

The impact of power on the depth of sustainability collaboration in the supply chain  
network for Australian food retailers

**Abstract**

The purpose of this paper is to investigate the impact of supplier power within supply chain networks (SCN) on the depth of sustainability collaboration with their focal firms. A web-based survey was applied to two large Australian retailers' SCNs which resulted in receiving 67 completed questionnaires. A cluster analysis was conducted to create a suppliers' power taxonomy. ANOVA and Tukey tests were also used to explain the mean differences in the depth of collaborative relationships. This paper identifies four quadrants for suppliers based on their power at both network and node levels, highlighting the impact of power on the depth of collaboration in each quadrant. The results also indicate that the depth of collaboration between the focal firm and its suppliers increases when the suppliers' power increases at the network level and decreases at the node level.

**Keywords** Power, sustainability practices, supply chain network, focal firms, retail

**1 Introduction**

For the past two decades, the increasing pressure from end-consumers, government agencies, activists, and other stakeholders has encouraged firms to pay more attention to the topic of sustainable supply chain management (SSCM) (Biswal et al., 2017; Høgevoid et al., 2016; Rezaei Vandchali et al., 2018; Touboullic and Walker, 2015; Vörösmarty and Tátrai, 2019). The stakeholders in particular, often view buying firms as being responsible for incursions in the environmental, social, and economic aspects of sustainability, known as the triple bottom line, in their supply chain network (SCN) (Hofmann et al., 2014). This has led to the employment of a wide range of sustainability practices which require buying firms to collaborate with their suppliers to ensure their commitment to the sustainability standards (Biswal et al., 2018; Meinschmidt et al., 2018; Wilhelm et al., 2016a). Supply chain collaboration is a vital ingredient in achieving sustainability targets which is also increasingly emphasised by industrial practices as a tool to balance the priority of the three aspects of sustainability (Chen et al., 2017; Hultman and Elg, 2018; Rezaei Vandchali et al., 2018). This motivates firms to invest in promoting partnerships

and joint initiatives to meet sustainability objectives (Blome et al., 2014). Through such investments, firms can improve the overall efficiency of the supply chain which can affect their market position as well as stakeholders' perceptions, which can ultimately increase the firms' competitive advantage (Blome et al., 2014).

Firms can be considered as nodes in complex interdependent networks (Johansson and Elg, 2002). Collaborating with other actors within the network can create an effective business environment which can lead to the success of each actor (Hultman and Elg, 2018). However, firms may be strongly influenced by their surrounding networks in the sustainability context which can render the task of collaboration more complex (Blome et al., 2014). In addition, the cost of collaboration failures with other actors can justify why an effective supply chain collaboration rarely exists (Fawcett et al., 2015). Previous research on supply chain collaboration suggests the imbalance of power as being a key factor in influencing the depth of collaboration among supply chain members (Kähkönen, 2014). McNichols and Brennan (2004), for example, explain that firms need to take the power dimension into consideration to gain compliance in adopting and implementing collaborative efforts. Power, therefore, can be considered as an influencing factor in the outcome of business relationships (Cox, 2007; Moore et al., 2004; O'Callaghan and Murray, 2017) and firms may view this as a major barrier to their collaboration efforts. Kähkönen (2014) suggests that the depth of collaboration can be strongly affected by the actors' power within the network, as the actor who is in a superior position may not have the intention of developing collaborative relationships with other SCN actors. For example, powerful suppliers that are known to the retailer can have an important stake in developing of sustainability in the SCN (Hultman and Elg, 2018). Thus, the task of employing the collaborative relationship is quite challenging, particularly with powerful SCN actors.

The relationship between the impact of power and collaboration has been chiefly investigated within dyadic interactions while remaining overlooked within networks context (Kähkönen, 2014). This paper addresses this gap by investigating the issue of power from a wider perspective and analysing its impact on the depth of sustainability collaboration in buyer-supplier relationships within the SCN. In this regard, Section 2

explores the collaborative relationship in a sustainability context. Section 3 explains the power relations at both network and node level, then develops seven hypotheses. Section 4 presents the methodology via a web-based survey, while Section 5 analyses the numerical data. Section 6 discusses the result and Section 7 provides implications, limitations and recommendations for future research.

## **2 Collaborative relationships**

Collaboration plays a key role in the integration of process and partnership among various members in supply chains (Dash et al., 2018; O’Callaghan and Murray, 2017; Salema and Buvik, 2018). From the network perspective, integrating individual networks at different levels of a supply chain (e.g., manufacturing and distribution) can provide visibility, flexibility and maintainability for improvement projects (Heikkilä et al., 2016; Sandberg and Mena, 2015). Supply chain collaboration can be defined as a process of partnership between more than two independent actors to fulfil common goals and mutual benefits (Chen et al., 2017). Collaboration in a supply chain includes “aligned objectives, open communication, sharing of resources, risks and rewards” (Soosay et al., 2008, p. 160). This provides opportunities for firms to integrate operations and increase the effectiveness of the chain (Fernie and McKinnon, 2003; Momeni and Rezaei Vandchali, 2017). Therefore, to promote collaborative efforts, firms may need to engage in various joint initiatives in planning and processing in their trade relationships.

Collaborative supply chain management (SCM) practices is a significant driver for successful SSCM (Hultman and Elg, 2018). A growing body of research examines the various implications of the collaborative relationship within SSCM (Bag, 2016; Gimenez and Tachizawa, 2012; Martins et al., 2017; Rezaei Vandchali et al., 2018; Vachon and Klassen 2006, 2008). Lu et al. (2009) found that to improve the environmental aspect of sustainability, collaboration between multiple businesses is essential. This collaboration between buyers and their suppliers is the key component of, for example, green supply chain management (GSCM) which improves the environmental performance of these firms (Chin et al., 2015). Other examples include: corporate social responsibility (CSR) in retail-supplier relationships (Hultman and Elg, 2018), pollution prevention technologies (Vachon, 2007), and governance mechanisms supporting sustainable SCM

(Vurro et al., 2009). This intention towards having a collaborative relationship, which began in traditional SCM practices (Day et al., 2017; Vachon and Klassen, 2006), has dominated SSCM practices (Touboulic and Walker, 2015). For examples, Chen et al. (2017) comprehensively discuss range of supply chain collaboration and sustainability studies.

In a collaborative relationship, firms directly participate in developing sustainability practices within their suppliers. By creating a team with suppliers, firms can facilitate the corporate social responsibility process and advise their suppliers to diffuse the sustainability practices in their own supply chain (Meinlschmidt et al., 2018; Padin et al., 2018). Some research proposes that a more collaborative relationship can lead to the improvement in the relationship quality which can contribute to higher performance (Alvarez et al., 2010; Buvik and Anderson, 2016). For example, from the ‘transferring new knowledge’ perspective, firms can promote the knowledge of suppliers’ personnel in terms of managing sustainability issues (Andersen and Skjoett-Larsen, 2009; Wilhelm et al., 2016b). From the ‘acquiring new knowledge’ perspective, firms can benefit from suppliers who have already learned how to implement sustainability practices within their business environment (Blome et al., 2014; Svensson, 2016). By developing a close cooperation, firms can add more sustainability to their SCN, which can be beneficial for each participant (Wilhelm et al., 2016b). More importantly, research indicates that collaborating in sustainability practices may result in superior sustainability performance rather than sanctions (Abländer et al., 2016). For example, instead of dictating that suppliers must follow sustainability practices, working closely with first-tier suppliers can be considered as an incentive for suppliers to extend the sustainability practices to their own supply chain (Wilhelm et al., 2016a). However, firms must leverage their internal resources to analyse their supply base and identify the degree of investment in the collaborative relationship which can be affected by the pattern of power relations within the SCN.

### **3 Supplier’s power taxonomy**

Previous research has mainly focused on the issue of power in dyadic relationships between firms; for example, a buyer and a supplier (Kähkönen, 2014). This means that

this type of power relation has more often been analysed at the node level (for example see Zhuang et al., 2018). However, some researchers have found that the discussion of power must be directed to the larger networks in which firms interact with numerous SCN actors (Pilbeam et al., 2012, Kähkönen, 2014). Choi and Wu (2009) argue that having the dyadic framework is not enough to fully understand the embeddedness of firms within a SCN. Considering the lack of studies that have investigated power at the network level and also the significant value that can be added by having a network perspective in analysing power within SCM, this paper examines the issue of power at two levels, node and network level, and develops a taxonomy of suppliers' power by these two levels.

### **3.1 Power at the node level**

The relative power of an organisation over another can be considered dependency (Caniëls and Gelderman, 2007). Dependency can be defined as the extent to which a firm relies on the actions of others to reach certain objectives (Corsten and Felde, 2005). "The dependence of one party provides the basis for the power of the other" (Emerson, 1962, p. 32). According to dependency theory (Pfeffer and Salancik, 2003), the reduction in the number of potential suppliers can weaken the influence of the firm over its suppliers. A supplier has a limited ability to disobey its buyer's commandments if the supplier is highly dependent on its buyer (Awaysheh and Klassen, 2010). In other words, buyers' signals can more likely increase the motivation of the suppliers to take actions regarding specific objectives if the suppliers' dependence on the buyer increases. This means the power can be analysed by measuring the dependency as the dependent party is more likely to follow the orders from the party that is relied upon.

Dependency plays a key role in the investigation of buyer-supplier relationships, particularly in SSCM (Meinlschmidt et al., 2018, Tachizawa and Wong, 2014, Wilhelm et al., 2016b). A focal firm can potentially demand its upstream or downstream partners to manage sustainability issues in the supply chain by exerting power over the dependent partners. Dependency can also affect the use of suppliers' socially responsible practices as buyers are more interested in applying corporate social responsibility (CSR) practices when their suppliers are more dependent upon them (Awaysheh and Klassen, 2010). This is mainly due to the extent of influence that buyers can exert on the suppliers to follow

sustainability practices (Delmas and Montiel, 2009). According to the extensive literature review conducted by Tachizawa and Wong (2014), dependency is identified as an influencing factor which can affect firms' decision-making process to manage sustainability issues within the SCN. In this regard, power at the node level is the degree of influence that one actor has over another actor and can be construed as dependency.

### **3.2 Power at the network level**

A firm's network power is denoted as the ability of the firm to influence other organisations within the SCN (Burt and Sparks, 2003). Unlike dependency, which is confined to the dyadic relationship, power resides within the network in which a firm is embedded (Meqdadi et al., 2017; Tatkeh and Park, 1998). However, one challenge in analysing the SCN context is defining network boundaries and deciding which actors should be included in the network. Therefore, it is essential to identify the related actors of the SCN. By ignoring this issue, the scope of the network may extend by adding numerous actors in each tier (Lambert et al., 1998). Since networks are borderless, the key is to identify the actors who play a significant role in the value-added activities, which consequently leads using resources by firms to manage them (Min and Zhou, 2002).

In general, the members of a firm's SCN include all types of actors (from extracting the raw material to consuming the final product) that can directly or indirectly affect the firm's business environment (Braziotis et al., 2013). However, to make a highly complex network more manageable, Lambert et al. (1998) divide members in the SCM context into two distinct actors; primary and supporting. Primary members refer to the independent organisations that are directly involved in the business processes of producing the specific product. Supporting members refer to the organisations that provide various resources (such as knowledge, utilities, and assets) for primary members. Primary and supporting members can be identified when the focal firm analyses their SCM context from a network perspective since the linear perspective is only able to identify the primary members.

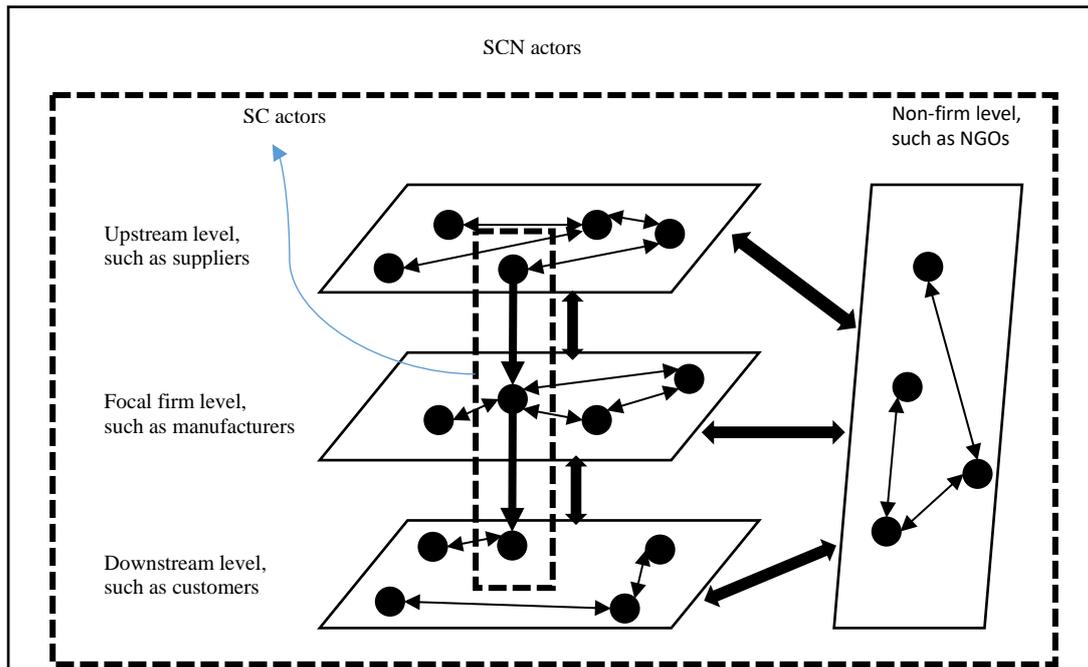
Furthermore, the actors of the SCN can be positioned at three levels: the upstream network level, which is concerned with the interactions regarding the supply side; the

focal firm level, and the downstream network level, which is related to the interaction on the customer side (Chang et al., 2012; Razavi et al., 2012). The focal firm is a relative perspective which means that any firm could be the focal firm as they have the ability to make strategic decisions (Chang et al., 2012). In addition, focal firms can be physically positioned at various stages of the SCM from the raw material to the end customer (Harland et al., 2001). Regardless of the size (such as small versus large), focal firms may have various types of relationships with each of their suppliers and customers regarding different objectives and their structural position in the SCN (Chang et al., 2012).

Figure 1 indicates the position of the actors from a SCM context. The SC actors shown in Figure 1 are the actors who are vertically connected to each other. Furthermore, the SCN actors are the actors that exist in each layer. The SCN actors also may include non-firm actors (Crespin-Mazet and Dontenwill, 2012). Thus, the SCN actors can be both the SC actors and the actors who have a relationship with the SC actors in each layer. These types of actors can be identified based on the focal firm's knowledge and recognition of their extended network (Eng, 2008). In addition, the focal firm can be positioned at each level.

Firms can gain power over other SCN actors through various resources. Table 1 indicates the common sources of power in a SCN. For example, expert power is related to the situation that the retailer knows about the end-consumer's demands and has capabilities to design and distribute new products to the end-consumer (MacCarthy and Jayarathne, 2012). From the referent power perspective, creating a relationship with NGOs can offer attractive reputational resources to the manufacturer (Alvarez et al., 2010). In legitimate power, the supplier believes that a manufacturer has sufficient competency to ask for developing new capabilities and processes (Crespin-Mazet and Dontenwill, 2012). Reward power is associated with a customer's ability to provide an incentive for suppliers through increasing order volumes if they follow codes of conduct (Andersen and Skjoett-Larsen, 2009). In coercive power, the customer can terminate the business relationship with a supplier in the case of non-compliance with the customer's demand for the sustainability standard (Pedersen and Andersen, 2006). Using these five sources, firms can directly and indirectly influence other SCN actors.

**Figure 1. Typical SC and SCN actors**



**Table 1. Bases of inter-firm power**

Power base	Description
Expert power	Source has access to knowledge, skill and technology desired by target.
Referent power	Target values identification with source.
Legitimate power	Target believes source retains natural right to influence it.
Reward power	Source has the ability to mediate rewards to target.
Coercive power	Source has the ability to mediate punishment to target.

Source: Adapted from Zhao et al. (2008)

### 3.3 Developing hypothesis

Considering the significant impact of power relations on the depth of collaboration (Kähkönen 2014), this paper categorises a focal firm's suppliers based on their power at the node (which is implied as dependency) and network levels. As shown in Figure 2, suppliers in quadrant 1 have a low dependency on the focal firm and a low power at the network level. In quadrant 2, suppliers have a low dependency on the focal firm and a

high power at the network level. Suppliers who are placed in quadrant 3, have a high dependency on the focal firm at the node level and low power at network level while in quadrant 4, suppliers have a high dependency on the focal firm and a high power at the network level.

To identify the impact of power on the depth of collaboration in the sustainability context, seven hypotheses have been developed as follows:

H1: A taxonomy of the suppliers' position can be developed based on their power at the network level and their dependency at the node level.

H2: There is a significant difference between the depth of sustainability collaboration that exists between focal firms and their suppliers in quadrant 1 and quadrant 2.

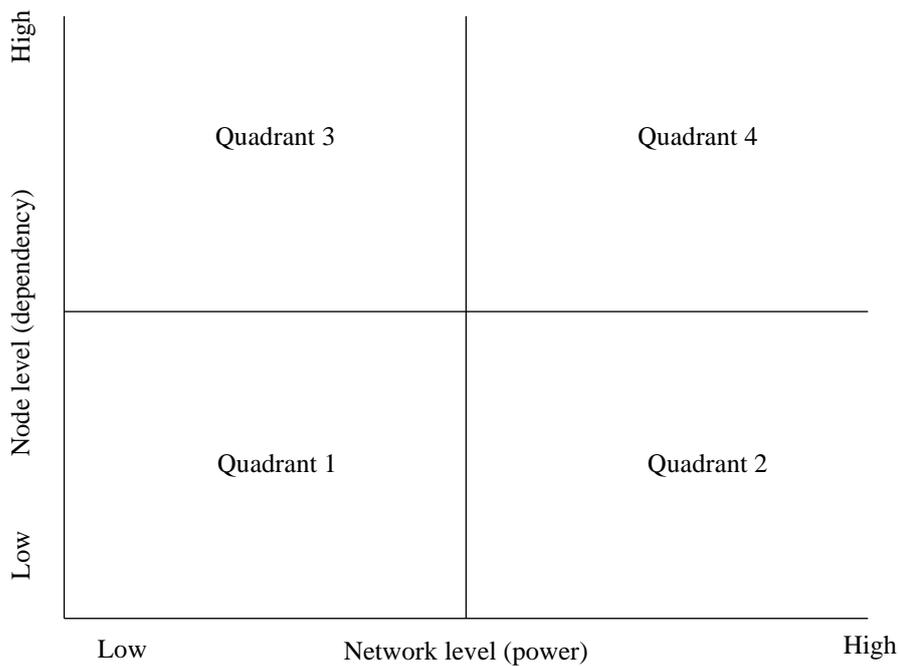
H3: There is a significant difference between the depth of sustainability collaboration that exists between focal firms and their suppliers in quadrant 1 and quadrant 3.

H4: There is a significant difference between the depth of sustainability collaboration that exists between focal firms and their suppliers in quadrant 1 and quadrant 4.

H5: There is a significant difference between the depth of sustainability collaboration that exists between focal firms and their suppliers in quadrant 2 and quadrant 3.

H6: There is a significant difference between the depth of sustainability collaboration that exists between focal firms and their suppliers in quadrant 2 and quadrant 4.

H7: There is a significant difference between the depth of sustainability collaboration that exists between focal firms and their suppliers in quadrant 3 and quadrant 4.



**Figure 2. A taxonomy of suppliers' power**

#### **4 Methodology**

This paper used a survey-based research to collect the empirical data. The survey methodology has been commonly applied to research related to the supply chain collaboration as it can assist researchers to fully understand the larger population and generalise the findings (Chen et al., 2017). This paper considers suppliers and manufacturers (suppliers afterwards) who supply products to retailers in the Australian food retail industry. Two giant retailers' SCN, Wesfarmers (currently trading as Coles) and Woolworths, were selected to investigate their collaboration initiatives with their suppliers. They have a huge market share (around 80%) in Australia and they are considered as a pioneer of the sustainability movement in the industry (O'Kane, 2016). Retailers can be considered the dominant actors within most SCN (Sparks, 2010) as they are gaining increasing power from their suppliers (Gustafsson et al., 2006). The relationship between the retailer and suppliers has always been strategically important (Bengtsson et al., 2000, Ruiz-Martinez et al., 2018) as they see each other as "significant partners" (Kähkönen, 2014, p. 23). In addition, developing collaborative relationships in a fast-moving consumer goods industry can be considered a challenging task (Corsten

and Kumar, 2005). Furthermore, in the food sector, retailers have more intention to diffuse sustainability practices with their SCN and act as guardians of customer interests (Fuchs and Kalfagianni, 2009). These characteristics make the selected empirical context ideal to investigate the buyer-supplier relationships and test the hypotheses.

#### **4.1 Questionnaire development**

Based on a comprehensive literature review, the questionnaire was first developed in two parts. The questions in the first part were associated with the power at the network and the questions in the second part were related to the dependency on the focal firms and the depth of collaboration between focal firms and suppliers. The questions were designed to be answered by a 7-point Likert scale which is considered to be more effective than the other number of points (Krosnick, 2018). In the last step, a group of academic and industry experts tested the questionnaire in terms of wording, ordering of questions, the structure of questions and typographical errors. This ensured the content validity of the questionnaire, essentially finalising it before sending it to respondents.

#### **4.2 Sampling and data collection**

To determine the population for sampling, Coles and Woolworths' online shopping websites were used to find the suppliers of food products as there were no official websites that indicate the number of suppliers working with Coles and Woolworths. According to the online shipping websites, there are 839 suppliers across different food and beverage product categories (such as meat and dairy) working with these two large retailers. Through random sampling, 278 suppliers were selected. After distributing the questionnaire and using two rounds of reminders over a period of three months, 67 completed questionnaires were returned, equating to a response rate of 24%. The profile of respondents is shown in Table 2 and indicates that the number of suppliers working with each retailer in the sample size is nearly similar. Target respondents include supply chain managers of large firms or the managing director/chief executive officer of small firms in the first priority and in the case of unavailability of these two positions, the operation/production managers, sales and operations manager, and environmental managers were targeted in the next priorities. These job titles were selected as it is

postulated that the people who hold such positions will have sufficient knowledge of their firms' business networks and also sustainability collaboration efforts which were essential to complete the questionnaire.

**Table 2. Respondents' profile**

<b>Focal firms</b>	<b>Frequency</b>	<b>Percentage</b>
Coles	35	52%
Woolworths	32	48%
Total	67	100%

The external validity of the questionnaire and the biasness of the data was checked by a non-response bias test. Based on categorising the data into two groups (early and late responses), the result indicates no concern. In addition, to ensure the reliability of the data, Cronbach  $\alpha$  for each variable was checked and since the values are more than 0.7 (Table 3), it can be considered that the data is reliable for further analysis.

**Table 3. Reliability test**

<b>Variable</b>	<b>Reliability Statistics</b>	
	<b>Cronbach's Alpha</b>	<b>N of Items</b>
Power	0.740	10
Dependency	0.933	6
Collaborative relationship	0.939	6

### **4.3 Analysis approach**

To test the hypothesis, the classification of the suppliers in four quadrants must be validated and then compared the depth of collaboration across the quadrants. In this regard, the research followed to the two-step analysis approach suggested by Revilla and Villena (2012). In the first step, cluster analysis was conducted to classify the suppliers based on their power at the network level and their dependency on the focal firms at the node level. In the second step, ANOVA and Tukey comparison tests were conducted to measure the significance of differences in employing the collaborative relationship across the different quadrants.

## 5 Data analysis

Figure 3 shows the model summary for four clusters. The inputs included the supplier's power at the network and their dependency on the focal firms at the node level. Considering the cluster quality by using a Silhouette measure of cohesion and separation, the result was placed in the good (green) part, which emphasises the high quality of clusters that supplier are placed. Figure 4 shows the distribution of sample size in different clusters. The value of 1.75 for the ratio of largest clusters to smallest clusters shows that the four clusters created an appropriate classification of the sample.

Figure 3. Cluster quality

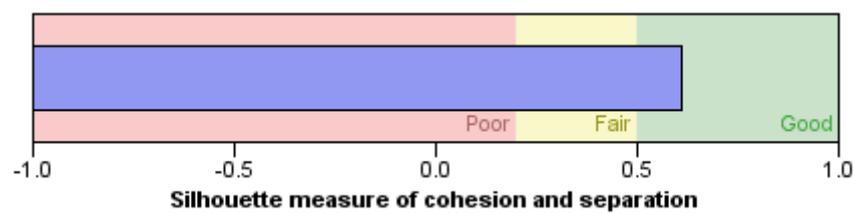


Figure 4. Cluster sizes

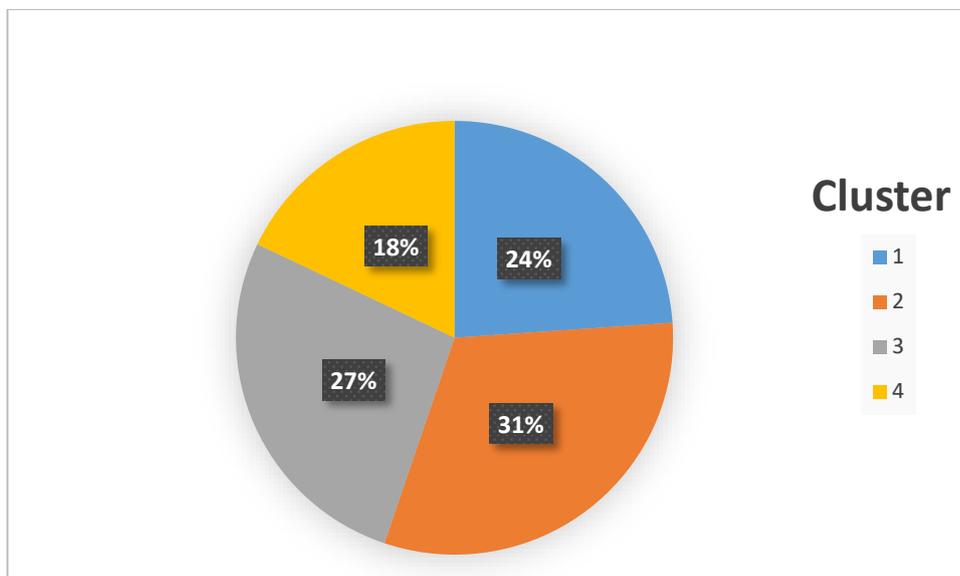


Table 4 shows the characteristics of each of the four clusters. Cluster 1 includes 16 suppliers with a low level of the suppliers' power at the network level and low level of the suppliers' dependency on the focal firm at the node level. Cluster 2 consists of 21 suppliers which are characterised by a high level of suppliers' power at the network level

and a low level of suppliers' dependency on the focal firm at the node level. Cluster 3 includes 18 suppliers and, in contrast to cluster 2, profiles a low level of suppliers' power at the network level and a high level of suppliers' dependency on the focal firm at the node level. Cluster 4 consists of 10 suppliers and, in contrast to cluster 1, is characterised by a high level of suppliers' power at the network level and a high level of suppliers' dependency on the focal firms at the node level. Table 4 also indicates that there is a significant difference between the four clusters developed by suppliers' power positions at both the network and node level, as the  $p$ -value for F-test in ANOVA is less than 0.0001. In addition, according to the information provided in Table 5, there is a significant difference between the type of suppliers that are categorised in clusters 1 and 3, clusters 1 and 4, clusters 2 and 3, and clusters 2 and 4 in terms of suppliers' dependency on the focal firm at the node level. From the powers' perspective at the network level, significant differences can be seen between clusters 1 and 2, clusters 1 and 4, clusters 2 and 3, and clusters 3 and 4. Therefore, H1 is supported.

**Table 4. Cluster results for the taxonomy of the suppliers' positions**

	<b>Cluster 1</b>	<b>Cluster 2</b>	<b>Cluster 3</b>	<b>Cluster 4</b>	<b>F (ANOVA)</b>
Network level	3.41	6.16	3.61	6.36	104.37***
Node level	3.31	3.09	6.25	5.91	85.1***
N	16	21	18	12	
* $p < 0.05$ , ** $p < 0.01$ , *** $p < 0.001$					

ANOVA and Tukey HSD comparison tests were used to test the other hypotheses, identifying the significance of differences among the four clusters in terms of employing a collaborative approach. As presented by the ANOVA test in Table 6, there is a significant difference between the collaborative relationships employed between buyers and suppliers in the four clusters, having F value of 5.58 with its  $p$ -value less than 0.0001. Table 6 also shows the results of two other tests, the Welch test and Brown-Forsythe test.

Having a  $p$ -value less than 0.01 indicates the success of these two tests, thereby supporting the significant difference across the clusters in terms of employing a collaborative relationship.

**Table 5. Tukey HSD comparison test across the four clusters**

<b>Dependent Variable</b>	<b>(I) Two Step Cluster Number</b>	<b>(J) Two Step Cluster Number</b>	<b>Mean Difference (I-J)</b>	<b>Std. Error</b>	<b>Sig.</b>
Dependency	1	2	0.23	0.25	0.802
		3	-2.94***	0.26	0.000
		4	-2.60***	0.29	0.000
	2	1	-0.23	0.25	0.802
		3	-3.16***	0.24	0.000
		4	-2.83***	0.27	0.000
	3	1	2.94***	0.26	0.000
		2	3.16***	0.24	0.000
		4	0.33	0.28	0.634
	4	1	2.60***	0.29	0.000
		2	2.83***	0.27	0.000
		3	-0.33	0.28	0.634
Power	1	2	-2.75***	0.21	0.000
		3	-0.19	0.22	0.809
		4	-2.95***	0.24	0.000
	2	1	2.75***	0.21	0.000
		3	2.56***	0.20	0.000
		4	-0.20	0.23	0.825
	3	1	0.19	0.22	0.809
		2	-2.56***	0.20	0.000
		4	-2.75***	0.23	0.000
	4	1	2.95***	0.24	0.000
		2	0.20	0.23	0.825
		3	2.75***	0.23	0.000
* $p < 0.05$ , ** $p < 0.01$ , *** $p < 0.001$					

**Table 6. ANOVA results for collaborative relationships: mean (standard deviation)**

	<b>Cluster 1</b>	<b>Cluster 2</b>	<b>Cluster 3</b>	<b>Cluster 4</b>	<b>F (ANOVA)</b>	<b>Welch test</b>	<b>Brown- Forsythe test</b>
Network level	2.41	3.06	3.44	4.43	5.58**	6.22**	5.81**
* $p < 0.05$ , ** $p < 0.01$ , *** $p < 0.001$							

To find the significance differences in the depth of collaboration between groups, the Tukey test was conducted with the results presented in Table 7. The results indicate that distinctions in employing collaborative relationships are salient between suppliers that are placed in clusters 1 and 4 given that the mean difference (2.01) is significant with  $p$ -value less than 0.01; thus, supporting H4. As indicated by the results, there is also a significant difference in the mean value (1.37 with  $p$ -value less than 0.05) between clusters 2 and 4. This result supports H6. In addition, the results do not find support for other hypotheses (H2, H3, H5, and H7) since the comparison test showed no significant differences between respective clusters. Table 8 provides the depth of collaboration across the four clusters. As indicated by the mean value, suppliers in cluster 4 have the highest rank of employing collaborative relationships with the focal firms while suppliers in cluster 1 have the lowest rank in this area.

**Table 7. Tukey HSD comparison test across the four clusters**

(I) Cluster Number	(J) Cluster Number	Mean Difference (I-J)	Std. Error	Sig.
1	2	-0.65	0.44	0.461
	3	-1.03	0.46	0.120
	4	-2.01**	0.51	0.001
2	1	0.65	0.44	0.461
	3	-0.38	0.43	0.808
	4	-1.37*	0.48	0.029
3	1	1.03	0.46	0.120
	2	0.38	0.43	0.808
	4	-0.99	0.49	0.200
4	1	2.01**	0.51	0.001
	2	1.37*	0.48	0.029
	3	0.99	0.49	0.200

\* $p < 0.1$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$

**Table 8- clusters**

Cluster	1	2	3	4
Inputs	Network level (power) 3.41	Network level (power) 6.16	Network level (power) 3.61	Network level (power) 6.36
	Node level (dependency) 3.31	Node level (dependency) 3.09	Node level (dependency) 6.25	Node level (dependency) 5.92
Depth of collaboration (mean)	2.42	3.06	3.44	4.43

## 6 Results and discussion

The results show that focal firms can classify their suppliers in four clusters based on their power. From the node perspective, a supplier's power can be implied as dependency on its focal firm. This means that as suppliers become more dependent on the focal firm, the focal firm's influence over the supplier will be increased in this dyadic buyer-supplier relationship. This also postulates that the focal firms' dependency on the suppliers is very low due to the high market share of the two focal firms and numerous available suppliers that they have in the Australian food and grocery market. This situation shows that suppliers' power over their focal firms in clusters 3 and 4 is lower than that of clusters 1 and 2. From the network perspective, suppliers' power can be construed as the degree of influence that they have over other SCN actors. If the influence over the SCN actors is high, suppliers can be considered as powerful actors (clusters 2 and 4) and in the case of lower influence over the SCN actors, the suppliers' power within the SCN is low (clusters 1 and 3).

To manage sustainability issues within the SCN, focal firms need to balance their resources in terms of collaboration with their suppliers. They need to find the appropriate way to diffuse their sustainability practices to their SCN in a collaborative manner. In this regard, the results show that the focal firms have the highest intentions to establish collaborative relationships to manage sustainability issues within a supplier when the suppliers' power within the network and also their dependence on the focal firms is high (cluster 4). Hence, it may be construed that when suppliers have a high level of power in the network, they have the ability to influence other SCN actors. In this respect, focal firms can invest resources in developing collaborative relationships with these powerful suppliers (Kähkönen, 2014) given the latter's ability to demand sustainability standards from other SCN actors, thereby making focal firms' SCN more sustainable. In other words, the investment that has been made to improve the sustainability performance of the SCN will pay off in the future.

There are many examples of firms using their power to force their SCN actors to employ the environmental and social standards across the suppliers and the manufacturers (Roberts et al., 2006). Additionally, when the suppliers' dependency on the focal firm

increases (i.e., when suppliers' power at the node level decreases), suppliers are more willing to develop their existing relationship. "Whereas the less powerful actor may be forced to commit to a relationship, the more powerful one may have no incentive to engage in collaboration" (Kähkönen, 2014, p. 26). From the focal firms' perspective, it may require less time and money to collaborate with the more dependent suppliers. In this way, as discussed by previous studies (Corsten and Felde, 2005), the benefits of collaboration outweigh its cost as the focal firms dominate the relationship. This can also be supported by two pieces of evidence from the data analysis section. First, Table 8 indicates that the mean of employing the collaborative relationship between the focal firms and their suppliers is at the lowest value in cluster 1 (2.42), followed by cluster 2 (3.06). This implies that the focal firms have low intentions of employing collaborative relationships with suppliers that have low dependency on them. Second, according to the information in Table 7, the comparison test validates the significant difference between the depth of employing the collaborative relationship in clusters 4 and 2 (highlighting the impact of suppliers' dependency), and in clusters 4 and 1 (highlighting the impact of suppliers' dependency and their power within the SCN).

The results did not support the significant difference between cluster 3 and cluster 4 (H7). The insignificant distinction between clusters 3 and 4 indicates that as the supplier's dependency on the focal firm increases in both clusters, the focal firm develops more intention to employ the collaborative relationship. However, based on the empirical evidence (Table 8), there is a slight difference between the mean value of employing the collaborative relationship in cluster 3 (3.44) and cluster 4 (4.43). The difference can be seen in terms of suppliers' power at the network level. For instance, in cluster 3 (mean value of 3.61) the suppliers' power at the network level is lower than that of cluster 4 (mean value of 6.36). This can be attributed to the focal firms' tendency to classify powerful suppliers within the SCN as the first priority to invest resources in developing a collaborative relationship. The powerful suppliers may easily shift the cost (e.g., sustainability practices projects) to the SCN actors because of their bargaining power within the SCN.

The results did not show a significant difference in focal firms' intentions to employ the collaborative relationship between suppliers placed in clusters 1 and 3 (H3). However, there is a slight difference between the mean values (2.42 in cluster 1 and 3.44 in cluster 3). This may be related to the ease of developing a collaborative relationship with dependent suppliers. Although the suppliers have a low level of power within the SCN, the intention towards employing collaborative relationships in cluster 1 (with low supplier dependency on the focal firms) is slightly lower than cluster 3 (with high supplier dependency). The reluctance towards employing collaborative relationships with less dependent suppliers may come from the difficulties in attempting this in the past with these types of suppliers. This is also supported by other studies which indicate that highly dependent suppliers are more likely to comply with their focal firm's requests than less dependent suppliers (McNichols and Brennan, 2004, Musyoki and Ngugi, 2017). "The more dependent suppliers are on their buyers, the more effort they will make to satisfy the buyers" (Kadir et al., 2011, p. 6). Contrary to this, less dependent suppliers may not have interest in developing a collaborative relationship in terms of managing sustainability issues, as developing this type of relationship is costly. In this regard, as discussed by Kadir et al. (2011) those less dependent suppliers that have financial issues may not be able to invest their resources on this type of relationship (such as training), rather, they would prefer to work on their current issues or short-term focus.

Regarding the differences in employing collaborative relationships between clusters 1 and 2, and also between clusters 2 and 3, the results did not indicate the salient distinction; therefore, there is no evidence to support H2 and H5. However, the slight differences between the mean value of employing collaborative relationships in clusters 1 and 2 may be attributed to the fact that the suppliers' power in cluster 2 is higher than that of cluster 1, resulting in a higher mean value of employing collaborative relationships.

## **7 Conclusion**

The purpose of this paper is to analyse the impact of suppliers' power on the depth of retailer-supplier collaboration to manage sustainability issues within the SCN. A cluster analysis methodology is used to empirically test the hypotheses from the data collected with a web-based questionnaire among suppliers in two Australian giant retailers' SCN.

The findings demonstrate that to find the degree of the resource investment in collaborative relationships, retailers need to examine the suppliers' power at both network and node level. The result of this analysis can add value to both academics' and practitioners' understanding.

### **7.1 Theoretical and managerial contribution**

This paper makes significant contributions to the SSCM literature by analysing and categorising the power dynamics within a network context and the effect on the collaborative relationship; a research area which has not yet been thoroughly explored (Kähkönen, 2014). By analysing the power relations at both the network and node level, this paper distinguishes itself from previous studies. At the network level, the suppliers' power is analysed based on their influence over other SCN actors. At the node level, the suppliers' power is analysed based on the extent of their dependency on the focal firm. The findings indicate the degree of collaboration between focal firms and suppliers increases when the suppliers' power at the network level and their dependency at the node level are high. This means that there is a greater chance of collaboration between focal firms and suppliers that are recognised as a powerful actor within a SCN as well as being more dependent on the focal firms. Contrary to this, the findings also revealed that, when the suppliers' power at network level is low and they are also less dependent on the focal firms, the opportunities for developing collaborative relationships between suppliers and focal firms will decrease. This paper also partially extends the recent work of Kähkönen (2014) by empirically testing how the power relations can affect the depth of collaboration to manage sustainability issues via data collected from a survey in two SCN.

The findings of this paper provide recommendations to managers on how to create a balance when devoting resources to managing sustainability issues through the collaborative relationship. Since collaborating with suppliers can be costly, it is a considerable investment to employ a collaborative relationship with each supplier within the SCN. In this regard, the findings from this paper can assist managers in prioritising the suppliers to initiate sustainability practices within a collaborative relationship. They should view their suppliers' power relations at the network level to gain a more comprehensive understanding of the suppliers' capabilities within the network. In

addition, managers need to consider suppliers' power at the node level and analyse suppliers' dependency on their firms. In this way they can make an informed decision regarding the extent of resources to invest on the collaborative relationship.

## **7.2 Limitations and future research**

There are several limitations related to this paper. The first limitation is related to determining the population of the two retailers' SCN as there are no official websites to provide information from the focal firms' managers regarding the number of suppliers working in the two retailers SCN. Future research may find it more useful to directly approach the focal firms' managers to collect the required information. The second limitation relates to the lack of knowledge within the suppliers regarding the power relations at both network and node level, and collaborative relationships with Coles and Woolworths. However, this paper postulates that the targeted senior managers within the suppliers are aware of the required knowledge. Finally, the empirical data for this paper were collected from the supplier's side of the supplier-retailer relationship. This is another limitation which can be addressed by adding data from the retailer's side in the future studies. Another interesting avenue for the future research may be to analyse the interdependency between suppliers and retailers by considering the retailer's dominance over the suppliers as well.

## **Disclosure statement**

No potential conflict of interest was reported by the authors.

## **References**

- Ablander, M.S., Roloff J. and Nayır, D.Z. (2016) 'Suppliers as stewards? Managing social standards in first-and second-tier suppliers', *Journal of Business Ethics*, Vol. 139, No. 4, pp.661–683.
- Alvarez, G., Pilbeam, C. and Wilding, R. (2010) 'Nestlé Nespresso AAA sustainable quality program: an investigation into the goernance dynamics in a multi-stakeholder supply chain network', *Supply Chain Management: An International Journal*, Vol. 15, No. 2, pp.165-182.
- Andersen, M. and Skjoett-Larsen, T. (2009) 'Corporate social responsibility in global supply chains', *Supply Chain Management: An International Journal*, Vol. 14, No. 2, pp.75-86.

- Awaysheh, A. and Klassen, R.D. (2010) 'The impact of supply chain structure on the use of supplier socially responsible practices', *International Journal of Operations and Production Management*, Vol. 30, No. 12, pp.1246-1268.
- Bag, S. (2016) 'Green strategy, supplier relationship building and supply chain performance: total interpretive structural modelling approach,' *International Journal of Procurement Management*, Vol. 9, No. 4, pp.398-426.
- Bengtsson, A., Elg, U. and Johansson, U. (2000) 'The process of internationalization: how Swedish food retailers perceive their domestic supplier relationships', *The International Review of Retail, Distribution and Consumer Research*, Vol. 10, No. 4, pp.321-334.
- Biswal, J.N., Muduli, K., Satapathy, S. and Tripathy, S. (2018) 'A framework for assessment of SSCM strategies with respect to sustainability performance: an Indian thermal power sector perspective', *International Journal of Procurement Management*, Vol. 11, No. 4, pp.455-471.
- Biswal, J.N., Muduli, K. and Satapathy, S. (2017) 'Critical analysis of drivers and barriers of sustainable supply chain management in Indian thermal sector', *International Journal of Procurement Management*, Vol. 10, No. 4, pp.411-430.
- Blome, C., Paulraj, A. and Schuetz, K. (2014) 'Supply chain collaboration and sustainability: a profile deviation analysis', *International Journal of Operations & Production Management*, Vol. 34, No. 5, pp.639-663.
- Braziotis, C., Bourlakis, M., Rogers, H. and Tannock, J. (2013) 'Supply chains and supply networks: distinctions and overlaps', *Supply Chain Management: An International Journal*, Vol. 18, No. 6, pp.644-652.
- Burt, S.L. and Sparks, L. (2003) 'Power and competition in the UK retail grocery market', *British Journal of Management*, Vol. 14, No. 3, pp.237-254.
- Buvik, A. and Andersen, O. (2016) 'Adaptation problems in business relationships with substantial asset specificity and environmental uncertainty: the moderating effect of relationship duration', *International Journal of Procurement Management*, Vol. 9, No. 2, pp.206-222.
- Caniëls, M.C. and Gelderman, C.J. (2007) 'Power and interdependence in buyer supplier relationships: a purchasing portfolio approach', *Industrial Marketing Management*, Vol. 36, No. 2, pp.219-229.
- Chang, C.W., Chiang, D.M. and Pai, F.Y. (2012) 'Cooperative strategy in supply chain networks', *Industrial Marketing Management*, Vol. 41, No. 7, pp.1114-1124.
- Chen, L., Zhao, X., Tang, O., Price, L., Zhang, S. and Zhu, W. (2017) 'Supply chain collaboration for sustainability: a literature review and future research agenda', *International Journal of Production Economics* In press.

- Chin, T.A., Tat, H.H. and Sulaiman, Z. (2015) 'Green supply chain management, environmental collaboration and sustainability performance', *Procedia CIRP*, Vol. 26, No. 1, pp.695-699. Malaysia.
- Choi, T.Y., and Wu, Z. (2009) 'Taking the leap from dyads to triads: buyer-supplier relationships in supply networks', *Journal of Purchasing and Supply Management*, Vol. 15, No. 4, pp.263-266.
- Corsten, D., and Felde, J. (2005) 'Exploring the performance effects of key-supplier collaboration: an empirical investigation into Swiss buyer-supplier relationships', *International Journal of Physical Distribution & Logistics Management*, Vol. 35, No. 6, pp.445-461.
- Cox, A. (2007) 'Transactions, power and contested exchange: towards a theory of exchange in business relationships', *International Journal of Procurement Management*, Vol. 1, No. 1-2, pp.38-59.
- Crespin-Mazet, F. and Dontenwill, E. (2012) 'Sustainable procurement: building legitimacy in the supply network', *Journal of Purchasing and Supply Management*, Vol. 18, No. 4, pp.207-217.
- Dash, A., Das, R.K., Tripathy, S. and Nayak, S. (2018) 'Supply chain coordination voyage towards supplier relationship management: a critical review', *International Journal of Procurement Management*, Vol. 11, No. 5, pp.586-607.
- Day, M., Magnan, G., Hillenbrand, C. and Fawcett, S. (2017) 'Relational architecture and relational capability: organisational levers to support strategic supplier relationships', *International Journal of Procurement Management*, Vol. 10, No. 3, pp.267-289.
- Emerson, R.M. (1962) 'Power-dependence relations', *American Sociological Review*, Vol. 27, No. 1, pp.31-41.
- Eng, T.Y. (2008) 'Customer portfolio planning in a business network context', *Journal of Marketing Management*, Vol. 24, No. 5-6, pp.567-587.
- Fawcett, S.E., McCarter, M.W., Fawcett, A.M., Webb, G.S. and Magnan, G.M. (2015) 'Why supply chain collaboration fails: the socio-structural view of resistance to relational strategies', *Supply Chain Management: An International Journal*, Vol. 20, No. 6, pp.648-663.
- Fernie, J. and McKinnon, A. (2003) 'The grocery supply chain in the UK: improving efficiency in the logistics network', *The International Review of Retail, Distribution and Consumer Research*, Vol. 13, No. 2, pp.161-174.
- Fuchs, D. and Kalfagianni, A. (2009) 'Discursive power as a source of legitimation in food retail governance', *The International Review of Retail, Distribution and Consumer Research*, Vol. 19, No. 5, pp.553-570.

- Gimenez, C. and Tachizawa, E.M. (2012) 'Extending sustainability to suppliers: a systematic literature review', *Supply Chain Management: An International Journal*, Vol. 17, No. 5, pp.531-543.
- Gustafsson, K., Jönson, G., Smith, D. and Sparks, L. (2006) *Retailing logistics and fresh food packaging: managing change in the supply chain*. Kogan Page Publishers.
- Harland, C.M., Lamming, R.C., Zheng, J. and Johnsen, T.E. (2001) 'A taxonomy of supply networks', *Journal of Supply Chain Management*, Vol. 37, No. 3, pp.21-27.
- Heikkilä, M., Sajasalo, P., Heikkilä, J. and Pohjola, M. (2016) 'Management dilemmas in innovative supplier networks', *International Journal of Procurement Management*, Vol. 9, No 5, pp.616-635.
- Høgevold, N.M., Svensson, G., Wagner, B., Varela, J.C.S., Ferro, C. and Padin, C. (2016) 'Influence of stakeholders and sources when implementing business sustainability practices', *International Journal of Procurement Management*, Vol. 9, No. 2, pp.146-165.
- Hofmann, H., Busse, C., Bode, C. and Henke, M. (2014) 'Sustainability-related supply chain risks: conceptualization and management', *Business Strategy and the Environment*, Vol. 23, No. 3, pp.60-172.
- Hultman, J. and Elg, U. (2018) 'Developing CSR in retail–supplier relationships: a stakeholder interaction approach', *The International Review of Retail, Distribution and Consumer Research* In press.
- Sandberg Kadir, K.A., Tam, O.K. and Ali, H. (2011) 'Patterns of supplier learning: case studies in the Malaysian automotive industry', *Asian Academy of Management Journal*, Vol. 16, No. 1, pp.145-159.
- Kähkönen, A.K. (2014) 'The influence of power position on the depth of collaboration', *Supply Chain Management: An International Journal*, Vol. 19, No. 1, pp.17-30.
- Krosnick, J.A. and Presser, S. (2010) 'Question and questionnaire design', *Handbook of Survey Research*, Vol. 2, No. 3, pp.263-314.
- Lambert, D.M., Cooper, M.C. and Pagh, J.D. (1998) 'Supply chain management: implementation issues and research opportunities', *The international Journal of Logistics Management*, Vol. 9, No. 2, pp.1-20.
- Lu, C.S., Lin, C.C. and Tu, C.J. (2009) 'Corporate social responsibility and organisational performance in container shipping', *International Journal of Logistics: Research and Applications*, Vol. 12, No. 2, pp.119-132.
- MacCarthy, B.L. and Jayarathne, P. (2012) 'Sustainable collaborative supply networks in the international clothing industry: a comparative analysis of two retailers', *Production Planning and Control*, Vol. 23, No. 4, pp.252-268.

- Martins, G.S., Rossoni, L., Duarte, A.L. and Martins, R.S. (2017) 'Supply chain relationships: Exploring the effects of both relational and structural embeddedness on operational performance', *International Journal of Procurement Management*, Vol. 10, No. 5, pp.639-664.
- McNichols, T. and Brennan, L. (2004) 'Evaluating ecollaboration: toward a positioning map for supply chain integration', *17th Bled eCommerce Conference*. Slovenia.
- Meinlschmidt, J., Schleper, M.C. and Foerstl, K. (2018) 'Tackling the sustainability iceberg: a transaction cost economics approach to lower tier sustainability management', *International Journal of Operations & Production Management*. In press.
- Meqdadi, O., Johnsen, T.E. and Johnsen, R.E. (2016) 'The role of power and trust in spreading sustainability initiatives across supply networks: a case study in the biochemical industry' *Industrial Marketing Management* In press.
- Min, H. and Zhou, G. (2002) 'Supply chain modeling: past, present and future', *Computers & Industrial Engineering*, Vol. 43, No. 2. pp. 231-249.
- Momeni, M. and Rezaei Vandchali, H. (2017) 'Providing a structured methodology for supplier selection and evaluation for strategic outsourcing', *International Journal of Business Performance and Supply Chain Modelling*, Vol. 9, No. 1, pp. 66-85.
- Moore, C.M., Birtwistle, G. and Burt, S. (2004) 'Channel power, conflict and conflict resolution in international fashion retailing', *European Journal of Marketing*, Vol. 38, No. 7, pp.749-769.
- Musyoki, K.B. and Ngugi, E. (2017) 'Effects of supplier development practices on performance of pharmaceutical suppliers for hospitals in nairobi city county', *International Journal of Supply Chain Management*, Vol. 2, No. 1, pp. 32-56.
- O'Callaghan, E. and Murray, J. (2017) 'Internal brand identification as metamorphic glue in the internal branding process within a retailer network', *The International Review of Retail, Distribution and Consumer Research*, Vol. 27, No. 5, pp.533-551.
- O'Kane, G. (2016) 'A moveable feast: exploring barriers and enablers to food citizenship', *Appetite*, Vol. 105, No. 12, pp.674-687.
- Padin, C., Ferro, C., Svensson, G., Høgevold, N.M., Varela, J.C.S. and Wagner, B. (2017) 'Validating the influence of stakeholders and sources when implementing business sustainability practices', *International Journal of Procurement Management*, Vol. 10, No. 2, pp.248-265.
- Pedersen, E.R. and Andersen, M. (2006) 'Safeguarding corporate social responsibility (CSR) in global supply chains: how codes of conduct are managed in buyer-supplier relationships', *Journal of Public Affairs*, Vol. 6, No. 3-4, pp.228-240.

- Pfeffer, J. and Salancik, G.R. (2003) *The external control of organizations: A resource dependence perspective*. Stanford University Press. New York.
- Pilbeam, C., Alvarez, G. and Wilson, H. (2012) 'The governance of supply networks: a systematic literature review', *Supply Chain Management: An International Journal*, Vol. 17, No. 4, pp.358-376.
- Razavi, S.M., Safari, H., shafie, H. and Rezaei Vandchali, H. (2012) 'How customer satisfaction, corporate image and customer loyalty are related?', *European Journal of Scientific Research*, Vol. 78, No. 4, pp.588-596.
- Revilla, E. and Villena, V.H. (2012) 'Knowledge integration taxonomy in buyer-supplier relationships: trade-offs between efficiency and innovation', *International Journal of Production Economics*, Vol. 140, No. 2, pp.854-864.
- Rezaei Vandchali, H., Cahoon, S. and Chen, S.L. (2018) 'Creating a sustainable supply chain network by adopting relationship management strategies', *Journal of business to business marketing*, In Press.
- Roberts, S. (2003) 'Supply chain specific? Understanding the patchy success of ethical sourcing initiatives', *Journal of Business Ethics*, Vol. 44, No. 2/3, pp.159-70.
- Ruiz-Martinez, A., Gil-Saura, I. and Frascuet, M. (2018) 'Axes of relationship value between manufacturers and retailers', *Management Decision*, In press.
- Salema, G. and Buvik, A. (2018) 'Buyer-supplier integration and logistics performance in healthcare facilities in Tanzania: the moderating effect of centralised decision control', *International Journal of Procurement Management*, Vol. 11, No. 2, pp.250-265.
- Sandberg, E. and Mena, C. (2015) 'Exploring strategic strengths and weaknesses of retail purchasing groups', *The international review of retail, distribution and consumer research*, Vol. 25, No. 3, pp.276-297.
- Soosay, C.A. and Hyland, P. (2015) 'A decade of supply chain collaboration and directions for future research', *Supply Chain Management: An International Journal*, Vol. 20, No. 6, pp.613-630.
- Sparks, L. (2010) 'Supply Chain Management and Retailing', *Supply Chain Forum: An International Journal*, Vol. 11, No. 4, pp.4-12.
- Svensson, G., Padin, C. and Eriksson, D. (2016) 'Glocal business sustainability: Performance beyond zero!', *International Journal of procurement management*, Vol. 9, No. 1, pp.15-26.
- Tachizawa, E.M. and Wong, C.Y. (2014) 'Towards a theory of multi-tier sustainable supply chains: a systematic literature review', *Supply Chain Management: An International Journal*, Vol. 19, No. 5/6, pp.643-663.

- Tat Keh, H. and Park, S.Y. (1998) 'An expanded perspective on power in distribution channels: Strategies and implications', *The International Review of Retail, Distribution and Consumer Research*, Vol. 8, No. 1, pp.101-115.
- Touboulic, A. and Walker, H.L. (2015) 'Theories in sustainable supply chain management: a structured literature review', *International Journal of Physical Distribution and Logistics Management*, Vol. 45, No. 1, pp.16-42.
- Vachon, S. (2007) 'Green supply chain practices and the selection of environmental technologies', *International Journal of Production Research*, Vol. 45, No. 18-19, pp.4357-4379.
- Vachon, S. and Klassen, R.D. (2006) 'Extending green practices across the supply chain: the impact of upstream and downstream integration', *International Journal of Operations and Production Management*, Vol. 26, No. 7, pp.795-821.
- Vachon, S. and Klassen R.D. (2008) 'Environmental management and manufacturing performance: the role of collaboration in the supply chain', *International Journal of Production Economics*, Vol. 111, No. 2, pp.299–315.
- Vörösmarty, G. and Tátrai, T. (2019) 'Green supply management in the public and private sector in Hungary', *International Journal of Procurement Management*, Vol. 12, No. 1, pp.41-55.
- Vurro, C., Russo, A. and Perrini, F. (2009) Shaping sustainable value chains: network determinants of supply chain governance models', *Journal of Business Ethics*, Vol. 90, No. 4, pp.607-621.
- Wilhelm, M.M., Blome, C., Bhakoo V. and Paulraj, A. (2016a) 'Sustainability in multi-tier supply chains: understanding the double agency role of the first-tier supplier', *Journal of operations management*, Vol. 41, No. 1. pp.42-60.
- Wilhelm, M.M., Blome, C., Wieck, E. and Xiao, C.Y. (2016b) 'Implementing sustainability in multi-tier supply chains: strategies and contingencies in managing sub-suppliers', *International Journal of Production Economics*, Vol. 182, No. 1, pp.196-212.
- Zhao, X., Huo, B., Flynn, B.B. and Yeung, J.H.Y. (2008) 'The impact of power and relationship commitment on the integration between manufacturers and customers in a supply chain', *Journal of Operations Management*, Vol. 26, No. 3, pp.368-388.
- Zhuang, G., Herndon, N.C., and Zhou, N. (2006) 'Exercises of power in marketing channel dyads: power advantage versus power disadvantage', *International Review of Retail, Distribution and Consumer Research*, Vol. 16, No. 1, pp.1-22.