. For example, applying “bonding” mechanisms for networks with overly strong ties might not be supportive when quick and efficient adaptation to external market or industry changes becomes necessary. Instead, other mechanisms such as “bridging” can help external actors possessing new information or knowledge to connect with the network, thereby benefitting network interaction and value co-creation. Similarly, knowledge transfer mechanisms can be in place that neglect actors who primarily depend on knowledge-transfer, but find it hard to activate transfer mechanisms themselves, for instance, SME (Garguilo and Benassi, 1999, Molina-Morales and Martinez-Fernandez, 2010). In this case, “bridging” between these groups can represent a meaningful mechanism to raise the network’s global efficiency (see Hanna and Walsh, 2002, 2008).
These few examples highlight that social capital for inter-firm business networks should be conceptualized as originating from different sources, depending on the strength of inter-firm relationships and the governance mechanisms applied to networking (Noteboom, 2006, Garguilo and Benassi, 2000, McEvily and Zaheer, 1999). Although brokerage have been explored in the management and marketing literature, most studies adopt a quantitative approach by focusing on the number and density of ties (for example, Fritsch, Kauffeld-Monz, 2010; Kirkels and Duysters, 2010; Stam, 2010, or Lee, 2010).

In this paper, it is argued that it is necessary to analyse “bonding” and “bridging” in more contextualized ways, as it is done, for example, by Eklinder-Frick, et al. (2011, 2012) or Anderson and Jack (2002). The questions of how brokerage mechanisms are established or which kinds of initiatives or activities between firms are related to which mechanism is still an under-explored topic in the business network research. Against this background, the present paper aims to describe how “bonding”, “bridging” and additionally “protecting” can be established and used as distinct, yet inter-related, mechanisms to support the transfer of knowledge and capabilities within inter-firm business networks to enhance their embedded social capital. To this aim, the paper focuses on describing the initiatives which actors take to establish these mechanisms, thereby showing their contribution to value creation on the network level.

Empirically, the paper focuses on a single case study of an inter-firm business network connected to an offshore windmill farm. Albeit a growing business, the offshore windmill industry is characterized by high levels of complexity due to multiple actors who contribute to the process of value co-creation. In one way knowledge exchange within the industry, and particularly among and with SME, is organized efficiently. The industry is, however, characterized as being mature and hierarchically structured with only a few windmill manufacturers dominating and orchestrating the business. As a result, outsourcing of service and maintenance from large enterprises to the bulk of SME has been established within the industry. Co-operation and co-ordination among the two parties, i.e., SME and the large firms, in the area of services and maintenance thus turned out as a vital, yet highly complex pre-condition for the growth and expansion of the offshore windmill
industry. Against this background, the case study of the ‘Offshore Service Net’ covers important key actors in the industry including around 30 SME, a large energy provider, a windmill manufacturer and a non-profit organization in charge of managing co-operation between SME and large firms. Methodically, the case analysis is informed by structured qualitative interviews with key informants from firms as well as third-party experts.

The paper focuses on four related questions: What kind of transfer mechanisms in terms of “bonding”, “bridging” and “protecting” can be identified for the case network? How do “bonding”, “bridging” and “protecting” mechanisms that are associated with brokerage unfold? How can these mechanisms interactively be described as network collaboration taking place in value co-creating settings for the case network? And, finally, how is social capital residing in the firms’ network relationships influenced by “bonding”, “bridging” and “protecting”? To answer these questions, the paper first presents some theoretical considerations explaining how social capital, brokerage and particularly “bonding”, “bridging” and “protecting” relations, and value co-creation are conceptually inter-related. This is followed by the case analysis. The final discussion reflects the main findings against the theoretical arguments and gives some concluding comments as well as managerial implications.

**Theoretical considerations**

**Social capital for value creation in business networks**

In line with Hanifan’s (1916, 1920) understanding, sympathy and loyalty represent two inter-related aspects of social capital that benefit the individual and the community simultaneously, thereby supporting social cohesion. Social networks are composed of social capital from two different origins (see Putnam, 2000, Coleman, 1988). This applies also to inter-firm business networks, particularly those that include strong and sometimes egocentric members versus loyally committed ones. The fact that social capital is double-edged sword is, however, not per se a problem. Matiaske (2013), for example, highlights that social cohesion in terms of trustful, strong relationships can be associated with asymmetrically power or dependency constellations of business actors who
collaborate over the exchange of knowledge and resources. Such configurations thus provide different opportunities for business actors. According to this perspective on social capital, even interaction within asymmetric network configurations can lead to building trust among the diverse members and compensate individual members for a lack of resources, thereby finally strengthening inter-actor relationships (Coleman, 1990, Håkansson et al., 2009, Matiaske, 2013). The degree of social exchange taking place within business relationships then reflects the extent and need of trust necessary to overcome liabilities of asymmetric dependencies by connecting actors for value co-creation. In a business network context, such value-creating connections are particularly important for SME who can take over outsourced functions from huge powerful actors (for example, large firms), but at the same time depend on receiving information and knowledge to deliver value co-creating input (Baraldi et al., 2012, Johnsen and Ford, 2006, Matiaske, 2013).

Independent of its origin, social capital embedded in an inter-firm business network is thus shaped by a set of different actors in terms of their functions and power positions in the network, which both guides and challenges resource exchange (Pfeffer and Salancik, 1978, Håkansson and Snehota, 2006). However, such dependencies (see Thompson, 1967, and Brown et al., 2010) imply that typically only a few large and powerful companies earn a premium residual value within business networks, whereas the value for weaker participating firms represents only an average value or can even be negative (Peteraf and Barney, 2003). As a consequence, asymmetries in value creation render trade-offs and conflicts more likely, which, again, influences the network management and its prospects to steer network-based collaboration. Even if frequent exchange between firms increases the likelihood of knowledge transfer mechanisms being established in such contexts, asymmetric dependencies due to different power positions bear the risk of penalizing teams or subnetworks of actors in the process of knowledge exchange.

Trust reduces the individual risk for network actors, particularly for weaker ones, by lowering behavioral uncertainty based upon an appropriate level of co-operation and cross-organizational resource integration within the relationship (Coleman, 1990, Håkanson et al., 2009, Håkanson and Snehota, 2006). Moreover, trust supports social cohesion in general and team-based cooperation in particular, thus benefiting the process of adapting the capabilities of weaker firms to the standards of the stronger ones, for instance, large and powerful enterprises in a business network; trust then
supports their transformation in a way that new projects can be supported (Coleman 1990, Pfeffer und Salancik, 1978, Sadiq and Weible, 2010). Since value co-creation depends on trust, reliability and waiving of opportunism (Williamson, 1985, 1993), trust is considered as a vital mechanism to support social cohesion between actors and/or groups (teams) of actors within business networks; it is also supposed to positively influence capability development and knowledge transfer (Easton, 2016, Easton and Lundgren, 2016, Håkansson and Johanson, 2016).

Taking up a relational perspective on inter-firm business networks (Dyer et al., 2008, Ngugi et al., 2010), we argue that value co-creation among network firms and improvements of this process is based on joint learning and information-sharing on the part of network firms who strive to achieve above-average residual values. This, however, requires a common stock of knowledge within the network, which is deemed necessary for screening, decoding, combining and evaluation network partners and their competencies (Tallman, et. al. 2004, Zahra and George, 2002, Cohen and Levinthal, 1990)). From a network management perspective, actors who are able to connect firms from different groups or teams or safeguard the network-based resources by keeping away opportunistic firms can act as important gatekeepers for the sake of value co-creation.

**Brokerage-based value creation in business networks**

**Value creation and brokerage**

Value is jointly created when actors exchange, integrate and apply resources with others (Jaakkola and Hakanen, 2013, Vargo and Lusch, 2011). As value creation in inter-firm business networks requires access to knowledge packages that are associated with different kinds of actors, teams of actors and/or (sub)networks within or outside the network, connecting those teams is vital for bringing together and “bonding” complementary capabilities. Accordingly, business networks can be understood as weakly or strongly interconnected actors or teams integrating inputs embedded in the organizations or networks that interact (Håkansson and Johanson, 2016). Information and knowledge are important resources provided within such networks, which are critical for value co-creation (Ahuja, 2000). The degree to which resource exchange among network firms leads to joint value creation, however, depends both on their access to contextual information and knowledge and the nature of the ties between firms (Baraldi et al., 2012). Particularly actors who control interfaces
between complementary capabilities are more likely to translate new ideas into marketable products (Kogut, 2000). While strong ties are characterized as dense social relationships which connect strong or frequently interacting actors with one another (see Jack, 2005), weak ties are described as loose connections that bond actors with a low interdependency who infrequently exchange information and/or resources (Coleman, 1990, Burt, 2005).

Altogether, resource exchange and value co-creation take place in different settings of inter-firm interdependencies within inter-firm business networks (Ngugi et al., 2010, Pfeffer and Salancik, 1978). Thompson (1967) classifies these constellations as either reciprocally interdependent relations, in which the exchange of resources implies coadjutant interdependencies, or unilaterally dependent ties, so-called sequentially dependent relationships. In addition, team-based, complementary value co-creation can be considered as a third category implying team-based dependencies (Brown et al., 2010).

Brokerage-opportunities can result from the different categories of interdependent ties. The concept of brokerage is closely linked to Burt (2005) who calls actors that connect value co-creating players broker. Broker work in a twofold way by either connecting actors or preventing actors from getting connected. In doing so, they can foster sequentially or reciprocally interdependencies or avoid them. Brokers thus identify opportunities associated with the diversity and non-redundancy of information and knowledge flows within different (sub-)networks of social relationships that do not overlap (Burt, 2005, Eklinder-Frick et al., 2012, Barnes et al., 2015). This understanding of a broker in a business network context assumes that firms are embedded in multiple, and only partially overlapping, business networks, thus benefitting from establishing exchange relationships with various groups in the network (Dyer and Singh, 1998). While Burt conceptualizes brokers as intermediaries who benefit both the network and themselves based upon resource asymmetries only (Gnyawali and Madhavan, 2001), this paper uses a concept of brokerage which is associated with several and distinct mechanisms to build such relationships. Therefore, brokerage is conceptualized as a process of activities on the part of specific actors (see also Belso-Martinez et al., 2015),
containing and mixing three mechanisms called “bonding”, “bridging” and “protecting”, which will be explored related to their context.

Brokerage as “bridging”, “bonding” and “protecting” relations

Based upon the notion of social capital (Hanifan, 1916, 1920), we argue that social capital in inter-firm business networks encompasses different kinds of relations between firms embedded in a network, which we call “bridging”, “bonding” and “protecting” relations (see Putnam, 2000). According to this understanding, brokerage that initiates and uses these relations as mechanisms to steer the network can be important for value co-creation in the network, which will be based on activating knowledge and disseminating it among co-creating firms across business networks (Burt, 2005).

Value creation can be based either on strong ties, which rely on joint socialization mechanisms such as trust and common norms (Coleman, 1990), or on weak ties associated with less cohesive networks, due to brokerage (Burt, 2005). More specifically, based on Granovetter’s notion of “weak ties” (Granovetter, 1973), Burt (1997, 2005) considers brokers as actors who bridge - what he calls - "structural holes" in social networks (see, also, Burt, 1992). Such gaps between unconnected or loosely connected actors reflect opportunities in terms of information advantages and their strategical deployment. From a focal perspective, brokers can identify and exploit existing such opportunities residing in the weak ties between network parties and act as gatekeepers or matchmakers (Zaheer and Soda, 2009, Burt, 2005, Ahuja, 2000, Walker et al., 1997). “Bridging” activities or relations (Burt 2005:17) are thus conceptualized as ties in inter-firm business networks that connect previously unconnected or loosely tied firms or actors representing these firms (Patulny and Lind Haase Svendsen, 2007, Burt, 2005, McEvily and Zaheer, 1999). Value creation is then associated with bridging a focal network and a non-focal, i.e., peripheral, one or linking different types of networks for the sake of enabling new resource combinations.
In contrast to “bridging relations”, “bonding relations” can support interconnectedness between firms by tightening existing “weak ties” (Granovetter, 1973) or strong ones, which supports network cohesion to create exclusive relationships (see Putnam, 2000). For instance, “bonding” activities by a broker can support the transformation of “weak ties” into “strong ties” (Kogut, 2000). Value creation then takes place within dense inter-firms relationships where specific knowledge is shared based upon common frames, languages and norms (Burt, 2005, see also Adler and Kwon, 2002: 24). “Bonding” activities support value creation in cases when emphasis needs to be placed on strong interaction and similar understandings to foster resource exchange, enhance trust or defy opportunism (Burt, 2005, Huggins, 2000).

The distinction between “bonding” and “bridging” underlines that brokers can take different kinds of action for the sake of value co-creation. As mentioned before, brokerage can also mean that resources of strategic relevance are kept exclusive, by preventing from tying up further actors (Coleman, 1990, Burt, 2005, Pfeffer and Salancik, 1978, Peteraf and Barney, 2003). This reflects the fact that social capital is not necessarily associated with all sub-groups of a network the same way (Hanifan 1916, 1920). To this aim, “protecting” specific inter-firm relations or activities of resourceful actors through brokerage is another vital function of brokers in a network context. “Protecting” relations can help powerful actors to keep their firm-level and network-based resources exclusive (including information and knowledge), or protect their reputation (see Jack 2005). As we argue, brokerage can support or hinder knowledge exchange and value creation among business actors, based upon using these three functions (Coleman, 1990, Burt 2005, Eklinder and Frick et al., 2014).

Strong ties versus weak ties as different configurations for using brokerage

Coleman (1990) places much emphasis on strong ties and dense social relationships as enabling factors for value co-creation. Accordingly, a business network can consist of strong ties between a close inner circle of firms who frequently and intensively interact. Dhanaraj and Parkhe (2006) argue that the most powerful actors within such networks, which constitute quasi-unique resource bundles, will step into the position of a leader who pull together dispersed resources and capabilities of network members. From their perspective, network orchestration is viewed as a deliberate process guided by the purposeful actions of a hub firm to co-create value for the network, yet being
motivated by exploiting their own benefits in accordance to the network goals (Kogut, 2000, Dhanaraj and Parkhe, 2006). Such a configuration may lead to homogeneity within the network and overlaps in the information flows (Kogut, 2000), thereby supporting co-ordination through repeated exchange and trust, whilst defying opportunistic behaviour on the part of the networks members.

Consequently, strong ties can support the exchange and the convergence of information and knowledge, particularly tacit knowledge, into a common language or action script (Noteboom, 2006). This, again, facilitates both “bonding” relations and an institutionalization of exclusive “bridging” activities (Belso-Martinez et al., 2015, Coleman, 1990, Burt, 2005). Established strong actors, especially when they are aware of their power, are more likely to acquire a position that enables brokerage opportunities. However, powerful brokers possessing sufficient resources might as well exploit their position based upon strong, cohesive ties of network members. This may lead to a constellation in which only an established group of actors is involved in networking, implying a “lock-in” of these actors in a limited set of resource combinations and knowledge bases (Noteboom, 2006). In such a configuration, all information and resources bundled in the network stem from the sub-network only instead of making use of multiple information sources associated with “weak ties” with outer circles.

As a result, while “bonding” relations in terms of strong inter-actor relations are likely to create exclusivity (including offering “protecting” relations) through quasi-unique resource-bundles of high strategic importance, they exclude themselves from important external knowledge sources (Burt, 2005, Filieri et al., 2014). In these constellations, “bridging” relations might be important to connect the focal and highly cohesive social networks with selected actors from other social groups, thus offering specific complementary resources to the core network resources (see McEvily and Zaheer, 1999). In fact, “weak ties” (Granovetter, 1973) are important in value co-creating network settings due to their multiplicity. By acquiring information from the outside of the network, the network may overcome information limitations by granting access to multiple information sources (Granovetter, 1973, Barnes et al., 2015). Therefore exploiting “weak ties” through brokerage provides opportunities particularly for SME that may compensate for a lack of resources through
accessing wider circles of interaction (Aldrich and Kim, 2007, Mosey and Wright, 2007, see, also, Eklinder-Frick et al., 2014).

Networks containing asymmetric resource dependencies can benefit from both “bridging” and “bonding” relations. “Bonding” activities play an important role for shaping teams of actors and establishing effective knowledge-bridging mechanisms within and across the different teams bound by weak ties. Using “bridging” relations, network resources can be integrated to support cohesion among diverse network members (Noteboom, 2006). Zaheer and Soda (2009) find that especially newly shaped teams span “structural holes” (Burt, 2005) and develop that much cohesion that they start acting as broker themselves and contribute to value co-creation through orchestrating ties and resources. Even loosely connected weak actors from multiple settings and backgrounds (for example, different industries) can identify and set up new value co-creating settings due to brokerage (Filieri et al., 2014).

Altogether, both strong and weak ties can be exploited using brokerage for value co-creation. In constellations of strong ties between actors, brokers can exploit established trustful relationships in a network via a “bonding” mechanism using their powerful position to strengthen the relationship further. Accordingly, the position of brokers is typically associated with asymmetric interdependencies within social networks offering various opportunities for “bridging”, “bonding” and “protecting” activities (see Ahuja, 2000; Gnyawali, Madhavan, 2001). By contrast, actors holding less powerful positions can contribute to value co-creation with their own valuable resources and at the same time, they can improve their access to complementary resources. The more frequent the exchange of resources within value co-creating settings takes place, the more likely it becomes that weaker actors improve their social capital and empower themselves, based on brokerage. While it does not matter if brokerage opportunities arise base upon bridging strong or weak ties, “protecting” mechanisms are a necessity in order to develop and maintain opportunities that are related with exclusive value co-creating settings. From a dynamic perspective, with changing opportunities for value co-creation, “bridging”, “bonding” and “protecting” mechanisms applied by network brokers need to be adapted to new circumstances.
Research design, sampling and methodological considerations

Case study research has its strengths in producing significant theoretical insights, contextualizing the unit of interest appropriately and thus adapting a theoretical framework to a specific scientific problem (Eisenhardt, 1989, Eisenhardt and Graebner, 2007, Siggelkow, 2007, Boeije, 2010, Myers, 2010). The case study presented in this paper follows such a qualitative approach, based upon structured qualitative interviews (n=12) with key informants from the main firms (windmill manufacturers, utility companies, service and maintenance providers) involved in the business network as well as related third-party experts from industry associations, consultancies, or regional bodies. Key respondents are managers or upper-level executives (Table 1).

As we assume a value co-creating network milieu to be made up by interconnected actors and overlapping sub-networks, the sample includes vertical and horizontal as well as lateral actors collaborating in multiple sub-networks covered by the case network, which will be anonymously called “Offshore Service Net”. The interviewees have thus been coded with A for actor and split up into the three distinct categories forming the network, i.e., lateral actors (LA1-5), vertical actors (VA1 and VA2) and horizontal actors (HA1-5). The vertical and the horizontal actors are mainly associated to company networks with the windmill manufacturer and the supply company classified as vertical actors and the service and maintenance providing companies as horizontal actors. By contrast, the lateral actors are involved in industrial, political and scientific networks.

This categorisation also illustrates the interdependencies among the involved actors (Figure 1) because it highlights firm-, network-, and industry-specific scarcities, which are orchestrated by more or less interdependent actors to jointly create value (Campbell, 1985, Håkansson and Snehota, 2006, Easton, 2016, Håkansson and Johanson, 2016). Consequently, the categories employed are in line with the conceptual differentiation between “strong” versus “weak network ties” that incorporate these interdependencies (Coleman, 1990, Thompson, 1967, Brown et al., 2010).
Concerning the research design and sampling process, the single case study on the “Offshore Service Net” is organized in different steps. The first step was concerned with the organization of the interview guide and the empirical fieldwork, which was followed by the transcription and coding of the empirical material. The empirical fieldwork was conducted between 2011 and 2012 *via* face-to-face or phone interviews, using a semi-structured questionnaire to guide the interviews. The questionnaire contains different thematic sections of questions (Q1-Q8). Sections Q1 and Q2 are general questions with regard to the company and the interviewee. Q3 comprises questions that helped identify valuable tangible and intangible resources which the firm or key actor surveyed possesses, such as knowledge, skills and reputation, *etc.* Q4 asks the respondents to describe the activities they perform to support the exchange of services and goods within the business network. Moreover, the respondents were interviewed about their motivation to join the network and actively take part in value co-creating projects and initiatives. For this reason, a practical and simple definition for the term “value co-creation” was used in order to create a common understanding of its meaning.

Q5 refers to the positions, roles and functions of the actors or the firms they represent in the business network and other industry associations or the industry. Q6 is associated with the nature of inter-actor relationships such as the importance and intensity of competition within the network, customer and supplier relations within and outside the network, the large firms as central and powerful players, or interdependencies and specific ties between SME and large companies. Q7 asks interviewees to describe the resource profile of the business network from their perspective. Finally, Q8 concerns the description of the respondents’ future strategy with regard to new markets, market opportunities and mergers with other business networks. The interviews had a length between 50 and 70 minutes each (see, again, Table 1). In line with the case study approach proposed by Yin (2003), Myers (2010) and Boeije (2010), additional data about the network were gathered from sources such as annual reports, newspaper articles and material to substantiate and contextualise findings from the interviews.
The sampling made use of snowballing techniques relying on suggestions from one of the first key actors interviewed. In fact, the manager of the most important industry association recommended investigating the “Offshore Service Net”, which was known as being very progressive and even discussed as a potential “role model” for the industry in terms of the collaboration and resource-exchange taking place within the network against the background of a highly dynamic external business environment. More specifically, the case was considered to be successful in coordinating service and maintenance on behalf of the windmill farm. Prior to the interviews with firms involved in the business network, we therefore contacted further lateral actors to take up this recommendation and learn more about the business environment including the challenges, resource endowments/scarcities and the structure of the business relationships of the key actors involved.

All interviews have been taped and transcribed, coded and analysed. For the analysis, we employed qualitative content analysis, using the complete information provided in the transcripts to reconstruct the objects or topics dealt with in the interviews and the related contextual information of the elaborations given by the respondents (Titscher et al., 2000). To achieve this, any text elaboration on resources, actors, interaction, role and function was marked. Marked text passages were coded afterwards and reduced to their core information concerning the object and context related to the object. The mechanisms of brokerage for the case study were identified and analysed from the perspective of the interviewees, and we accumulated the coded observations with regard to the phenomena of “bonding”, “bridging” and “protecting”. Beyond such directly observable activities, the key respondents were also asked to describe the resources circulating within the network or the industry to identify (potential) “bonding”, “bridging” and “protecting” mechanisms during the interview.

Context: Introducing the Business Network “Offshore Service Net”

The “Offshore Service Net” is located in the Danish wind energy business, an industry that has grown up. By the end of the 1970s, mainly start-ups had been constructing windmills. Only two
decades later, the windmill industry was among the fastest growing Danish industrial sectors (Kaldellis and Zafirakis, 2011), and some of the formerly small producers have grown into large manufacturers, while at the same time powerful players from other industries (re-)entered the market. Today the industry is hierarchically structured with a few large manufacturers and supply companies on top of the hierarchy alongside approximately 97% of SME at the bottom. Consequently, large manufacturers have to source service and maintenance from a brigade of SME to efficiently build and run windmill farms (Martin et al., 2016, Sarker and Faiz, 2016, Scheu, 2012, Blanco, 2009). *Inter alia*, these producers need to acquire a specifically trained labor pool and shape the skills of workers needed in the industry. As service and maintenance capabilities are mainly incorporated in the workforce of the industry’s SME, suppliers and manufacturers of offshore windmill farms strongly depend on SME to access these core resources.

In the future, windmill farms are expected to double their size in the near future (EWEA, 2015), whereas their future surplus energy per windmill is expected to only slightly rise (DAMVAD, 2014 and EWEA, 2015). Increasing the number of windmills per farm therefore implies both more service and maintenance and technician hours. Thus, the “minimization of technician hour per kilowatt” (Sarker and Faiz, 2016, Chen and Blaabjerg, 2009, Blanco, 2009) and windmill farm demands again more and better coordinated exchange and knowledge transfer among the SME. Therefore, the necessary service and maintenance capabilities, which are developed and offered by various SME, rely on physical proximity and close local collaboration between windmill farms and producers. This is not only necessary for those windmill farms that are already operational to safeguard their service and maintenance capabilities, but close distance to service and maintenance facilities is particularly important for newly set-up offshore windmill farms as they rely on the transfer of knowledge and competencies (LA1, HA1).

As a result, business relationships and networking within the Danish windmill industry requires strong and efficient co-ordination of adaptation and learning processes among firms, particularly SME, to shape the industry’s strategic capabilities for future challenges. Notably knowledge and capabilities need to be transferred from one offshore windmill business to another. Yet, this transfer is challenging because some of the SME are locally bound or do not want to grow further, as the
key informants HA1 and LA1 report. Connecting experienced workforce such as technicians from established projects with those working in newly established windmill farms thus depends on some kind of bridging activities conducted by experienced co-ordinating actors. In addition, the transfer of core capabilities such as knowledge from established to new farms necessitates trust for mechanisms in terms of “bridging”, “bonding” and “protecting” to function.

The “Offshore Service Net” is constituted of a team of SME that provide mainly service and maintenance to meet the need of the large manufacturers and energy providers. The team is thus well aware of both the need and preconditions for empowering their own position in this business collaboration. Physically, the case network is connected to Denmark’s largest offshore wind farm between Djursland and the island of Anhold. Besides firms, various business associations form part of the network that are in charge of providing lobbying and general business support to its members, i.e., firms and producers, or sub-networks from neighbouring countries such as Germany.

Since 2013, the wind farm is fully operational with a capacity to supply an annual power that corresponds to 4% of the total Danish power production. In June 2010, the Danish Ministry of Energy, Utilities and Climate gave the concession to a large Danish energy company (VA1) to build, run and exploit the wind farm for a period of 25 years with a fix on feed in tariffs (guaranteed payments for the delivered energy) for the initial 12 years. VA1 then committed one of the two Danish wind turbine manufacturers (VA2) to produce wind turbines on behalf of this farm. While the supply company is the owner of the wind farm, the turbine manufacturer represents its most important contractor and also acts as manager of the wind mill farm (Børsen, 8.5.2012). Approximately 20 SME are legally bound as sub-contractors with fixed mid-term contracts with one of the two manufacturers, shaping a team to collaborate over service and maintenance provision as a package. However, not all SME are integrated into the team: some SME sporadically offer their services to central firms in the network without fix-term contracts.

Formally, the “Offshore Service Net” has been set up as a non-profit organisation financed by member fees and in charge of managing the team of SME. More specifically, one important goal
from the start was to support quick adaptation of the services offered, local infrastructure and the network- and firm-based capabilities to the standards of the supply company and the industry to prepare for future challenges. Managing co-operation among members firms operating in diverse areas such as surveying, construction, consulting, inspection, shipping service and maintenance was another goal of the network, particularly when it comes to business collaboration between the team of SME and the large and central firms VA1 and VA2.

“Bonding”, “bridging” and “protecting” mechanisms as brokerage in the business network

How network ties are organised: The need for brokers

Industry-related asymmetries between firms in the network

Albeit very young, the Danish windmill market incorporates a high degree of established and institutionalised inter-firm relationships. About 95% of the companies including the large firms belonging to the sector are listed as members of the industry association. The high degree of institutionalisation is reflected in the fact that the association (represented by LA1) views itself as the central hub for discussing ideas and bargaining decisions with regard to structural changes in the industry.

As the lateral actors report (LA1 - LA5), the windmill industry in Denmark is considered as both mature and hierarchically structured, with both conditions representing important future challenges with regard to the industry’s competitive advantage. None withstanding the great importance of the industry, long-term survival is still difficult for many SME operating in maintenance and service. The respondents clearly stress that the Danish market will not be large enough any longer for many firms to live on it and internationalisation is thus turning into a necessity, rather than being an option, as the following quotation highlights: “So compared to let us say Germany or Spain or other countries where there is a large wind industry, we do not have a logical market. You cannot
live on the Danish market. The home market is primarily important in terms of pushing the envelope off what you can do in the energy system. By increasing the penetration levels, we reached 20 percent and we are approaching 25 percent of the wind energy in electricity. That is higher than any other country” (LA1).

To achieve this, the producers and providers, typically large companies with international experience, are considered as crucial actors to further develop the competitiveness of the industry. In this respect, the interviewees consider the hierarchical structure within the network as a competitive advantage, because it allows a predominance of large energy companies and windmill manufacturers with international experience who are at the forefront of delivering cutting-edge technology. However, this also means that some SME, if not many, have to struggle hard in economic terms, which is an important challenge for the whole windmill industry when it comes to accessing new markets, improving established competencies and developing novel core capabilities against future external challenges. As a matter-of-fact, the core capabilities of the industry or its actors are primarily, if not uniquely, based on technical competencies, and SME without solid skills in this area are not able to deliver the expected performance.

At the same time, and also partly due to its hierarchical organization, the offshore industry face significant other scarcities in terms of human resources and high-skilled workers in the field of maintenance and service, and the majority of firms, i.e., the SME, also lack resources in strategic fields where they need to develop their business. For instance, LA3 stresses that in spite of Denmark’s remarkably good position and excellent expertise both in windmill manufacturing and service and maintenance, capabilities in service and maintenance are viewed as lacking scarcity. To improve these essential capabilities for SME, the industry associations and public consultancies (LA1, LA2, LA5) have initiated and organized training programmes for firms, particularly SME in the network and the industry, as is stated by LA1: “...anyone can go to an offshore training program if one wants to improve mechanical and electrical skills. The combined mechanical and electrical offshore skills are basically that what is creating our core competence” (LA1). However,
these organizations also learnt that, due to time restrictions, particularly the small and micro-firms hardly managed to participate in these activities.

Therefore, LA1 and LA2 both stress that the training programmes were rarely used by SME and they consider the “Offshore Service Net” a good alternative compared to traditional workshop programmes offered by business associations. For SME, the network integrates specific training for its members, which can be performed during the firms’ daily work. Consequently, the network supports the adaptation of firm- and network-level technical competencies to the industrial standards through such activities. Capability improvement is vital for the industry, as the key respondents find, to compensate for lacking capabilities related to current offshore windmill projects and new projects abroad.

Besides training programmes, preassembly premises in close proximity to the offshore wind parks are deemed as a significant approach to organize manufacturing and simultaneously facilitate learning processes among SME and larger firms. Indeed, all lateral actors interviewed stress the importance of co-ordinated exchange of experience and knowledge across the industry, which takes place in multiple network settings. The firms involved face the need to acquire new skills and capabilities, while, at the same time, switching from one project to the next. These processes are facilitated by physical closeness and the vicinity of windmill farm projects including manufacturing, service and maintenance, and the windmill farms. Some respondents also emphasize that the industry cannot further grow without a management and leadership approach involving SME, especially in the process of shaping their firm- and industry-level capabilities.

**Network brokers and their tasks**

In the light of the existing hierarchies and asymmetries within the “Offshore Service Net”, the need for brokerage becomes clear. Indeed, several parties acting as brokers can be identified for the case network. Particularly LA3, an organization that is responsible for supporting such capability
development and networking within the industry, acts as a matchmaker who moderates and steers learning processes between the large firms on the one hand and the bulk of SME in the network on the other. The interviewee from LA3 calls his organization “an umbrella for business networks”. At the same time, he stresses that joint learning through SME involvement in projects outside their core businesses (for example, research and development) faces important limitations caused by a striking lack of resources on the part of many SME: “Some SME can hardly involve themselves in the huge projects, as they do not have the capacity. They would need to get involved in cooperative networks to participate in newly emerging business activities, for example in Bremerhaven” (LA3).

There is further evidence that notably the lateral actors in the “Offshore Service Net” are proactively committed to adapting the infrastructure of the network and the industry to future challenges. In doing so, they take the role of a facilitator and broker within the network, specifically between the team of SME (including the micro-enterprises) and the large and powerful companies. Indeed, the “Offshore Service Net” has become a role-model for capability development and knowledge transfer within the industry based upon collaborative learning, as LA1 states. In addition to LA1, HA1, the manager of the case network, has formally adopted the role of a network broker who constantly communicates the demand from the two large firms VA1 and VA2 located in the center of the network towards the SME, thereby building important connections for sharing information and knowhow between these heterogeneous groups. This information-sharing and knowledge exchange takes place through fairs, workshops and meetings which he organizes. Moreover, LA1 involves specialized lateral actors (LA1-LA5) as further brokers and/or matchmakers who seek to adapt network-based resources by bringing together potential co-creating actors, thereby initiating learning processes within the “Offshore Service Net”. Consequently, there are several parties or actors performing tasks and activities of a “broker” (Table 2).

(Table 2: Brokers and their roles in the case network about here)

The brokers which have been identified for the business network are located at the most important interfaces where coordination and matchmaking is needed to prevent the network from a lack of
specific capabilities (such as high-skilled labour) or develop and safeguard strategic capabilities (for example, entry rules and their management by LA1 and LA2). The actors working as brokers proactively transform the network by shaping teams that learn to co-create value and consequently influence the inter-firm configuration and interdependencies within the “Offshore Service Net”. As a result, brokers in the network enable SME to reach higher resource endowments, particularly with regard to strategic resources, while large firms can increase their long-term commitment, both of which benefit the network. Especially long-term commitment of the large firms matters because it professionalizes inter-firm interaction within teams and thus helps to overcome the limitations and barriers to collaboration due to network asymmetries.

Those actors who formally adopt the role of a broker (managers of LA1-5 and HA1) are on the one hand in a formal position that gives them sufficient authority to act strategically and transform the network. On the other hand, they operate according to the demand of an industry which wants the business network to adapt itself to future challenges through improvements of existing capabilities and development of novel competencies. Moreover the mechanisms which the brokers apply in the “Offshore Service Net” are being used against the background of a paradoxical constellation: SME and their competencies are crucial pre-conditions for running offshore windmill farms because these firms offer service and maintenance as a core competency, both in the industry and the case network. As a result, the specific competencies constitute the core competitive advantage of the network. Consequently, the process of shaping and protecting SME capabilities is already institutionalized to a huge extent. However, the “Offshore Service Net” faces important limitations at the same time in that particularly SME operate with significant resource scarcities such as skilled labour and thus hardly manage to participate in initiatives established on the industry level. Therefore the networking activities that the lateral actors (LA1-5) institutionalize face only limited success, as the following quotation highlights: “If you are a company with let’s say 100 or 200 employees, you will probably have a really good sense of what is going on in the market. You have someone that is clever enough or has enough time to actually do an analysis or buy that service from someone. But if you are smaller, which most of our companies are, than you don’t have it. And you are too busy keeping up with your own customers to look for new ones. So what we should do more is actually to upgrade whatever the work they do themselves” (LA 1).
“Bonding”, “bridging” and “protecting” mechanisms for brokers in the network

As a consequence of this constellation, “bonding” and “bridging” the different actors or groups in the network, but also “protecting” the competitive edge of the network are important functions the brokers exert.

Bonding

The creation of common values among network firms is an important bonding mechanism (Anderson and Jack, 2002), which was observed between the large firms and larger SME in the “Offshore Service Net”. These firms jointly pool complementary resources and protect them against external competition. Notably SME including micro-businesses in the network pool their resources with larger SME to become part of the service and maintenance team. Bonding activities matter for value creation both on the level of the business network and the industry, because they are suited to shape strategic capabilities particularly when it comes to developing high-skilled work. Since bonding relies to a large extent on team-based interrelationships, in this case particularly among SME, these firms achieve to strengthen their position vis-à-vis the two large firms in the business network, using bonding activities. In this respect, reputation and trust with regard to the quality and continuity of the services delivered facilitate such bonding within the network.

In a similar vein, the large enterprises recognize that many SME succeeded in constantly delivering service and maintenance, thereby shaping the capabilities needed. In order to push these business opportunities for SME in the “Offshore Service Net”, the manager HA1 used positioning of the SME as a cohesive team and creating exclusivity regarding their offer as bonding mechanisms, as he reports: “The purpose of the cluster is to position the member companies best possible in relation to the customer companies. So all the companies involved in building and running the offshore wind park are our customers and the whole purpose of the cluster is to bring as much business to the member companies of the cluster as possible” (HA 1).
Against the background of the existing scarcities, it is important that service and maintenance is constantly available because the large firms are the most important customers for the service and maintenance provided by the SME. Therefore, the reciprocal interdependency between the two large firms and the team of SME also shapes the degree of internal competition in the area of service and maintenance in the case network. Generally, such internal rivalry is regulated by a code of conduct, which holds that the “best” firm will receive the order. In addition, a low degree of competition within the network facilitates a trustful atmosphere that, again, supports learning process among members, particularly as “learning-by-doing”. Consequently, small firms can acquire new skills complementing their established ones.

Based upon this profile, which is supported by the identified bonding activities which the brokers use in the network, even small and micro-businesses can integrate new, and partly strategic, initiatives into their daily operations. Joint and continuous learning as well as the adaptation of skills in service and maintenance involving particularly complementary skills are essential elements of the network approach of the “Offshore Service Net” to improve their strategic advantage as a co-operative business network. For instance, HA5 offers such complementary skills as equipment and expertise to test new processes and products, which benefits the network, yet does not raise internal competitive pressure. As “bonding” creates trustful relationships, it can be viewed as a precondition for protecting the case network against external competition within the industry, but also facilitates potential “lock-in” effects if over-embedded, strongly connected, actors neglect to include new actors who can provide valuable complementary resources (such as new technologies).

**Bridging**

Therefore, “bridging” is another vital mechanism employed by brokers for the “Offshore Service Net”. The main bridging mechanism in terms of building connections between firms (Anderson and Jack, 2002) for the network under review is associated with delivering and co-ordinating valuable resources. In the network under investigation, several participants act as matchmakers, screening supply and demand within the network and externally. Following up on these initiatives, the actors both bridge and bond among the network firms with their ongoing activities and initiatives. Most of
these matchmakers hold a formal position as brokers in the “Offshore Service Net” or they belong to the powerful companies, which offer resources that are vitally needed by the other participants. For instance, HA3 bridged his capabilities stemming originally from the bridge-building business with those of the very small companies who had already brilliant service and maintenance capabilities and, in doing so, instigated a team-based learning process. More generally, bridging initiatives are particularly important to involve SME in a way that initiatives can be integrated in their daily and operational activities, whereas the large firms in the business network can be more easily activated by the brokers through the offers of products and services on the part of SME. Consequently, integrating initiatives of strategic relevance into the daily work routines of the bulk of SME in the “Offshore Service Net” can be considered as an important bridging mechanism. Jointly creating strategic capabilities with large firms to offer complementary resources is at the same time a significant bonding mechanism in the asymmetric network, because the development of R&D capabilities takes place embedded in exclusive relationships of large firms with selected trustworthy SME and other actors. In this case, bridging and bonding mechanisms are overlapping.

**Protecting**

At the same time, external rivalry is limited because not every SME is allowed to join the network and its formal organization. Against this background, “bonding”, “bridging” and “protecting” mechanisms belong to the brokers and their activities to steer the “Offshore Service Net” (Table 3). The opposite of bridging can be regarded as a “protecting” mechanism, because strategic processes are exclusive and the team of SME in the “Offshore Service Net” is not willing to share revenues with an increasing number of firms entering the business network. Besides joint learning and knowledge transfer, limiting competition is thus another key task for the network management. As the lateral actors interviewed state, network firms highly value that competition is limited internally by means of a code of conduct, which keeps rivalry between network partners on a low level but protects them from overly fierce external competition. By only accepting new network members on the grounds that they offer lacking complementary competences within the range of existing competencies, the manager of the “Offshore Service Net” acts as a gatekeeper.
Limited competition supports the process of common learning because it fosters trust and also stabilizes the internal economy of network firms, as they can “buy” extra time for common learning about new market developments. Therefore, HA1 highlights that due to improved service and maintenance competences and acquired capabilities in co-ordination, the “Offshore Service Net” holds a clearly recognizable competitive advantage compared to stand-alone SME who only take orders from the large windmill manufacturers: “So looking at (Offshore Service Net), you have a very broad set of competences and if I compare that to a cluster in the western part of Jytland, where they are all manufacturing companies supplying parts - physical parts - to Vestas or Siemens (...), this cluster is focused on operation and maintenance as opposed to manufacturing and that is another thing which makes this cluster interesting in my mind. You have very few, actually in Denmark I know up only about this cluster, who is focusing on operation and maintenance, all the other clusters they are focusing on manufacturing” (HA1).

(Table 3 Bonding, bridging and protecting initiatives in the “Offshore Service Net” about here)

Discussion and conclusions

As is stated by Kirkels and Duysters (2010: 375), “there is a clear lack of understanding regarding intermediaries operating within SME networking structures”. Picking up this argument, the present paper uses conceptual ideas derived from social capital theory for inter-firm business networks to examine different mechanisms which such intermediaries can use in SME networks for jointly creating value for the network. Burt’s (2005) concept of a broker who bridges so-called structural holes in the social network by connecting previously unconnected or only loosely coupled members offers such a valuable point of departure for this study. More specifically, the present study incorporates the idea of a “broker” in the tradition of Burt (2005) who uses “bridging” relations to build links between diverse sources of information and knowledge within a larger network consisting of asymmetrically interdependent subnetworks. With four questions guiding the empirical analysis of a Danish case network in the windmill business, brokerage is conceptualized in more general terms as the interplay of distinct mechanisms called “bridging”, “bonding” and

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“protecting” that incorporate different types of activities or initiatives, all of which supposedly foster social capital the network context (see Adler and Kwon, 2002, and Putnam, 2000).

What kind of transfer mechanism in terms of “bonding”, “bridging” and “protecting” can be identified for the case network “Offshore Service Net”?

The case study highlights that apart from “bridging” and “bonding” (see Adler and Kwon, 2002) “protecting” mechanisms can be identified among the activities associated with brokerage. Relationships between actors, activities, events, or initiatives on the part of specific actors or organizations (e.g. business organizations or external bodies associated with the case network) have been identified as mechanisms for “bridging” and/or “bonding” of the involved actors. While the function of the respective mechanism is always the same, the way how “bonding”, “bridging” or “protecting” relations are established and how activities or initiatives are applied for value co-creation can be quite different. More specifically, the study shows that mechanisms that emerged in an a priori value co-creating setting were described as being highly sufficient in terms of contributing to value creation and safeguarding resource exclusivity. By contrast, other mechanisms that have been institutionalized by lateral actors intending to bridge among the actors of the industry were considered to be selectively sufficient. This finding emphasizes that it is important to look closely into the distinct mechanisms and its related network configurations. Beyond that resource limitations of targeted actors have to be taken into consideration and finally it has to be identified which mechanisms actually match which kind of targeted actors and/or projects.

How does brokerage unfold through “bonding”, “bridging” and “protecting”?

As it is acknowledged in the literature (e.g. Adler and Kwon, 2002, Coleman, 1990), “bonding” and “protecting” initiatives foster relationships, making them more cohesive. Consequently, processes of value co-creation using exclusive resource bundles in inter-firm business networks can be considered as a result of intensive and strong relationships. In the “Offshore Service Net”, activities and initiatives that bonded the team members across different subnetworks and protected them against external rivalry were, indeed, supportive of enhancing the strength of the existing relationships. In this case, SME development in the network was an important impact because brokerage mechanisms revealed the great value of their joint service and maintenance creation for
the network. The team-based interdependencies within the group of SME spurred capability development of the “Offshore Service Net” as a system. Moreover, a lower degree of rivalry within the network was another important result of “protecting” initiatives that intensified the exchange of knowledge and resources among the members, thereby inducing or supporting “learning by doing” processes. This observation is in line with the findings from Zaheer and Soda (2009) that particularly newly founded teams turn into active brokers.

The case of the “Offshore Service Net” highlights that brokerage mechanisms contributed to strengthening network cohesion in terms of developing stronger inter-actor relations and allowing more co-ordinated action. Those activities also support exclusivity of the case network by developing a quasi-unique resource-bundle of strategic relevance. By opening up the network to internal and external “bridging” initiatives, the brokers identified for the “Offshore Service Net” improved its access to resources within the network and outside. This was, among other things, achieved by orchestrating the SME team according to the needs of large firms represented in the network. Increasing the network’s reputation through communication all over the windmill industry is another effect of brokerage for the case network.

How can these mechanisms interactively be described as collaboration in value co-creating settings of a business network?

Even if value co-creating settings emerge beyond exclusive relationships, trust and power influence are important for establishing such settings for the case network. Initially, the large and powerful firms were not willing to share information and risks with SME on an equal and fair basis; however, due to the increase of power on the part of the SME team delivering service and maintenance as a package, this group was able to gain a more powerful position in the network by rendering their package offered to the large firms more exclusive. From the perspective of SME, this relative increase in power represents a fruitful strategy for collaboration in value co-creating settings (see Pfeffer, Salancik, 1978, Jaakkola and Hakanen, 2013). Moreover, the SME team achieved to establish more sustainable and trust-based relationships with the large firms because of the higher frequency of resource exchange and rising interdependencies between the two parties, as a result. Exchanging knowledge and other resources more frequently can be a strategy to reduce asymmetric
interdependencies (Matiaske, 2013; Håkanson, Snehota, 2006). Beyond “bridging” relations established from within the network, external brokerage initiatives of lateral actors matter for value creation as they facilitate the access of SME to potential new customers, help them overcome information limitations and strengthen their reputation (Coleman, 1990, Uzzi, 1997, Granovetter, 1973, Barnes et al., 2015). For example, SME were able to compensate for a lack of resources and identify brokerage opportunities like new emerging offshore projects where new teams for service and maintenance need to be shaped. Finally, trust-based and less asymmetrically dependent relationships based upon intensive exchange of knowledge, services and goods support joint learning and capability improvements, which, again, foster a co-operation where resources and risks are more equally shared and strategic capabilities can be better developed. This finding is also supported by Noteboom (2006) who argues that trustful and frequent exchange leads to a convergence of information and knowledge into a common language or action script.

How the social capital which resides in the firms’ network relationship is influenced by “bonding”, “bridging” and “protecting”?  

The paper has started off from claiming that the discussion about “brokerage” for inter-firm business networks is still an under-explored issue. It has been argued that especially a conceptualization of activities and actions applied by brokers is missing. To this aim, the paper gives a first overview of what brokerage mechanisms in terms of “bonding”, “bridging” and “protecting” can be made up. Such relations can be weak or strong ties, and the initiatives taken can have an informal character or be highly formalized. The case study describes how “bridging”, “bonding” and “protecting” relations can be established for the sake of shaping social capital residing relationships within inter-firm business networks. Like social capital (see, again, Hanifan 1916, 1920), mechanisms to exploit brokerage using these relations can work in different directions, either “bonding” or “protecting” social capital in the network, or “bridging” diverse sources of social capital to improve the one residing in the network (Burt, 2005).

Depending on the specific configuration in terms of network interdependencies, symmetries or asymmetries, brokerage is associated with mixing activities and initiatives to either “bond” network
firms or “bridge” subgroups between them, or to “protect” their competitive edge and resource exclusivity. To this aim, the study looks closely into the specific activities which brokers can use, such as informal meetings and formal workshops to facilitate information or knowledge exchange, fostering project-based collaboration between different groups of firms. Therefore, it adds to existing case studies that looks into the quality and nature of ties building social capital in inter-firm business networks (such as Eklinder-Frick, et al., 2011, 2012).

Moreover, the present study stresses that ex ante less powerful actors or groups of actors can gain powerful positions by using these mechanisms, thereby turning into brokers themselves. In that way this paper provides insights into cases where brokerage mechanisms are developed from an inter-firm network from within, as compared to evidence for external brokers (see, e.g., Huggins 2000, or Gausdal and Nilsen, 2011). In the case study, SME were able to compensate for their ex ante relatively disadvantaged position within the industry by co-operatively implementing “bridging”, “bonding-”, and “protecting” initiatives themselves.

Finally, the paper provides evidence that awareness for brokerage opportunities linked to all three mechanisms is an important pre-condition for enhancing network-based social capital. As the case study shows, there has been only a low level of awareness among SME in the network and also for an external (lateral) broker for the opportunities of brokerage through “bridging”, “bonding” or protecting”.

The findings presented, however, face some important limitations, suggesting follow-up research because it uses a cross-sectoral single case study. Therefore, it should be considered as a first step to illustrate the relevance of “bonding”, “bridging” and “protecting” mechanism, suggesting follow-up research.
References


Børsen, Copenhagen, 08.05.2012.


Figure 1: Illustration of “Offshore Service Net”
<table>
<thead>
<tr>
<th>Actor</th>
<th>Information on the interview</th>
<th>Type of organisation</th>
<th>Main activities of the organisation with regard to value-co-creation in the network</th>
</tr>
</thead>
<tbody>
<tr>
<td>LA1</td>
<td>Face to face, 70 min</td>
<td>Industry association</td>
<td>Lobbying, developing and fostering infrastructure on the regional and national level.</td>
</tr>
<tr>
<td>LA2</td>
<td>Face to face, 70 min</td>
<td>Industry association, project management</td>
<td>Matchmaking or transfer of resources, local infrastructure and knowledge.</td>
</tr>
<tr>
<td>LA3</td>
<td>Face to face, 65 min</td>
<td>Consultancy (public)</td>
<td>Reconstruction of local infrastructure and development of tools for knowledge transfer and learning (focus on SMEs).</td>
</tr>
<tr>
<td>LA4</td>
<td>Via telephone, 40 min</td>
<td>Supply company outside the network</td>
<td>Potential strong tie for future projects; competitor of one of the central player in the network (large firm).</td>
</tr>
<tr>
<td>LA5</td>
<td>Via telephone, 60 min</td>
<td>Public R&amp;D organisation</td>
<td>Accessing research resources and integrating the network in research projects.</td>
</tr>
<tr>
<td>VA1</td>
<td>Via telephone, 57 min</td>
<td>Supply company</td>
<td>Accessing the resources (tariffs and concession) to run the windmill farm, demanding service and maintenance.</td>
</tr>
<tr>
<td>VA2</td>
<td>Via telephone, 55 min</td>
<td>Turbine manufacturer</td>
<td>Delivering wind turbines, demanding and co-ordinating service and maintenance.</td>
</tr>
<tr>
<td>HA1</td>
<td>Face to face, 75 min</td>
<td>Organisation facilitating interaction between the large firms and around 30 SMEs</td>
<td>Co-ordinating and initiating information and resource exchange; initiating joint learning; strengthening the SMEs.</td>
</tr>
<tr>
<td>HA2</td>
<td>Via telephone, 50 min</td>
<td>Experienced offshore service and maintenance company; global actor</td>
<td>Supporting learning processes among and the reputation of SMEs.</td>
</tr>
<tr>
<td>HA3</td>
<td>Via telephone, 65 min</td>
<td>Experienced bridge constructor</td>
<td>Adapting SME capabilities to the offshore context and initiating learning among SMEs including micro-enterprises (self-employed electricians).</td>
</tr>
<tr>
<td>HA4</td>
<td>Via telephone, 55 min</td>
<td>Established organisation in charge of managing the local port and the local offshore infrastructure.</td>
<td>Accessing public resources.</td>
</tr>
<tr>
<td>HA5</td>
<td>Via telephone, 65 min</td>
<td>Organization engaged with R&amp;D related to offshore service and maintenance and testing of new products</td>
<td>Co-creating strategic capabilities for large firms and SMEs.</td>
</tr>
</tbody>
</table>
### Table 2 Brokers and their roles in the case network

<table>
<thead>
<tr>
<th>Broker due to their formal function/position</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lateral actors</td>
<td>• Lobbying</td>
</tr>
<tr>
<td>LA (LA1-5)</td>
<td>• Tying up with important strong actors nationally and internationally</td>
</tr>
<tr>
<td>LA1-5 act as broker due to their formal position</td>
<td>• Supporting the process of getting embedded into the windmill industry and relevant business networks abroad</td>
</tr>
<tr>
<td></td>
<td>• Institutionalizing rules and knowledge transfer mechanism which support the industry (bridging mechanism)</td>
</tr>
<tr>
<td></td>
<td>• Matching the infrastructure</td>
</tr>
<tr>
<td>Vertical actors</td>
<td>• Responsible to find key contractors</td>
</tr>
<tr>
<td>VA (VA1-2)</td>
<td>• Shaping and fostering trustful relationships with the most important key actors (LA, VA and HA)</td>
</tr>
<tr>
<td>VA1-2 act as broker due to their power</td>
<td>• Responsible to ensure that the windmill farms are running constantly and smoothly</td>
</tr>
<tr>
<td></td>
<td>• Improving and fostering reputation</td>
</tr>
<tr>
<td>Horizontal actors</td>
<td>• Matching supply and demand</td>
</tr>
<tr>
<td>HA (HA1-5)</td>
<td>• Matching the process of adapting SMEs capabilities to the standards set by the VA (VA1-2)</td>
</tr>
<tr>
<td>HA1 acts as broker due to his formal position as manager of the “Offshore Service Net”</td>
<td>• Supports to get to a code of conduct</td>
</tr>
<tr>
<td></td>
<td>• Creates exclusivity of the service and maintenance products collectively offered by the service net</td>
</tr>
<tr>
<td></td>
<td>• Voice of the SMEs from the “Offshore Service Net”</td>
</tr>
<tr>
<td></td>
<td>• Improving and fostering reputation of the “Offshore Service Net”</td>
</tr>
</tbody>
</table>
Table 3 Bonding, bridging and protecting initiatives in the “Offshore Service Net”

| Initiatives associated with bonding | • Building and sustaining strong long-term relationships internationally, nationally and locally outside “Offshore Service Net” (VA1-2, LA1-5, especially LA1-2).  
| • Creating exclusivity for specific sub-networks within “Offshore Service Net” (HA1-5, especially HA1, supported by LA1-5, VA1-2).  
| • Co-creating supplementing scarcities within the network (HA1-5).  
| • Sustaining regular relations with key customers (HA1, V1-2).  
| • Strengthening the position of the network against external challenges (HA1-5). |

| Initiatives associated with bridging | • Connecting the service and maintenance team with important actors within “Offshore Service Net” and outside (HA1, VA1-2, LA1-5).  
| • Matching the network-based capabilities with potential new members (HA1, VA1-2, LA1-5).  
| • Participation in initiatives such as workshops, fairs, etc. (HA1-5, VA1-2).  
| • Adaptation of capabilities towards external challenges (HA1-5, VA1-2, LA1-5).  
| • Connecting co-creating actors or acting as co-creator (HA1, LA1-5).  
| • Developing and institutionalizing a knowledge-creating and knowledge-enhancing infrastructure within the relevant sub-networks inside “Offshore Service Net” (LA1-5, HA1, HA4).  
| • Facilitating collaborative relationships with specific brokers residing in sub-networks (HA1, VA1-2, LA1-5).  
| • Influence institutionalization of the industry and the network through standards and the definition of needs (VA1-2). |

| Initiatives associated with protecting | • Keeping potential external competitors outside “Offshore Service Net”, not connecting and integrating them with the network (HA1).  
| • Refraining from matching capabilities from within the network with potential new members (HA1).  
| • Excluding external participation from initiatives such as workshops, fairs, etc. (HA1, LA3).  
| • Developing and institutionalizing exclusive knowledge-creating and knowledge-enhancing infrastructure (HA1).  
| • Creating exclusivity for the service and maintenance team within the network (HA1).  
| • Strengthening the position of the team within the “Offshore Service Net” against external challenges (HA1). |