

ADOPTION OF SUSTAINABLE PRACTICES IN FOOD SUPPLY NETWORKS: THE ROLE OF BROKERAGE

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Abstract

Recent research suggests that firms can obtain resources to support adoption of sustainable supply chain management (SSCM) practices through their supply network ties. This paper explores the role of brokerage in the exchange of financial and knowledge resources aimed at supporting the adoption of SSCM practices in supply networks. The paper presents a case study of the banana supply network in Costa Rica. We identify brokers in the network and brokerage behaviors. We extend SSCM research by considering a wide range of actors and contribute by uncovering the behaviors and actions that characterize brokerage in supply networks.

Keywords: sustainable supply chain management, supply networks, brokerage

Introduction

Environmental, social and economic outcomes can be improved in supply networks when firms successfully adopt sustainable business practices such as sustainable supply chain management (SSCM) (Seuring and Muller, 2008). SSCM is concerned with the integration of environmental, social and economic goals across a firm's supply management operations (Gimenez et al., 2012). Small and medium sized firms in food supply networks, however, frequently struggle to adopt SSCM practices due to high costs, lack of financial resources and lack of knowledge resources (Collins et al., 2007). Small and medium sized farmers in these networks increasingly experience stagnant revenues combined with constant cost reduction pressures that threaten their economic sustainability and inhibit adoption of SSCM practices (Renting et al., 2003).

Adoption of SSCM is influenced by availability of financial and knowledge resources. Focal firms that lack financial and knowledge resources to adopt SSCM practices often search for

these resources outside firm boundaries (Lee and Klassen, 2008). Although SSCM research has examined the exchange of financial and knowledge resources between a focal firm and its direct customers and/or suppliers (e.g. Gimenez and Tachizawa, 2012), there is growing evidence that such resources are also held by organizations to which a focal firm is indirectly connected such as competitors, downstream customers or NGOs (Pagell and Wu, 2009).

A network perspective, which views any system as a set of interrelated actors, is appropriate for considering the exchange of financial and knowledge resources in a supply network formed by a focal firm's ties with direct and indirect suppliers, customers and sustainability-focused actors (Tate et al., 2013; Saunders et al., 2017). This perspective suggests that a focal firm can access financial and knowledge resources through its network ties (Borgatti and Li, 2009).

A supply network is composed of different types of actors, such as suppliers, buyers and NGOs. Recent research suggests that different types of actors (e.g. for-profit firms as opposed to NGOs) hold unique resources, which can be combined to create value (Rodríguez et al., 2016). Yet not all firms in a supply network have direct ties to different types of actors. Small and medium-sized firms, for instance, usually have direct ties only to their customers. To further understand how small and medium firms reach organizations that are indirectly connected, we suggest exploring brokerage.

Brokers are actors that coordinate the exchange of resources between other actors that are themselves unconnected or weakly connected (Gould and Fernandez, 1989; Obstfeld et al., 2014). Previous research has considered the impact of brokers in relation to entrepreneurial and innovation-related outcomes in supply networks (Bellamy et al., 2014; Carnovale et al., 2017). Yet despite the mounting evidence that focal firms often require external resources to successfully adopt sustainable business practices and recent suggestions that these resources may be held by supply network actors that are indirectly connected to a focal firm, relatively few studies have considered brokerage in relation to sustainability in supply networks.

A recent conceptual contribution by Saunders et al. (2017) posits that brokers help incorporate knowledge and information from indirectly connected organizations in the development of sustainability initiatives, and influence their diffusion and adoption by transferring information about the initiative to indirectly connected supply network organizations. We extend the important conceptual contribution made by Saunders et al. (2017) by empirically examining the impact of brokerage in supply networks, defined as "behavior by which an actor influences, manages or facilitates interaction between other actors" (Obstfeld et al., p. 141) to adopt SSCM practices.

In this paper, we aim to shed light on the behaviors and actions associated to brokerage that influence the exchange of financial and knowledge resources aimed at supporting SSCM in food supply networks. The research question that guides this study is: *How does brokerage influence adoption of SSCM practices by small and medium firms in food supply networks?*

To answer this research question we are conducting a case study of the fresh banana supply network in Costa Rica. The banana supply network is a theoretically relevant context to study the impact of brokerage on adoption of SSCM practices. Intensive production of the crop has been linked to negative environmental outcomes, social challenges and declining producer prices (FAO, 2018). As a result of public concerns over negative environmental and social outcomes, retailers and distributors increasingly request producers to adopt sustainable business practices. Small and medium producers, however, struggle to cope with increasing costs and decreasing prices. The network is also characterized by 3rd parties, including NGOs, multi-stakeholder initiatives (MSI) and producer associations, which hold valuable financial and knowledge resources. The network thus presents opportunities for actors to engage in brokerage.

Literature review

SSCM practices

Sustainability, defined as meeting present needs without compromising the ability of future generations to meet their own needs, considers a focal firm's environmental, social and economic performance (Elkington, 1998). SSCM, defined as the integration of an organization's social, environmental and economic goals in the systemic coordination of business processes for improving the performance of the individual company and its supply chains specifies that an organization's performance should be evaluated considering the impact of its own and its suppliers' operations on ecological and social systems as well as profit (Carter and Rogers, 2008).

SSCM practices are adopted across a firm's operational processes to improve environmental and social outcomes (Gimenez et al., 2012). Environmental practices include land management, resource conservation and recycling and reuse of waste in farms and food processing facilities (Pullman et al., 2009). Social practices are concerned with ensuring worker quality of life, job satisfaction, skill development and fair compensation in both farms and food processing facilities (Yawar and Seuring, 2015). SSCM practices have also been linked to improved economic performance for focal firms (Golicic and Smith, 2013).

Financial and knowledge resources

Adoption of SSCM practices requires financial and knowledge resources (Lee and Klassen, 2008; Gold et al., 2010). Financial resources refer to assets used by a focal firm to fund capital expenditures or working capital. In food supply networks farmers must pay the costs associated with achieving certifications such as GlobalGAP or Rainforest Alliance (Alvarez et al., 2010).

Adoption of SSCM practices also requires that firms build up knowledge resources (Sarkis et al., 2010). Knowledge resources refer to focal firm awareness of formal practices for efficient production, awareness of the supply chain management activities of suppliers and customers and awareness of the activities of peripheral network actors (Tachizawa and Wong, 2014; Schoenherr et al., 2015).

In food supply networks, awareness of formal processes for efficient production is associated with the use of good agricultural practices such as appropriate application of fertilizer. Awareness of the supply chain management activities of suppliers and customers is exemplified by farmers being knowledgeable about the procurement, production and distribution activities required for their product to reach the final destination in good conditions. Awareness of the activities of peripheral actors in the network is exemplified by farmers that are knowledgeable about the activities of NGOs that are active in the network, for example.

Small and medium farmers can lack financial and knowledge resources. Farmers face intense pressure from their customers to cut costs on a continuous basis without sacrificing quality (Choi and Linton, 2011). Furthermore, as suppliers of raw materials they are often required to continuously invest in new technologies to maintain competitiveness. This reduces profit margins and constrains availability of financial resources.

Small and medium farmers may also lack the knowledge resources necessary for successfully adopting SSCM practices. SSCM practices require training to be effective (Sarkis et al., 2010). Lacking close contact with end consumers, farmers may not be sufficiently aware of environmental and social responsibilities.

Brokerage

Brokerage is defined as behavior through which an actor influences interaction between other actors (Obstfeld et al., 2014). Brokers are characterized by having direct ties with two or more network actors that are themselves unconnected or only weakly connected.

Extant literature suggests that brokerage impacts how information, knowledge or other resources are exchanged between actors in organizational networks. Brokerage can influence

the exchange of resources by facilitating the transfer of financial or knowledge resources between unconnected organizations or enabling the creation of a new tie between previously unconnected organizations (Obstfeld, 2005).

Extant research has extensively examined the benefits associated to brokerage for the broker (e.g. Burt, 2000; 2004). Yet brokerage can also have an impact on organizations that surround the broker (Clement et al., 2018). Ayuso et al. (2013), for example, describe SME suppliers who act as transmitters of buyer CSR requirements in supply chains, thus facilitating the transfer of knowledge resources in the supply network. Adobor et al. (2014) describe a trade association that works to build connections between buyers and minority owned suppliers, while Rodriguez et al. (2016) describe an NGO that connects a multi-national buyer with poor suppliers. In these cases brokerage enables the exchange of resources between previously unconnected actors through creation of new network ties.

Alternatively, brokerage can hinder the exchange of resources by keeping disconnected organizations apart or cultivating conflict between weakly connected organizations. Buyers that keep competing suppliers separated from each other (Choi and Wu, 2009b) or first-tier suppliers that actively work to keep their customers and their suppliers disconnected (Wilhelm et al., 2016) hinder the exchange of resources in their supply networks.

Methods

We address our research questions through inductive research based on a case study (Yin, 2009). Conducting a case study is appropriate because the phenomenon under study is complex and we intend to capture contextual conditions that we believe are relevant to the study of sustainability in supply networks (Baxter and Jack, 2008). This method allows us to build a thorough description of the underlying reality of brokerage, resource exchange and sustainable outcomes in supply networks. Case studies can be used for exploration, theory building, theory testing or theory extension (Voss et al., 2002). Our case study serves for building theory regarding the relationship between brokerage, the exchange of financial and knowledge resources and sustainable outcomes in supply networks.

Sampling

Given our interest in exploring brokerage and exchange of financial and knowledge resources aimed at supporting adoption of SSCM in food supply networks, our unit of analysis is the supply network. Our research focuses on the banana supply network in Costa Rica, which is a theoretically relevant context for conducting our study (Eisenhardt, 1989). This network is characterized by a wide range of actors including global agribusinesses such as Dole, Del

Monte, Chiquita and Fyffes, independent farmers, local and international retailers, NGOs, MSIs and producer associations.

Historically, the environmental and social performance of banana producing organizations has been problematic. Environmental concerns include soil erosion, water contamination from excessive use of pesticides and agrochemicals and deforestation that destroys rainforests. Social concerns include poor worker safety, low wages and unionization restrictions. More recently, economic performance is also a concern, with farmers facing rising costs and stagnant prices.

Yet many firms in the network have improved environmental, social and economic outcomes over the past twenty years. Chemical pesticides are gradually being replaced by biological pesticides. Resource consumption in banana packaging plants has been reduced by re-using the water used to wash bananas prior to packing. The plastic bags usually used to cover the bananas in the plantations that were previously discarded into rivers are now recycled. Worker health and safety have improved with reductions in the use of toxic agrochemicals. Minimum wages and social security benefits are provided to all farm workers.

Nevertheless, bananas remain a commodity, and distributors and retailers increasingly rely on certifications and private standards to differentiate their product in terms of quality and credence attributes such as environmentally and socially responsible farming (Roth et al., 2008). To achieve certifications, independent farmers facing stagnant prices and increasing production costs are simultaneously required adopt SSCM practices.

As a result of advances in sustainability some actors in the supply network, such as the local producer association, the NGOs or the MSI, have accrued resources that could be used by independent farmers to adopt SSCM practices.

Data collection

We collected primary and archival data to achieve our objective of exploring brokerage at the network level. Primary data was collected through 14 semi-structured interviews conducted in person (when one of the researchers travelled to Costa Rica) or over Skype. We developed a semi-structured interview protocol to guide the interview process and enhance construct validity. Table 1 contains the main themes that were included in our interview protocol.

Table 1 – Interview protocol themes

Theme	Description
Role in the network	Describe the organization and its goals.

SSCM practices	Environmental: agricultural practices used.
	Social: practices related to producers and workers (e.g., conditions and salaries).
	Economic: practices related to financial viability/stability.
Resource exchange	Describe relevant environmental, social or economic initiatives currently being pursued or considered.
	Timeframe: when where initiatives started?
	Collaboration: are initiatives pursued independently or jointly with other supply network actors?
	Are resources shared? If yes, which actors and which resources?
	Do any actors act as “gatekeepers” or “facilitators” in the network?
Key opportunities	Main opportunities perceived.
Key challenges	Main challenges faced.

We interviewed respondents from a wide range of organizations in the banana supply network including producers, producer associations, distributors, NGOs, retailers, MSI and consultants. Respondents occupied positions that ranged from general manager to procurement manager and working group coordinators. All interviews were recorded and transcribed and generally lasted between 30 and 60 minutes. Table 2 contains details regarding the respondents and types of organizations included in our primary data. We also collected archival data from websites, reports published by NGOs or MSIs and industry research organizations. Whenever possible, we used archival data to triangulate the information collected via interviews. We created a case study database using NVivo 12 software to facilitate retrieval of data during the collection and analysis stages.

Table 2 – Informants per type of organization

Organization	Size	Informant	Interviews
Producer A	Plantation size: 400 ha	Commercial director	1
Producer B	Plantation size: 706 ha	General manager	1
Producer C	Plantation size: 320 ha	General Manager	1
Producer D	Plantation size: 300 ha	Operations manager	1
Association of producers	Groups 932 small and very small producers	Founder	1
Distributor	Exports: 23.000.000 cases per year	Costa Rica operations manager	2
Local retailer	49 stores	Procurement manager	1
Certifying NGO	NA	Global director for sustainable agriculture	1
	NA	Costa Rica commodity lead	1
Producer Association	NA	Account manager	1
MSI	NA	Working group coordinator	1
Consultant	NA	General manager	1
Consultant	NA	Director of operations	1

Data coding

Given the exploratory nature of our research, we took an inductive approach to analyze our data. In accordance with grounded research procedures, data collection, coding and analysis were iterative and took place at the same time. We first coded our data to identify the general themes (open coding). In this stage we identified the connections between actors in the network and the resources that were present in the supply network. We also identified the actors in the network that engaged in brokerage, and instances where brokerage took place leading to exchange these resources with other actors. We wrote thick descriptions of the instances where brokerage appeared to be important for an actor's subsequent adoption of SSCM practices. In each of these instances we coded the behaviors and actions that characterized the exchange. We also coded the SSCM practices that were adopted by actors across the network. In the next stage, we organized the general themes into categories (axial coding), and finally we integrated the categories to build new theory. All coding has been carried out using NVivo 12 software.

Results

We set out to explore the influence of brokerage on resource exchange and adoption of SSCM practices by small and medium firms in supply networks. The network is composed by a wide variety of actors that play different roles in instances where resources are exchanged. We describe the actors and their roles in the network below.

Producers

Producer A is a non-profit banana farming and packaging operation that exports approximately 1.000.000 cases of fresh bananas per year. This producer is associated to a local university and all profits are used to fund the university's scholarship fund. In terms of sustainability, this producer has embraced SSCM practices since it was founded, *"accepting the challenge and the opportunity to show that it is possible to be a profitable business while being environmentally and socially responsible"*. The farm is currently certified by GlobalGAP, Rainforest Alliance and several customer private standards. Besides certifications, land management practices and resource conservation practices have been adopted. Their most important customer is a major North American retailer to whom the producer sells directly. Being able to sell directly to a retailer is key for this producer, as explained by the commercial director *"I think it was one of the best things that ever happened to us, not only because it*

represents a large market, but also because it helps confirm and support the production philosophy that we have been following”.

Producer B is a for-profit banana farming and packaging operation that exports approximately 2.000.000 cases of fresh bananas per year. Approximately 85% of total production is sold directly to a major European retailer and the remaining 15% is sold to global distributors. This producer is certified by Rainforest Alliance, GlobalGAP, ISO14001 and SMETA. It also implements land management in its operations by eliminating the use of agrochemicals used for weed control. Weed control is done manually, which reduces the use of pollutants and improves long-term outcomes such as soil quality by reducing erosion. Certifications and land management practices were adopted as a result of internal firm decisions, not due to external pressures. The general manager, however, perceives these practices as “*expenses*” that are not associated to additional revenues. Regarding certifications, he is wary of NGOs and certifiers such as Rainforest Alliance, noting that although they have environmental and social missions, they “*have their own agendas*”. Managerial knowledge seems to be crucial for this producer to maintain certifications. The general manager mentioned that “*we are very organized and this helps us. Because with certifications the most important part is documentation. They will come to the plantation, to the packaging plant, but they ask for a series of documents, and if some are missing, you immediately get a yellow card, to put it this way*”.

Producer C is a for-profit banana farming and packaging operation that exports approximately 900.000 cases of fresh bananas per year. Their mayor customer is a global distributor. This producer is certified by GlobalGAP and in process of achieving Rainforest Alliance certification. Additionally, the firm has adopted land management and resource conservation practices. In terms of resource conservation, it installed solar panels to supply its packaging plant with power. In terms of land management, it eliminated the use of agrochemicals for weeding by relying on manual weeding. This generates additional costs but improves long term soil quality by reducing erosion. In terms of social practices, this organization partnered with the local government to develop a housing project adjacent to the plantation, which provides homes for 92 families.

Producer D is a for-profit banana farming and packaging operation that exports approximately 900.000 cases of fresh bananas per year. Their mayor customer is a global distributor. The producer is certified by GlobalGAP and Rainforest Alliance. In terms of social practices the firm provides its workers with access to an on-site housing and a football field.

Producer E is an association of very small producers. It currently groups 932 very small producers whose farms are located in a remote part of the country. The association’s mayor

customers are food processing firms in Europe. The association is certified as organic by USDA and BioSuisse. It is also certified by Fairtrade. Other sustainability practices are centered around social sustainability, with the association funding for events where its associated farmers can gather.

In summary, we find that independent producers sell their product to large global distributors or directly to retailers in North America or Europe. Selling directly to retailers is more profitable, yet requires greater knowledge resources. SSCM practices are fairly consistent across producers. To export, producers must be certified by GlobalGAP, which we identify as an order qualifier. Rainforest Alliance certification is increasingly important for gaining market access, especially for producers that sell directly to retailers, but is not yet an order winner. Producers that sell directly to retailers are also certified by retailer private standards. In terms of environmental SSCM practices, producers adopt land management and resource conservation practices. For improvement of social outcomes, producers protect worker health and well-being and engage with their communities by developing infrastructure such as housing. Practices aimed at improving environmental and social outcomes, nevertheless, are perceived as additional cost burdens. The general manager of producer B, for example, described certifications as “*just expenses, in terms of revenue they represent nothing*”. The manager of producer C stated that “*producers end up paying for the party*” and stressed that “*bananas taste exactly the same*”.

Obtaining access to sell directly to retailers is a key concern for independent producers. The manager of producer C stated that “*95% of the time*” producers that sell to global distributors receive lower prices and are held to higher quality standards. For the manager of producer B, “*small producers that want to survive will need to find niches and go direct [to the retailers], because otherwise, at least in this country, the costs are too high for what we get in return*”. We thus identified market access as a key resource for producers to remain economically viable.

Distributors and retailers

Four distributors (Dole, Del Monte, Chiquita and Fyffes) account for the majority of banana exports from Costa Rica (CANABA, 2013). These distributors are often vertically integrated and own plantations in the country. However, they also source from independent farmers. Contracts with independent farmers are negotiated for a set period of time (usually yearly) and prices are fixed for the duration of the contract. Relationships with independent farmers are often long-term, with some independent farmers having supplied the same distributor for

decades. Distributors also handle all of the logistics necessary for the fruit to reach its final destination. The manager of producer B explained “[selling to a retailer] was hard because we needed much more documentation, logistics, everything that used to be managed by the distributor”. Distributors thus hold market access and supply chain knowledge resources. Regarding SSCM practices, all distributors adopt evaluation of their suppliers. Distributors are engaged with the MSI, as exemplified by Distributor A that is a founding member. Distributors also play an important role in the producer association.

North American and European retailers increasingly sourcing directly from farmers in Costa Rica. These retailers offer improved prices to producers, and thus hold important financial resources. Yet selling directly to a retailer requires that the producer be knowledgeable about the logistics needed for the product to be delivered in good conditions. Retailers are also knowledgeable regarding end consumer demands for sustainability.

Other actors

Non-profit actors are also active in the network. The producer association, established in 1973, has as its mission is the development of the banana industry in Costa Rica. This association is funded by exporters who contribute 5 cents for every case exported to the producer association. The producer association engages in significant research and development efforts and advises producers on technical issues related to production. Recently, the producer association obtained recognition of appellation of origin for Costa Rican bananas from the European Union. The producer association is thus an important holder of technical knowledge resources in the network.

NGOs are also present, acting as certifiers and activists in the network. We identified certification as an important resource held by NGOs. Finally, the World Banana Forum (WBF), a MSI, is active in the network. The WBF provides a platform for network stakeholders to interact and work together towards improving production practices and sustainability in the network.

Brokerage

Based on our analysis of the data, we mapped the different actors in the supply network and the connections between them. Figure 1 presents the banana supply network.

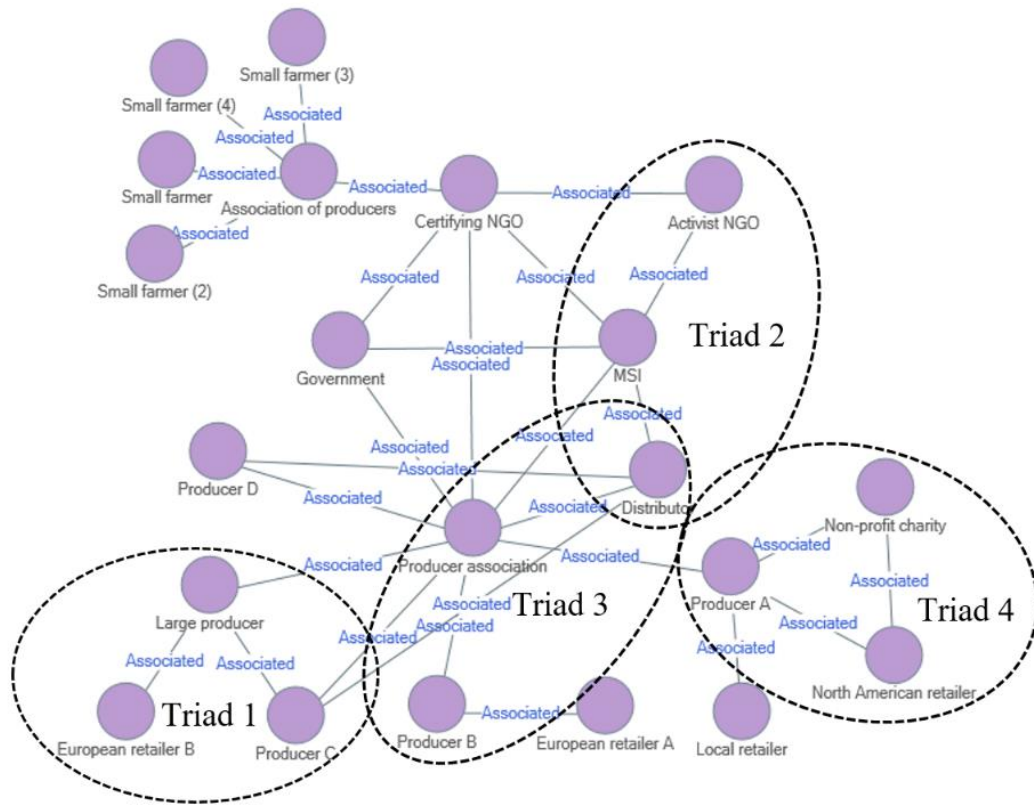


Figure 1- The fresh banana supply network

To gain an understanding of brokerage at the network level, we isolate four specific triads where brokerage was identified. This procedure is consistent with Choi and Wu’s (Choi and Wu, 2009a, p. 263) suggestion that the triad “captures the basic essence of a network and allows us to study the behavior of a network”. Prior supply network research has also employed this procedure (e.g. Choi and Wu, 2009b; Pathak et al., 2014). Table 3 summarizes our findings in terms of SSCM practices adopted, resources exchanged and brokerage in each triad.

Table 3- Instances of brokerage

Triad (alter-broker-alter)	Brokerage behaviors	Resource exchanged	SSCM practices adopted
Producer-Producer-Retailer	Advocacy	Market access	Land management, resource conservation, social practices, certification
NGO-MSI-Distributor	Neutrality	Knowledge resources	Land management, resource conservation, social practices
Producer-Producer Association-Distributor	Selfishness	None	None
Producer-nonprofit charity-retailer	Advocacy	Market access	Land management, resource conservation, certification

Triad 1 is composed by producer C, a large producer and a European retailer. In this instance, the resource exchanged was market access, and advocacy was the behavior that characterized the brokerage. The large producer engaged in brokerage by using a pre-existing relationship with the retailer to advocate for the producer C. The manager of producer C explained “*they [the larger independent producer] supported us a lot. What do I mean by support? They had been selling to [the retailer] for years, and they advised us on how to package the fruit, how to harvest differently to improve yields. And they told us, listen, we’re going to try to get you some volume. And that was how we started [selling to the retailer]*”. In this case, advocacy was used for introducing two parties, which then led to improved economic sustainability in the triad as both producers continued to sell directly to the retailer.

Triad 2 is composed by an activist NGO, the MSI and a distributor. In this triad the MSI engages in brokerage to advance sustainability initiatives in the network. The resource exchanged was knowledge, and the behavior that characterizes the brokerage was neutrality. A working group manager from the MSI described how the MSI must “*stay neutral*” during discussions, given the often conflicting objectives of the NGO and the distributor. In this case, neutrality was useful for inducing negotiations and facilitating the flow of information between parties, which aided the development of projects aimed at improving environmental and social outcomes in the triad.

Triad 3 is composed by producer B, the producer association and a distributor. The mission of the producer association is to contribute to the development of the local industry. However, the manager of producer B perceives that “*lately, the reason for having [the producer association] has been distorted. The reason is not for them to grow and become a big deal, no. The reason is for them to support local producers. Maybe due to the consolidation the interests of producers are now the interests of large producers, but for us small producers, the support they could provide in terms of technical things or lobbying, it is not given*”. In this instance, the producer association behaves selfishly by pushing its own interests ahead of the interests of producers, threatening economic sustainability in the triad.

Triad 4 is composed by producer A, an non-profit charity and a retailer. Similar to the instance described in triad 1, the non-profit organization advocacy was used by the non-profit organization to introduce the retailer and the producer. After the meeting, a business relationship was established between the producer and the retailer, which improved economic sustainability in the triad. Differently from the brokerage instance described in triad 1, however, once the relationship between the producer and the retailer was established, the broker played no further role in the triad.

Conclusion

We find that neutrality, advocacy and selfishness characterize brokerage in the supply network. Instances of brokerage are also characterized by introducing two parties, making two parties negotiate and facilitating the flow of information. While some instances of brokerage improve sustainable outcomes in the network, others threaten network sustainability. We also find that different types of actors engage in different brokerage behaviors. In triad 1, for example, where the broker and one of the alters were the same type of actor (both producers), the broker engaged in advocacy. Differently in triad 2, where all three actors were different, the broker engaged in neutrality.

We contribute to theory and to practice. Our key theoretical contribution lies in exploring the relationship between behaviors and actions that characterize brokerage in supply networks and adoption of sustainable business practices by actors that lack internal financial and knowledge resources. We extend previous research that has focused on buyer-supplier dyads by taking a network perspective that considers a wide range of actors including economic actors, such as distributors, retailers and suppliers, and non-economic actors, such as NGOs and producer associations. We contribute to practice by providing managers of small and medium organizations new insights regarding ways of accessing financial and knowledge resources that reside in their supply networks to achieve sustainable outcomes.

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