

Governance mechanisms in managing sustainability practices in retail supply networks

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Abstract

The purpose of this paper is to compare the application of sustainability practices in two Australian food supply networks to identify how suppliers and focal firms (retailers) interact in terms of sustainability practices. A web-based questionnaire is developed to investigate the sustainability practices in Australian suppliers.

Data from 66 received questionnaires are analysed via parametric and non-parametric tests to explain the differences between mean scores of the various sustainability practices implemented by retailers. The results identify two distinct governance mechanisms, which retailers apply to manage their suppliers' sustainability practices. The hands-off governance mechanism generally uses the sustainability practices in which retailers do not need to be involved directly when managing sustainability practices, while in the hands-on governance mechanism they are interested in participating directly. The results also show that the supplier's age and headquarter locations can affect the types of the two governance mechanisms in the supply network (SN). This paper is one of the few studies that empirically investigates governance mechanisms in the context of sustainability practices across the SN. The contribution of this research can assist further research to observe the application of sustainability practices in the SN. For focal firms with a complex SN, this paper provides insights into balancing their effort to manage sustainability practices in various suppliers.

Keywords: Sustainability practices; supply network; governance mechanism; focal firms; retail

1 Introduction

Over the last decade, incorporating sustainability practices into supply chain management (SCM) has attracted increasing attention from both academics and practitioners (Govindan et al., 2020, Miemczyk and Luzzini, 2019) because sustainability incursions have the ability to affect a firm's behaviour, damaging reputation and threatening long-term survival (Roscoe et al., 2016). For example, Mattel in 2007 was forced to recall US\$100 million worth of children's

toys when one supplier used lead-contaminated paint on the firm's toys. The firm watched its stock price fall 18% in the months that followed and has since been the target of litigation (Levesque, 2012). The pressure towards incorporating sustainable development objectives into firms' businesses mainly comes from government regulations and consumer awareness, which consistently encourages them to consider the social and environmental aspects in the extended network environment (Meinlschmidt et al., 2018). Another important reason for this pressure is related to the difficulties for end-customers in distinguishing between the sustainability standards of the focal firms and their supply chain players (Razavi et al., 2012; Roberts, 2003). Thus, considering the importance of stakeholders' voices in maintaining the public image of focal firms, there is an increasing imperative to report sustainability efforts to stakeholders that assists in transforming their growing pressures into sustainable outcomes (Chen and Kitsis, 2017). Accordingly, a large number of firms have undertaken a proactive approach in response to market demands for more sustainable products by operationalising sustainable development objectives in their supply chain in a wider context (Wilhelm et al., 2016). From an academic perspective, the interest in sustainable supply chain management (SSCM) is evident in the dramatic increase in published articles addressing, for example, sustainability issues in supply networks (SN) over the last five years (Dubey et al., 2017; Rezaei Vandchali et al., 2020). Firms can be considered as nodes in complex interdependent networks (Feili et al., 2011; Johansson and Elg, 2002; Momeni and Rezaei Vandchali, 2017). From the network perspective, integrating individual networks at different levels of the supply chain (e.g., manufacturing and distribution) can provide visibility, flexibility, and maintainability for improvement projects in the SCM context (Rezaei Vandchali et al., 2019b; Sandberg and Mena, 2015). In particular, the role of suppliers in the process of applying sustainability approaches within supply chain management (SCM) has recently been considered a high interest area (Roy et al., 2018).

Despite the increasing amount of research in SSCM, the way (why and how) that focal firms and their suppliers interact in terms of sustainability practices does not appear to have been thoroughly explored indicated by Rezaei Vandchali et al. (2019a), Roy et al. (2018), Dubey et al. (2017), and Meinel Schmidt et al. (2018). Thus, to address this gap, which is highlighted by these researchers, the following research questions have been developed to guide the current research and contribute to the existing literature:

- What types of governance mechanisms do focal firms use to approach their suppliers to incorporate sustainability into a SCN?
- How can the suppliers' characteristics affect the governance mechanisms used by focal firms?

This paper answers the research questions by first examining sustainability practices in the SN and then categorising sustainability practices into different governance mechanisms in section 2, leading to develop hypotheses in section 3. Through an empirical methodology in section 4, this paper also examines the application of the governance mechanisms in two SNs and how different suppliers' characteristics can affect them in section 5, before ending with the conclusions to the paper in section 6.

2 Categorising sustainability practices in supply networks

Based on the various definitions in the SSCM literature, it seems essential that the unit of analysis in SSCM needs to consider an inter-organisational network, which includes multiple actors at the macro-environmental levels (Matthews et al., 2016). For example, the global level of sustainability includes a complex network of various global and local, private, and public actors (Nadvi, 2008). By looking at the SSCM from the network perspective, a sustainable supply network can be defined as a set of actors who work together to create sustainable profit

through considering the potential for social and environmental issues across the various stages of a product lifecycle (Winkler, 2011). At the network level, firms typically consider the broad network of actors to cover the stakeholders' expectations. The benefit of adopting this perspective is that there are multiple actors that can affect a firm's endeavour in the direction of sustainable development objectives, which can be covered by the network perspective (Miemczyk et al., 2012). The network perspective can also consider both internal and external key actors in the sustainable supply chain management providing a deeper understanding of focal firms (Frostenson and Prenkert, 2015). This means that the achievement of sustainable development objectives can occur through involving multiple interconnected actors who may have different objectives.

However, achieving sustainable development objectives in the SN needs a key actor that has sufficient resources to play a lead role (Alvarez et al., 2010). This is reasonable as the key actor may have more resources and motivation than other actors to monitor and manage sustainability performance within the SN (Tachizawa and Wong, 2014). For example, a study by Heede (2014) suggests that approximately two-thirds of industrial CO₂ emissions in the world emanate from ninety large firms. This is also supported by previous research suggesting that small firms may have slow progress in the adoption of sustainability practice in their supply chain due to their upfront cost (Bourlakis et al., 2016). Therefore, large firms seem to be the appropriate starting point to follow up on sustainability issues in their SN and are often referred to as focal firms (Beske-Janssen et al., 2015).

With the interest in sustainable development increasing over the last ten years (Sudusinghe and Seuring, 2020, Blome et al., 2014, Dubey et al., 2017), firms are realising that incorporating sustainable development objectives into their SN can improve their economic performance and have numerous benefits through influencing their market position and

increasing customer satisfaction (Blome et al., 2014). The intention towards achieving sustainability objectives began with green supply chain management (GSCM) practices which mainly paid attention to the environmental aspect of the sustainable development objectives (Sarkis, 2003). By expressing doubts about GSCM practices providing a source of competitive advantage, greater interest occurred in SSCM practices (Govindan et al., 2020, Dubey et al., 2017). Wu et al. (2017) also argue that the performance of SSCM can be improved by GSCM practices. Moreover, the positive impact of SSCM practices on the firm performance has motivated firms to allocate more resources and times to implement those practices (Govindan et al., 2020). Therefore, various types of sustainability practices have been examined by various researchers to make the SN more sustainable (for example, Awaysheh and Klassen, 2010, Meinschmidt et al., 2018, Parmigiani et al., 2011, Tachizawa and Wong, 2014). this paper focuses on the sustainability practices that focal firms apply when managing sustainability issues in their suppliers within a SN. The importance of this topic is highly recommended by various authors arguing that a firm's competitive advantage is highly connected with the way they manage sustainability throughout their supply chains (Adam et al., 2019). This paper applies the two governance mechanisms (hands-on and hands-off) suggested by Gimenez and Tachizawa (2012) to categorise sustainability practices. The “hands-on” mechanism refers to the types of sustainability practices that focal firms are directly involved in, for example, implementing a joint venture. The “hands-off” mechanism is concerned with the types of sustainability practices that focal firms indirectly monitor by, for example, using standards to manage them. Table 1 provides examples of sustainability practices in each governance mechanism.

Table 1. Sustainability practices in two governance mechanisms

| Governance mechanisms | Examples of sustainability Practices |
|-----------------------|--------------------------------------|
|-----------------------|--------------------------------------|

| | |
|-----------|---|
| Hands-off | <ul style="list-style-type: none"> • No information about suppliers (Tachizawa and Wong, 2014). • Encouraging first-tier suppliers to source from second-tier suppliers who apply sustainability programmes to reduce the use of toxic chemicals (MacCarthy and Jayarathne, 2012). • Auditing suppliers by external service providers (Harms et al. 2013). • Monitoring suppliers based on information from third parties (Wilhelm et al. 2016b). • Collaborating with third parties to improve sustainability performance of suppliers (Wilhelm et al. 2016b) |
| Hands-on | <ul style="list-style-type: none"> • Regular auditing of suppliers' performance (Andersen and Skjoett-Larsen, 2009) • Termination of the supplier relationship (Harms et al. 2013) • Urging suppliers to follow product safety issues, such as using materials which are normally not required by the regulations (Parmigiani et al. 2011) • Mandating suppliers to attach radio frequency identification (RFID) tags to their products (Drake and Schlachter 2008) • Collaborate in the design of new products or new product lines (Vachon and Klassen, 2006) • Collaborating to educate students, teachers, community workers, and the general public on water conservation and management (MacCarthy and Jayarathne, 2012). • Training of suppliers for improving social and environmental conditions (Harms et al. 2013) • Training of key personnel at the supplier level (Andersen and Skjoett - Larsen, 2009) |

2.1 *Hands-off governance mechanism*

In the hands-off governance mechanism, focal firms have no interest in addressing sustainability issues with their suppliers or merely seek to satisfy the minimum requirements and standards of the sustainability issues in the suppliers. The focal firms may follow the sustainability issues with their first tier suppliers and neglect the lower tiers (Meinlschmidt et al., 2018, Wilhelm et al., 2016). Buyers may use this mechanism when they do not have enough control over their suppliers (Touboulic et al., 2014). Having less pressure from stakeholders can cause focal firms to apply a conservative approach (Simpson et al., 2007). The tendency towards this mechanism may also come from the situation that the sustainability performance of suppliers may not affect the focal firms' performance (Tachizawa and Wong, 2014). In other

words, they may not be key actors in the focal firms' SN. Thus, the sustainability practices implemented by suppliers may not seem valued by focal firms. Moreover, these actors can be small firms which have limited knowledge, expertise, and resources to follow sustainability issues and operate in countries in which the environmental and social issues are not strictly demanded by rules, regulations, and pressure from the final customer (Villena and Gioia, 2018). The focal firms then may only pursue a minimum level of sustainability commitments to comply with regulation (Lee and Ball, 2003). For example, the focal firms may ask their suppliers to receive ISO 14001 or eco-management and audit scheme (EMAS) certification and meet specific legislation such as hazardous material labelling and greenhouse gas emission (Vachon and Klassen, 2006). In this governance mechanism, the focal firms usually do not use resources or are directly involved in managing sustainability issues in their suppliers. The focal firms may ask their first-tier suppliers to improve the sustainability performance of their second-tier suppliers (Ablander et al., 2016). They may also collaborate with NGOs to manage the sustainability issues in their low-tier suppliers (Villena and Gioia, 2018). The reason may relate to the difficulties in identifying suppliers, measuring their compliance against sustainability standards, and executing the corrective actions in different tiers (Grimm et al., 2016). The level of information sharing between focal firms and their suppliers is low in terms of sustainability practices (Tachizawa and Wong, 2014). They may gather information and assess suppliers' sustainability practices through publicly disclosed documentation or auditing by another actor (Meinlschmidt et al., 2018). The lack of time and resources to providing timely feedback in sustainability issues in sub-suppliers (Johnson, 2017) and difficulties in managing sustainability issues in these suppliers which are located beyond the focal firms' visible horizon (Sancha and Gimenez, 2019) means that by using the hands-off governance mechanism focal firms try to manage sustainability practices in their SN with fewer expenses.

2.2 *Hands-on governance mechanism*

Sustainability practices within the hands-on mechanism are those in which focal firms are directly involved to manage sustainability issues in their suppliers. Focal firms use their resources to follow sustainability commitments in their suppliers regularly (Meinlschmidt et al., 2018). Collaboration plays a key role in the integration of process and partnership among various members in the supply chain management (SCM) context (O'Callaghan and Murray, 2017). For example, the focal firms and their suppliers may collaborate in sustainability practices based on the cooperation and joint activities that can be beneficial for each participant (Wilhelm et al., 2016). Previous studies highlighted that supplier collaboration on SSCM practices can have significant positive impacts on the firm performance (Ali et al., 2016). Villena and Gioia (2018) found that multinational companies closely work with their suppliers to meet environmental standards for their final products. Collaborating with other actors within the network can create an effective business environment that can lead to the success of each actor (Hultman and Elg, 2018). They may seek joint rules such as the sharing of knowledge, implementing an environmental management system, enhancing competencies and capabilities, and gaining certifications with their supplier to make their SN more sustainable (Vurro et al., 2009). Previous studies also show that using coopetition strategies, in which firms are simultaneously competing and collaborate to create value (Ritala and Tidström 2014), can assist focal firms to achieve economic, social, and environmental improvement (Limoubpratum et al., 2015). Focal firms may go beyond the minimum requirements and set global benchmarks, and be directly involved in various projects, both in the social dimension such as the well-being of employees and local community and in the environmental dimension such as the use of energy and use of toxic chemicals with its suppliers (MacCarthy and Jayarathne, 2012). Parmigiani et al (2011) provide an example, which explains how regulations related to banning mobile phone use while driving in some U.S states motivated focal firms like Nokia

to force their suppliers to follow this policy in every other U.S state as they anticipate that other U.S states will set this policy in the near future. The focal firms may first need to develop a detailed supply policy to address sustainability issues and make complex efforts to generate compliance among suppliers (Roy et al., 2018). In addition, focal firms may proactively raise sustainability issues with their suppliers. Focal firms may impose their own sustainability standards and urge suppliers to follow them (Neville and Menguc, 2006). Buyers which have more power over their suppliers may use this approach to demand sustainability requirements from their suppliers (Meqdadi et al., 2019). For example, IKEA established its own corporate social responsibility (CSR) certificate and requested suppliers to achieve the certificate (Andersen and Skjoett-Larsen, 2009). Any negative feedback from suppliers can result in the termination of the business relationship (Pedersen and Andersen, 2006), although in some cases, collaborating in sustainability practices may result in better sustainability performance rather than sanctions (Ablander et al., 2016). This provides opportunities for firms to integrate operations and increase the effectiveness of the chain. The results, however, may also bring more legitimacy in terms of sustainable development objectives for both parties.

Selecting a particular type of governance mechanism to encourage sustainability of the SN in suppliers is not a simple process for focal firms, and can be affected by various contingency variables. In particular, suppliers in the SN can be divided into different sizes (small, medium, and large) and years of operation. They may also have a different duration of the relationship with their focal firms and be scattered geographically in the SN. In this sense, to assess the governance mechanisms adopted by focal firms to manage sustainability issues in their suppliers, this paper uses four factors including 1) suppliers' size, 2) suppliers' age (how many years they have been operating), 3) length of relationship with focal firms and 4) suppliers' headquarter location. Although the importance of these factors has been suggested by various studies (Beltagui et al., 2020; Birasnav et al., 2019, Busse et al., 2016; Ghadge et

al., 2019; Huang et al., 2018; Leoncini et al., 2019; Li et al., 2019; Mao et al., 2020, Um and Kim, 2019, Wang et al., 2018, Wu and Li, 2020, Younis and Sundarakani, 2019), the main reasons for selecting these four factors, which lead to the hypotheses, are discussed in the next section.

3 Developing hypotheses

In relation to the first of the four factors, suppliers' size, prior studies have shown that firm size can affect the adoption of sustainability practices (Bourlakis et al., 2014). For example, 'smaller firms' are more likely to respond proactively to stakeholder pressure to create a good reputation and attract more clients, which is central for smaller firms' success (Panwar et al., 2016). In contrast, because of their greater resources, 'larger firms' can resist stakeholders' pressure as they have more organisational power (Lewis et al., 2014). The previous studies also highlighted that small suppliers may have not enough capacities and resources to pursue sustainability issues in their supply chain and provide timely feedback to their focal firms (Johnson, 2017). Regarding the second factor, the suppliers' age, firms' performance may differ between 'young' and 'mature firms' due to the "liabilities associated with newness" (Lai et al., 2013, 3044). The age difference can both have a negative impact and a positive impact on the adoption of sustainability practices (Hoogendoorn et al., 2015). Previous studies highlighted that younger suppliers have more tendency towards pursuing sustainability objectives by being involved with their focal firms (Huang and Chiu, 2018). Length of relationship is the third factor, which can affect the type of collaboration and cooperation that focal firms apply for 'new suppliers' and 'old suppliers' (Chu and Wang, 2012). Since trust develops over time, length of relationship can be considered a sign of trust among focal firms and their suppliers, which can have a significant impact on the types of governance mechanisms that focal firms apply to their suppliers (Alvarez et al., 2010). This factor has been suggested by previous

studies indicating its important role in governance mechanisms between firms in supply chains (Um and Kim, 2019). Regarding the fourth factor, the suppliers' headquarter location, numerous studies have highlighted the impact of distance on the types of sustainability practices chosen by focal firms (Awaysheh and Klassen, 2010). For example, Beltagui et al. (2020) and Gold et al. (2017) found that the large distance between buyers and suppliers can be considered as a barrier for buyers to force their suppliers to address sustainability issues. Therefore, this paper considers the suppliers' headquarter location as a sign of the distance between them. By developing a conceptual framework (Figure 1) and considering the importance of these four factors in the types of governance mechanisms, this paper develops eight hypotheses and examines the application of the two governance mechanisms for different suppliers.

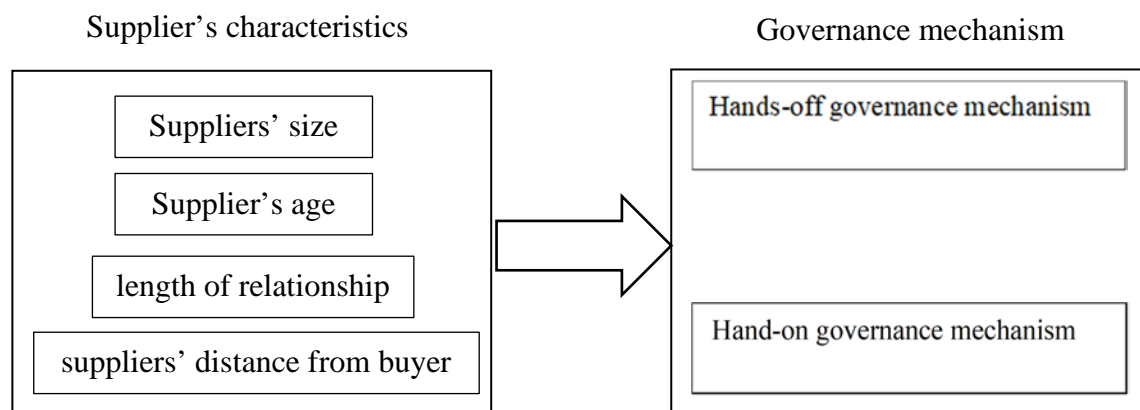


Figure1. A conceptual framework

H1-a: There is a significant difference between the hands-off governance mechanism chosen by focal firms to manage sustainability issues in 'small and medium suppliers' and 'large suppliers'.

H1-b: There is a significant difference between the hands-on governance mechanism chosen by focal firms to manage sustainability issues in ‘small and medium suppliers’ and ‘large suppliers’.

H2-a: There is a significant difference between the hands-off governance mechanism chosen by focal firms to manage sustainability issues in ‘young suppliers’ and ‘mature suppliers’.

H2-b: There is a significant difference between the hands-on governance mechanism chosen by focal firms to manage sustainability issues in ‘young suppliers’ and ‘mature suppliers’.

H3-a: There is a significant difference between the hands-off governance mechanism chosen by focal firms to manage sustainability issues in ‘new suppliers’ and ‘old suppliers’.

H3-b: There is a significant difference between the hands-on governance mechanism chosen by focal firms to manage sustainability issues in ‘new suppliers’ and ‘old suppliers’.

H4-a: There is a significant difference between the hands-off governance mechanism chosen by focal firms to manage sustainability issues in ‘domestic suppliers’ and ‘foreign suppliers’.

H4-b: There is a significant difference between the hands-off governance mechanism chosen by focal firms to manage sustainability issues in ‘domestic suppliers’ and ‘foreign suppliers’.

4 Methodology

The unit of analysis in this paper is the governance mechanism between retailers and their network of suppliers. The relationship between the retailer and suppliers has always been strategically important (Ruiz-Martinez et al., 2018) as they see each other as “significant partners” (Kähkönen, 2014, 23). Retailers can be considered as the dominant actors within the most SCN (Sparks, 2010) and they are gaining increasing power from their suppliers

(Gustafsson et al, 2006). In addition, as this paper consists of hypotheses and examines the sustainability practices in the network context, numerical data from numerous suppliers are essential to test the hypotheses. Therefore, a quantitative approach through a web-based questionnaire has been used, which provides more accessibility to the required data from the suppliers.

4.1 *Development of questionnaire*

As a result of reviewing the contemporary literature, questions were designed to assess the governance mechanisms. The wording for each question was then matched with the industry context, as it is important that the language and design of questions are compatible with the way that respondents are familiar. Moreover, based on the nature of the questions, this paper uses Likert's technique by asking respondents to determine their level of disagreement and agreement. Finally, eleven academic and industry experts' reviews of the questionnaire were utilised to pre-test and ensure the content validity, which made the questionnaire ready for the data collection process.

4.2 *Sampling and data collection*

Following the characteristics of focal firms suggested by Seuring and Müller (2008, 1699), two large retailers, Coles and Woolworths, in the Australian food and grocery industry were selected as the focal firms for the empirical part of this paper. Australia has one of the most concentrated food retail industries around the world (Wardle and Chang, 2015), of which Coles and Woolworths are the two main chains that have a considerable combined market share (around 80%) in the country. They have direct contact with the end-customer resulting in having significant power over their suppliers and giving them more leeway to request various conditions. To manage sustainability issues, they have initiated sustainability practices within

their SN. Food industries are exposed to sustainability incursions as they exist in particular environmental, social, and economic settings such as land use, rural livelihoods, and food security (Bloemhof et al., 2015). 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). Therefore, this paper focuses on the relationship between suppliers and these retailers in the Australian food and grocery industry.

To identify the suppliers in the two retailers' SN, the procedure shown in Figure 2 was developed. In the first step, Coles and Woolworths' online shopping websites were used to find the population, as it is not possible to find an official and authentic source providing the information about suppliers of the specific focal firm. According to the Coles and Woolworths' online shopping websites, there are 839 firms across different food and beverage product categories (such as dairy, meat) working with these two large retailers. In the second step, by targeting the suppliers in the Coles and Woolworths' SN and applying the 95% confidence level and 5% margin of error (Saunders, 2011, 144) through random sampling, 278 suppliers were identified. In the third step, to find the email address for respondents, this paper used various websites including suppliers' own website, the Australian Bureau of Statistics (ABS), Company 360, and LinkedIn. After identifying the name of suppliers in the Coles and Woolworths' online shopping websites, the suppliers' own websites were identified. In their websites, in the section of 'contact us' or 'organisational chart', key managers were sometimes identified. However, this type of information rarely exists on the supplier's websites. If the key managers cannot be identified in this way, the name of suppliers was searched on the 'company 360' and ABS website, which provides various information such as firms' websites, phone numbers, and most importantly key contact points. Due to the limitation related to the website's updating process, the key managers were searched simultaneously on the LinkedIn website to make sure that those managers were still working with the targeted supplier. Finally, if the key

managers for suppliers could not be identified by these websites, the final way is to call the targeted firms and ask the names and emails of desired individuals by phone. If they were not interested to participate in a survey (for example, by their organisations' policy), more suppliers were added to sample size by random sampling (step two).

By distributing the questionnaire via email to the targeted respondents, 66 questionnaires were received resulting in a 24% response rate, which is in accordance with the SCM literature (Awaysheh and Klassen, 2010, Blome et al., 2014).

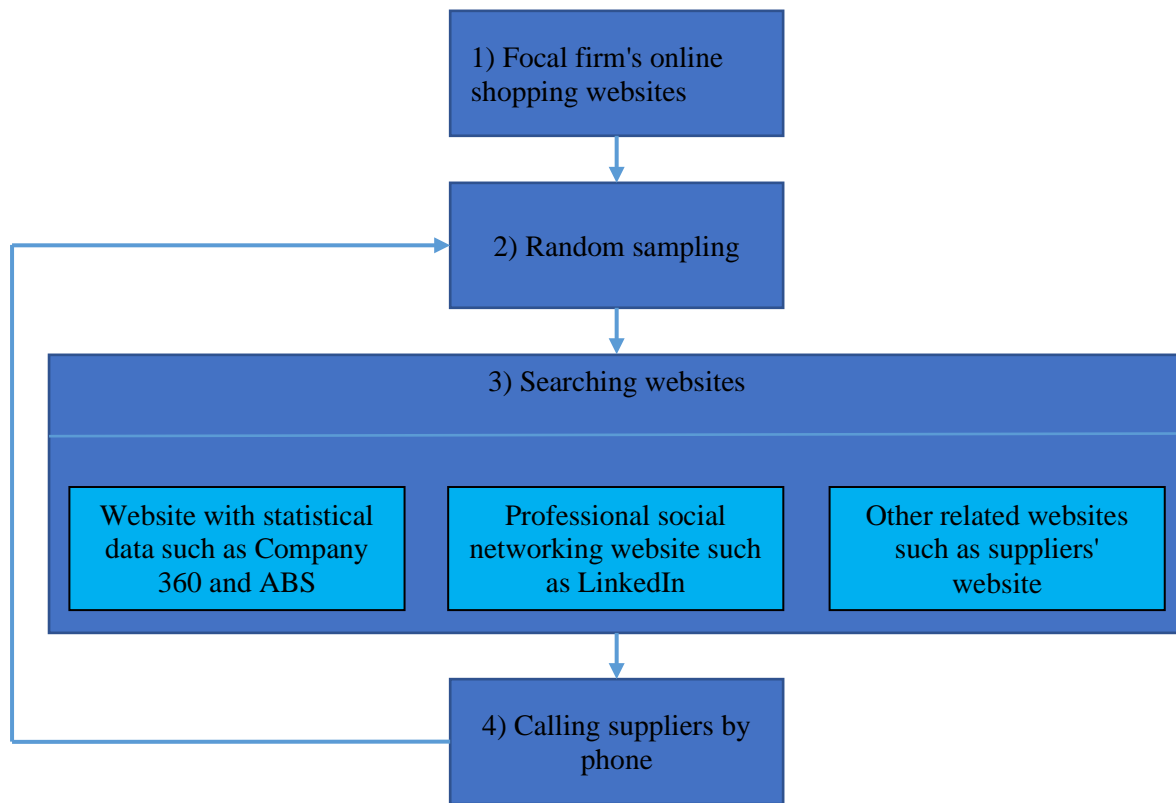


Figure 2. A procedure to identify suppliers in a focal firm's SN

5 Data analysis, results, and discussion

After separating the questionnaires answered for both Coles and Woolworths, and dealing with questionnaires consisting of missing data (questionnaires including the options of 'don't know' and 'not applicable') by removing or imputing, the final descriptive characteristics of respondents are presented in Table 2. Since respondents did not answer all questions in the questionnaire, the N values are different for the two governance mechanisms, therefore, further analysis is performed for each governance mechanism separately.

Table 2. Profile of respondents

| | Hands-off (N=81) | Hands-on (N=77) |
|---------------------------|------------------|-----------------|
| Focal firms | Frequency | |
| Both Coles and Woolworths | 30 | 29 |
| Coles | 15 | 11 |
| Woolworths | 6 | 8 |
| Total ¹ | 51 | 48 |
| Firm's age (year) | | |
| Young | 15 | 15 |
| Mature | 36 | 33 |
| Total | 51 | 48 |
| Number of employees | | |
| Small and medium | 27 | 24 |
| Large | 24 | 24 |
| Total | 51 | 48 |
| Location | | |
| Australia | 43 | 41 |
| Foreign | 8 | 7 |
| Total | 51 | 48 |
| Length of relationship | | |
| Old | 14 | 13 |
| New | 67 | 64 |
| Total ² | 81 | 77 |

¹ Since respondents did not answer all questions in the questionnaire, the N values are different from each other and also differ from 66 questionnaires. This means 48 and 51 out of 66 respondents answered the questions completely resulting in 18 and 15 out of 66 questionnaires answered with missing data related to hands-on and hands-off governance mechanism respectively.

² Since respondents who work with both Coles and Woolworths answered questions for Coles in the first part and Woolworths in the second part of the questionnaire, the frequency is doubled. For example, to calculate N=77, 29 questionnaires are multiplied by two (as they consist of answers for both Coles and Woolworths). Then, 58 is added to 11 and 8 unique questionnaires, which are answered for only Coles and Woolworths respectively.

5.1 *Data preparation*

To ensure the external validity of the questionnaire and identify if the data is biased, a non-response bias test was conducted between two groups of early and late. The results were found to exhibit no sign of non-response bias. The reliability of data was also checked with Cronbach α and the value for each governance mechanism found to be all above 0.7 (Table 3). However, before performing further analysis, the normality test was performed on the items of the two governance mechanisms. The test includes the Shapiro-Wilk and Kolmogorov-Smirnov tests, which are considered effective to test the normality of data (Ghasemi and Zahediasl, 2012). Using these two tests, the normality distribution was not observed for each item. Skewness and kurtosis for each item were also assessed. Results show that the absolute value of skewness and kurtosis for each item is placed between $[-3 \sim 3]$ and $[-10 \sim 10]$, which can be inferred that all items are normally distributed (Kline, 2015). Therefore, due to the different results (the results are not presented for the sake of brevity) for normal distribution and the small sample size, this paper uses both parametric and non-parametric techniques to test the hypotheses. For parametric techniques, this paper uses the t-test (Equation 1) to identify the differences between the means of the two groups (in hypotheses) in each governance mechanism. In the case of non-parametric techniques, a non-parametric counterpart t-test, the Mann-Whitney U test (Equation 2) was applied which is an efficient method to compare means of two independent samples, particularly when the normality assumption is violated (Coakes and Steed, 2007). However, the power of the Mann-Whitney U test may not be necessarily high when the sample size is very small (Su et al., 2013). In this situation, this paper finds Bootstrap analysis (which is a re-sampling approach generating more samples from the small sample) appropriate as it does not consider the assumption of normality and provide more accurate results with very small samples (Su et al., 2013). Therefore, based on this concern, this paper adds Bootstrap analysis to compare the means of the two groups alongside the Mann-Whitney U and t-test.

$$t = \frac{(X_1 - X_2)}{\sqrt{\frac{(s_1)^2}{N_1} + \frac{(s_2)^2}{N_2}}} \quad (1)$$

Where: X_1 and X_2 are the means of sample 1 and 2

S_1 and S_2 are the standard deviations of sample 1 and 2

N_1 and N_2 are the sample size of sample 1 and 2

$$U_1 = N_1 N_2 + \frac{N_1(N_1+1)}{2} - \sum R_1 \quad (2)$$

$$U_2 = N_1 N_2 + \frac{N_2(N_2+1)}{2} - \sum R_2$$

Where: N_1 and N_2 are the sample size for sample 1 and 2

R_1 and R_2 are the sum of the ranks in sample 1 and 2

Table 3. Reliability test

| governance mechanism | Reliability Statistics | |
|----------------------|------------------------|------------|
| | Cronbach's Alpha | N of Items |
| Hands-off | 0.837 | 5 |
| Hands-on | 0.937 | 13 |

Regarding the four factors, this paper uses the number of employees as a measure of the firm size (Yasuda, 2005). Based on the ABS definition (Clark et al., 2012), this paper defines ‘small and medium suppliers’ (SME) and ‘large suppliers’ when they have less and more than 200 employees respectively. In addition, this paper categorises suppliers into ‘young suppliers’ and ‘mature suppliers’ when they have been established less and more than 20 years respectively, as suggested by Mazzarol, Reboud, and Volery (2010). Regarding the length of the

relationship, this paper considers a supplier as a ‘new supplier’ when the duration of the focal firm-supplier relationship is less than five years. Otherwise, the supplier is considered to be an ‘old supplier’. Finally, the suppliers’ headquarter is considered as a location of the supplier, which this paper categorises into two locations; Australia and foreign countries.

5.2 *Hands-off governance mechanism*

Table 4 indicates the results of three tests for the hands-off governance mechanism based on size, length of the relationship, age, and location. All tests reveal that out of the four factors, there is a significant difference (p -value of 0.074, 0.067, and 0.058 for the t-test, Mann-Whitney U test, and Bootstrap analysis respectively) between the hands-off governance mechanism where both focal firms apply to manage sustainability issues in the suppliers with headquarters located in Australia and foreign countries, which supports H4-a. Based on 90% level of confidence, the results indicate the significance value is less than 0.1 which means that location can be considered as an important factor when focal firms use the hands-off governance mechanism. The focal firms show more tendency towards the hands-off governance mechanism (mean of 4.128 and 3.381 for the suppliers headquartered in Australia and foreign countries respectively) when their suppliers’ headquarters are outside of Australia. This tendency may come from the difficulty for focal firms to exchange information with the suppliers regarding sustainability practices. The term ‘liability of foreignness’ has been used in international business studies which signify the difficulties and the cost of selecting and monitoring foreign suppliers (King et al., 2005). For example, as the distance increases, focal firms face problems in gathering data which reduces the frequency of interaction and increases the transfer costs of information. This is also supported by previous works that lack of customers’ awareness of sustainability issues due to large distance with their suppliers can discourage customers to enforce changes in their suppliers (Beltagui et al., 2020, Gold et al.,

2017). For example, the Chinese labour working conditions improved once the media released the suicides rates to Western consumers (Chan and Pun, 2010). Therefore, the focal firms may resort to the low-cost efforts to follow sustainability practices in their foreign suppliers, for example, meeting the minimum requirement of sustainability issues without interfering directly. This paper did not find significant differences among the three remaining factors based on the three tests.

To explore more in the application of the hands-off governance mechanism, this paper examined the mean comparison between the two focal firms in implementing the hands-off governance mechanism regarding every four factors separately. However, results showed that there are no significant differences (except with suppliers' age which one out of three tests shows the significant difference) in the hands-off governance mechanism used by Coles and Woolworths in each factor (Table 5). This means Coles and Woolworths are acting similarly with respect to the four factors resulting in similar means. This result can also prove the significant effect of the location in applying the hands-off governance mechanism since the means for Coles and Woolworths for suppliers headquartered in Australia and foreign countries are similar (3.480 in Coles and 3.263 Woolworths for suppliers headquartered in Australia, and 4.187 and 4.033 in Coles and Woolworths respectively for suppliers' headquartered foreign countries).

5.3 *Hands-on governance mechanism*

Regarding the implementation of the hands-on governance mechanism, all three tests confirm that there is a significant difference (p -value of 0.036, 0.048, and 0.027 for t-test, Mann-Whitney U test, and Bootstrap analysis respectively) between the mean of the hands-on governance mechanism applying to young suppliers and mature suppliers, supporting H2-b

(Table 6). The results indicate the significance value is less than 0.05 meaning that suppliers' age (based on 95% level of confidence) is considered as being significantly important in selecting a hands-on governance mechanism. This means that the focal firms are more inclined to use the hands-on governance mechanism when their suppliers are young in comparison to the mature suppliers (mean of 4.03 and 3.35 for the young and mature suppliers respectively). This may relate to the criticality of young supplier's relationships with their key customers for survival and growth. For example, having a relationship with the key customers can be considered as social capital (social interaction, relationship quality, and network ties), which help young suppliers to acquire knowledge and they exploit this knowledge to achieve a competitive advantage through various practices such as new product development (Yli et al., 2001). This result is also aligned with the work of Delmas and Montiel (2009) which found that young suppliers show high levels of performance to adopt environmental certificates than mature suppliers to address their customer's concerns. From the collaboration perspective, Huang and Chiu (2018) support this argument by finding supplier age can negatively affect the suppliers' intentions towards collaborative activities indicating younger suppliers are more likely to be involved with their customers to develop their competitive advantage. Therefore, the young suppliers are more interested in participating in the development of common goals and expectations in which they can receive resources (such as education to their personnel) to improve their knowledge in managing sustainability issues. In addition, since the young suppliers are more likely to invest in innovation and research and development (R&D) projects (Shrivastava and Tamvada, 2017), the possibility of close cooperation in many joint activities between focal firms and them increases. This is also supported by Hockerts and Wustenhagen (2010) who argue that there is a high probability that young firms are involved in environmental sustainability practices. Regarding the other three factors (size, length of the relationship, and

location), this paper did not find significant differences in the application of the hands-on governance mechanism.

The results in Table 7 also show the mean differences in the application of the hands-on governance mechanism by Coles and Woolworths in each of the four factors. Findings indicate that there is no significant difference between the two retailers in implementing the hands-on governance mechanism regarding each factor. Like the hands-off governance mechanism, Coles and Woolworths behave similarly in treating their suppliers regarding managing sustainability issues through the hands-on governance mechanism in their SN. These results confirm the significant mean difference in the application of the hands-on governance mechanism applied by focal firms to young and mature suppliers (3.81 in Coles and 4.28 Woolworths for young suppliers, and 3.24 and 3.47 in Coles and Woolworths respectively for mature suppliers).

Table 4. Results of three tests for the hands-off governance mechanism

| Factors | Type of firm | Descriptive analysis | | | T-test | | | | | Mann-Whitney test | Bootstrap for independent samples test (bootstrap results are based on 1000 bootstrap samples) | | | |
|------------------------|--------------|----------------------|-------|-------|--------------------------|-----------------|-----------------------|---|-------|--------------------------|--|--------------------------|-----------------|-------------------------|
| | | | | | Sig. (2-tailed) | Mean difference | Std. error difference | 95% confidence interval of the difference | | | Asymp. sig. (2-tailed) | Std. error | Sig. (2-tailed) | 95% confidence interval |
| | | N | Mean | SD | | | | Lower | Upper | Lower | | | | Upper |
| Number of employees | SME | 45 | 3.683 | 1.247 | 0.179 | 0.410 | 0.302 | -0.192 | 1.012 | 0.151 | 0.303 | 0.175 | -0.194 | 1.002 |
| | Large | 36 | 3.273 | 1.427 | | | | | | | | | | |
| Length of relationship | New | 16 | 3.198 | 1.677 | 0.315 | -0.378 | 0.373 | -1.120 | 0.365 | 0.325 | 0.439 | 0.393 | -1.240 | 0.477 |
| | Old | 65 | 3.576 | 1.244 | | | | | | | | | | |
| Firms' age | Young | 22 | 3.413 | 1.399 | 0.727 | -0.121 | 0.345 | -0.820 | 0.578 | 0.857 | 0.349 | 0.724 | -0.806 | 0.598 |
| | Mature | 59 | 3.534 | 1.324 | | | | | | | | | | |
| Location | Australia | 68 | 3.381 | 1.321 | 0.074⁺ | -0.747 | 0.393 | -1.575 | 0.081 | 0.067⁺ | 0.399 | 0.058⁺ | -1.512 | 0.023 |
| | Foreign | 13 | 4.128 | 1.294 | | | | | | | | | | |

⁺ $P < 0.1$; * $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$

Table 5. Results of three tests for the hands-off governance mechanism for each focal firm

| Factors | Type of firm | Focal firms | Descriptive analysis | | | T-test | | | | | Mann-Whitney test | Bootstrap for independent samples test (bootstrap results are based on 1000 bootstrap samples) | | | |
|------------------------|--------------|-------------|----------------------|-------|-------|-----------------|-----------------|-----------------------|---|-------|------------------------|--|-----------------|-------------------------|-------|
| | | | | | | Sig. (2-tailed) | Mean difference | Std. error difference | 95% confidence interval of the difference | | Asymp. sig. (2-tailed) | Std. error | Sig. (2-tailed) | 95% confidence interval | |
| | | | N | Mean | SD | | | | Lower | Upper | | | | Lower | Upper |
| Number of employees | SME | C | 24 | 3.872 | 1.339 | 0.279 | 0.403 | 0.368 | -0.338 | 1.145 | 0.279 | 0.355 | 0.273 | -0.316 | 1.106 |
| | | W | 21 | 3.468 | 1.127 | | | | | | | | | | |
| | Large | C | 21 | 3.302 | 1.612 | 0.890 | 0.068 | 0.489 | -0.926 | 1.063 | 0.936 | 0.472 | 0.877 | -0.827 | 1.019 |
| | | W | 15 | 3.233 | 1.173 | | | | | | | | | | |
| Length of relationship | New | C | 11 | 3.182 | 1.907 | 0.949 | -0.052 | 0.788 | -1.768 | 1.665 | 0.913 | 0.762 | 0.942 | -1.394 | 1.504 |
| | | W | 5 | 3.233 | 1.205 | | | | | | | | | | |
| | Old | C | 34 | 3.743 | 1.324 | 0.257 | 0.350 | 0.306 | -0.262 | 0.962 | 0.308 | 0.306 | 0.254 | -0.248 | 0.965 |
| | | W | 31 | 3.392 | 1.143 | | | | | | | | | | |
| Firms' age | Young | C | 14 | 3.167 | 1.546 | 0.237 | -0.677 | 0.555 | -1.838 | 0.484 | 0.290 | 0.534 | 0.228 | -1.668 | 0.318 |
| | | W | 8 | 3.844 | 1.049 | | | | | | | | | | |
| | Mature | C | 31 | 3.804 | 1.436 | 0.100 | 0.569 | 0.340 | -0.112 | 1.250 | 0.139 | 0.332 | 0.095* | -0.136 | 1.286 |
| | | W | 28 | 3.235 | 1.141 | | | | | | | | | | |
| Location | Australia | C | 37 | 3.480 | 1.489 | 0.505 | 0.216 | 0.323 | -0.429 | 0.861 | 0.648 | 0.317 | 0.494 | -0.390 | 0.882 |
| | | W | 31 | 3.263 | 1.100 | | | | | | | | | | |
| | Foreign | C | 8 | 4.187 | 1.399 | 0.841 | 0.154 | 0.748 | -1.529 | 1.837 | 0.608 | 0.710 | 0.858 | -1.343 | 1.485 |
| | | W | 5 | 4.033 | 1.256 | | | | | | | | | | |

+ $P < 0.1$; * $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$

Table 6. Results of three tests for the hands-on governance mechanism

| Factors | Type of firm | Descriptive analysis | | | T-test | | | | | Mann-Whitney test | Bootstrap for independent samples test (bootstrap results are based on 1000 bootstrap samples) | | | |
|------------------------|--------------|----------------------|-------|-------|-----------------|-----------------|-----------------------|---|-------|-------------------|---|---------------|-----------------|-------------------------|
| | | | | | Sig. (2-tailed) | Mean difference | Std. error difference | 95% confidence interval of the difference | | | Asymp. Sig. (2-tailed) | Std. error | Sig. (2-tailed) | 95% Confidence interval |
| | | N | Mean | SD | | | | Lower | Upper | Lower | | | | Upper |
| Number of employees | SME | 39 | 3.394 | 1.395 | 0.318 | -0.290 | 0.289 | -0.865 | 0.285 | 0.338 | 0.293 | 0.328 | -0.920 | 0.294 |
| | Large | 38 | 3.684 | 1.118 | | | | | | | | | | |
| Length of relationship | New | 15 | 3.892 | 1.239 | 0.231 | 0.441 | 0.358 | -0.302 | 1.184 | 0.260 | 0.345 | 0.206 | -0.190 | 1.088 |
| | Old | 62 | 3.451 | 1.268 | | | | | | | | | | |
| Firms' age | Young | 21 | 4.031 | 1.209 | 0.036* | 0.679 | 0.312 | 0.046 | 1.311 | 0.048* | 0.294 | 0.027* | 0.110 | 1.286 |
| | Mature | 56 | 3.352 | 1.247 | | | | | | | | | | |
| Location | Australia | 65 | 3.492 | 1.261 | 0.497 | -0.287 | 0.413 | -1.168 | 0.593 | 0.252 | 0.417 | 0.496 | -1.009 | 0.519 |
| | Foreign | 12 | 3.780 | 1.323 | | | | | | | | | | |

+ $P < 0.1$; * $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$

Table 7. Results of three tests for the hands-on governance mechanism for each focal firm

| Factors | Type of firm | Focal firms | Descriptive analysis | | | T-test | | | | | Mann-Whitney test | Bootstrap for independent samples test (bootstrap results are based on 1000 bootstrap samples) | | | |
|------------------------|--------------|-------------|----------------------|-------|-------|-----------------|-----------------|-----------------------|---|-------|------------------------|--|-----------------|-------------------------|-------|
| | | | | | | Sig. (2-tailed) | Mean difference | Std. error difference | 95% confidence interval of the difference | | Asymp. sig. (2-tailed) | Std. error | Sig. (2-tailed) | 95% confidence interval | |
| | | | N | Mean | SD | | | | Lower | Upper | | | | Lower | Upper |
| Number of employees | SME | C | 19 | 3.085 | 1.409 | 0.963 | -0.017 | 0.365 | -0.758 | 0.724 | 0.814 | 0.354 | 0.958 | -0.642 | 0.623 |
| | | W | 20 | 3.688 | 1.352 | | | | | | | | | | |
| | Large | C | 21 | 3.676 | 1.187 | 0.181 | -0.604 | 0.443 | -1.500 | 0.293 | 0.191 | 0.440 | 0.192 | -1.421 | 0.245 |
| | | W | 17 | 3.693 | 1.062 | | | | | | | | | | |
| Length of relationship | New | C | 9 | 3.960 | 1.282 | 0.805 | 0.171 | 0.676 | -1.319 | 1.660 | 0.814 | 0.650 | 0.797 | -1.015 | 1.311 |
| | | W | 6 | 3.790 | 1.282 | | | | | | | | | | |
| | Old | C | 31 | 3.231 | 1.298 | 0.174 | -0.440 | 0.320 | -1.080 | 0.199 | 0.198 | 0.307 | 0.165 | -1.041 | 0.148 |
| | | W | 31 | 3.671 | 1.218 | | | | | | | | | | |
| Firms' age | Young | C | 11 | 3.805 | 1.246 | 0.383 | -0.473 | 0.530 | -1.582 | 0.635 | 0.398 | 0.517 | 0.395 | -1.341 | 0.491 |
| | | W | 10 | 4.279 | 1.180 | | | | | | | | | | |
| | Mature | C | 29 | 3.240 | 1.327 | 0.488 | -0.233 | 0.334 | -0.902 | 0.436 | 0.496 | 0.315 | 0.484 | -0.865 | 0.460 |
| | | W | 27 | 3.473 | 1.169 | | | | | | | | | | |
| Location | Australia | C | 34 | 3.345 | 1.317 | 0.324 | -0.310 | 0.312 | -0.933 | 0.313 | 0.315 | 0.319 | 0.345 | -0.936 | 0.338 |
| | | W | 31 | 3.654 | 1.196 | | | | | | | | | | |
| | Foreign | C | 6 | 3.683 | 1.381 | 0.813 | -0.194 | 0.799 | -1.974 | 1.585 | 0.630 | 0.769 | 0.811 | -1.746 | 1.339 |
| | | W | 6 | 3.877 | 1.386 | | | | | | | | | | |

+ $P < 0.1$; * $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$

6 Conclusion

This paper examined various sustainability practices of which focal firms manage in their suppliers towards the sustainability of their SN. By considering retailers as focal firms and dividing the sustainability practices into the governance mechanisms, this paper addresses the first research question identifying two broad categories. The first category is the hands-off governance mechanism in which focal firms are not interested in following sustainability issues with their suppliers and usually manage the sustainability practices indirectly. The second category is the hands-on governance mechanism in which focal firms have more intention towards addressing sustainability issues with their suppliers and are interested in being directly involved in managing sustainability practices. However, there are various factors that can affect the choice of focal firms in using the two governance mechanisms (Tachizawa and Wong, 2014). To answer the second research question, this paper analyses the effect of four factors (size, length of the relationship, age, and location) on the governance mechanisms. Results show that only the location and supplier's age can make a significant mean difference in the application of the hands-off governance mechanism and the hands-on governance mechanism respectively. This means that focal firms tend to have a hands-off governance mechanism with the suppliers located in large distances, thus supporting H4-a. This result is also supported by previous studies (Beltagui et al., 2020; Busse et al., 2016; Ghadge et al., 2019) that reveal how the distance between suppliers and buyers in supply chains can affect the buyers' motivation to adopt sustainability issues within their suppliers. Moreover, focal firms show more tendency towards using a hands-on governance mechanism with their young suppliers, supporting H2-b. There are several papers (e.g. Huang et al., 2018; Leoncini et al., 2019; Li et al., 2019; Mao

et al., 2020) that highlight the impact of a supplier's age in pursuing sustainability objectives, thereby supporting this argument that suppliers' age matters to sustainability governance mechanism. However, the previous research mainly examines the roles of firm age with various objectives that may result in for example, there being no impact of firm age on environmental, economic, social, and operational performance (Younis and Sundarakani, 2019, Wang et al., 2018), a positive impact of firm age on their green innovative performance (Wu and Li, 2020), or having no impact of firm age on the relationship between implementation of green supply chain management practices and corporate performance.

The analysis of focal firms in this study does not suggest significant differences in using governance mechanisms with their suppliers in terms of size and length of the relationship. However, previous works verified the moderating role of firm size on different subjects such as the firms' environmental and social performance (Wang et al., 2018), the relationships of collaborative activities with environmental performance (Lee, 2019), and environmental performance, economic performance and social performance (Younis and Sundarakani, 2019). Similar to the firm size, other attempts have been made to analyse the role of the relationship's length between buyer and suppliers on different subjects including, the positive impact of the relationship's length on the relationship between supply chain collaboration and firm performance (Um and Kim, 2019), and there being no impact of the length of the relationship on supplier operational performance (Birasnav et al., 2019).

6.1 *Theoretical and managerial contribution*

This paper contributes to the SCM literature by analysing the supplier base from the network perspective, which has been previously neglected (Miemczyk et al., 2012, Roscoe et al., 2016). There is increasing awareness of the benefits of the network perspective within the supply chain

community (Bellamy and Basole, 2013). Through analysing the SN, this paper provides researchers with useful insights into the governance mechanisms chosen by focal firms to improve the sustainability of their SN, which have been neglected in the SSCM literature (Meinlschmidt et al., 2018). This paper also contributes to the SSCM literature by analysing and categorising various sustainability practices, which focal firms apply to manage sustainability issues in their suppliers. Extending appropriate types of sustainability practices into the SN based on the contextual factors has been a great challenge for researchers (Meinlschmidt et al., 2018, Wilhelm et al., 2016, Tachizawa and Wong, 2014). Moreover, most of the research conducted on this topic is from the buyer's view with a paucity of interest in having input from the supplier's perspective (Villena and Gioia, 2018).

In this paper, various types of sustainability practices and four contextual factors have been examined and validated by an empirical study using primary data from the suppliers' side. The Australian food retail industry is highly concentrated and these two large retailers account for the majority of the market share. They have a complex SCN and have initiated sustainability practices in their SCN. Despite the limited number of received questionnaires, the targeted respondents had a high status in their organisations who provided valuable insights into the research questions. These characteristics provide a good empirical environment that was useful in testing the conceptual framework empirically. Specifically, this paper contributes to the SSCM literature by facilitating a better understanding of supplier's distance with focal firms and suppliers' age and their roles in focal firms' intention towards choosing a specific governance mechanism to manage sustainability issues with the SN. Moreover, by answering research questions this paper considers suppliers' characteristics in two different SN and investigates their effects on governance mechanisms that focal firms apply in their SN that may present a new perspective in investigating a complex SCN advancing the supply chain network theory (Hearnshaw and Wilson 2013). In addition, this paper provides a unique procedure to

identify sample size in studies designed to be empirically implemented in the SN context. Considering that networks are borderless, researchers have challenges to “read the network” and distinguish between actors in the network context (the actors that are related to the focal firm), the network horizon (the actors that the focal firm is aware of them which may be related or not related to the focal firm), and the network environment (the actors that the focal firm is not aware of them) (Holmen and Pedersen, 2003, 409). By using this procedure, researchers can increase the chance of identifying the related actors in the network context.

Findings from this paper can also assist managers to position sustainability practices into governance mechanisms to improve the sustainability of their SN. Since managing sustainability practices in the suppliers can be costly, finding the right practices for the right suppliers is quite challenging. In this regard, this paper provides factors, which can be useful for managers in their decision-making process regarding managing sustainability issues in their SN. For example, young suppliers are more interested in participating in joint activities towards achieving sustainability practices. Thus, the focal firm can make informed decisions of when to apply sustainability practices to different suppliers.

6.2 *Limitation and future research*

Despite the important contributions of this paper, there are some limitations that need further investigations. Firstly, this paper investigates the SN for two focal firms (retailers) in the Australian food and grocery industry. Future research could investigate more focal firms in different industries and different countries to analyse and improve the applicability of the results. Secondly, due to the small sample size of this paper, the generalisability of the results may be limited. Increasing the sample size in future studies may be helpful in advancing the knowledge of managing sustainability issues within the SN. Thirdly, despite the supplier’s age

and location, this paper could not find other factors that may affect the types of governance mechanisms that focal firms apply to their SN. The reason may relate to the limited number of firms in this study that may affect the significance of the results, and therefore, increase the number of responses in future research can validate the findings. Moreover, investigating factors related to the network context such as the network structure could also be a suitable area for future research.

7 Disclosure statement

No potential conflict of interest was reported by the authors

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